STANDARDIZED POSTPARTUM DEPRESSION SCREENING OF NICU MOTHERS

by

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Dedication

I dedicate this project to all mothers who have felt alone and confused by their experience of postpartum depression and, for whatever reasons, did not receive the support they required. You are not alone, and you deserve happiness.

Abstract

The purpose of this QI project was to determine the feasibility of instituting a standardized postpartum depression screening guideline in the NICU. A draft guideline was developed that instructed medical providers to screen all NICU mothers who read English or Spanish. Screenings were to be performed at two weeks, one month, four months, six months postpartum and at discharge. The Edinburgh Postnatal Depression Scale (EPDS) was used for screening. Documentation in the neonate's progress notes included negative (score less than 12) or positive (>/= 12) screening results and whether referral for services was rendered. Demographic information and compliance rates were gathered from chart audits. During implementation, 178 neonates were present, and the average weekly census was 61.8 neonates. There were 168 appropriate screenings, and 43 screenings were completed for a compliance rate of 25.6%. Of the completed screenings, eight required referrals and eight referrals were documented (100%). Identified barriers included difficulties with providers being able to connect with mothers at the bedside, discomfort with ability to manage care for a mother who screened positive, and ease of tracking. This QI project demonstrated successfully the feasibility of implementing a guideline to standardize PPD screening in the NICU. However, to address implementation barriers, it is recommended that the guideline specify who is responsible for oversight and administering screenings, increase provider education about community resources for mothers, and modify electronic health records to improve documentation.

Key words: Quality Improvement; Postpartum Depression; Neonatal Intensive Care Unit; Depression Screening

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Chapter One: Overview of the Problem of Interest

Society presents childbirth as a happy time. However, for many women, pregnancy is more stressful than their initial expectations. During and after pregnancy, women experience mood changes that range in severity and duration. Mood changes can worsen when a baby (neonate) is admitted to a neonatal intensive care unit (NICU). The purpose of this project was to assess the feasibility of standardized routine postpartum depression screenings of mothers with babies in the NICU. This would identify and refer mothers who were experiencing mood disorder postpartum depression while their neonates were hospitalized in the NICU.

Background Information

Women experience emotional variability after childbirth. Perinatal mood anxiety disorders (PMADs) and maternal postpartum mood disorders (PPMDs) are terms used to describe the emotional responses women experience during and after pregnancy. Several psychological disorders are associated with those terms, such as ‘postpartum blues,’ anxiety, and post-traumatic stress disorder (ACOG, 2015). This project focused exclusively on postpartum depression.

Postpartum depression (PPD) is recognized as a subset of major depressive disorders in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (American Psychiatric Association, 2013). To meet the criteria of PPD, symptoms must occur within the first month postpartum. Tahirkheli, Cherry, Tackett, McCaffree, & Gillaspy (2014) argued that symptoms are more likely to occur within the first three months. Based on other diagnostic standards, Meyers et al. (2013) wrote that symptoms may begin during the first postpartum year. Additional research suggested that symptoms peak between two and six months postpartum (Gavin, Gaynes, Lohr, Meltzer-Brody, Gartlehner, & Swinson, 2005).

PPD is characterized by insomnia, anhedonia, anxiety, inability to control thoughts, suicidal ideation, lack of attachment to the neonate, guilt, appetite changes, emotional lability, and decreased concentration (Gönülal, Yalaz, Altun-Köroğlu, & Kültürsay, 2014; Walsh & Karakashian, 2018). PPD risk factors include a history of depression or abuse, a prior pregnancy loss, inadequate social support, low socioeconomic status, and multiple stressors during or after pregnancy (Walsh & Karakashian, 2018).

Significance of Clinical Problem

The prevalence of PPD varies depending on (1) timing of screening and (2) screening instrument; prevalence is between 15% and 21.9 % in the general population (Friedman & Resnick, 2009; Gavin et al., 2005). Unfortunately, it appears that less than 50% of cases are diagnosed in clinical practice (Gjerdingen & Yawn, 2007). It is estimated that nearly 80% of mother's experiencing PPD do not receive treatment for their symptoms because of barriers such as stigma, lack of awareness, or issues with access to care (Flynn, Davis, Marcus, Cunningham, & Blow, 2004).

The timing of screening affects prevalence rate because PPD develops at various times. Elisei, Lucarini, Murgia, Ferranti, & Attademo, (2013) found that 11% of women screened developed PPD symptoms within 72 hours of delivery. Results of a longitudinal study indicated that 41.9% of women had a positive screen for PPD at four to eight weeks postpartum, dropping to 27.4% by 14-18 weeks postpartum (Horowitz & Goodman, 2004). Farr, Denk, Dahms, & Dietz (2014) found that 7% of women who screened negative for PPD in the hospital after delivery, screened positive at two to eight months postpartum.

Mothers with babies in the NICU have an increased risk of developing PPD compared with women with healthy babies. Gavin et al. (2005) noted that 19% of women with healthy

babies developed PPD in the first three months postpartum. Other study findings indicate between 25.5% to 39% of NICU mothers developed PPD in the first month postpartum (Lefkowitz, Baxt, & Evans, 2010; Segre, McCabe, Chuffo Siewert, & O'Hara, 2014). NICU mothers reported a higher rate of suicidal ideation (33%) compared with postnatal women in the general population (14%) (Lefkowitz et al. 2010; Lindahl, Pearson, & Colpe, 2005).

Identifying mothers with PPD and referring them to treatment is important for overall maternal health. Miles, Holditch-Davis, Schwartz, & Scher, (2007) wrote that 21% of NICU mothers who did not receive treatment for PPD reported significant symptoms at one year postpartum. Mounts (2009) found that 46% of mothers who experienced PPD symptoms continued to have symptoms at one year postpartum. Kingsbury et al. (2015) observed that 21% of mothers who participated in their study reported depressive symptoms up to 21 years postpartum. Lupton & Fenwick (2001) found that many mothers viewed NICU staff as 'gatekeepers' who limited mothers' interactions with their babies. Mothers felt that they needed to fit the nurse's view of a "good mother," thus, mothers were not comfortable voicing objections or concerns (Lupton & Fenwick, 2001). That is, mothers were hesitant to discuss their own symptoms of PPD because they were afraid the medical team would label them "difficult" or a "bad mother" (Lupton & Fenwick, 2001). Additionally, PPD may emerge as hostility, irritability, aggression or anger among NICU mothers, which would result in a "difficult" parent label (Mount, 2009). Guillaume et al. (2013) further substantiated that mothers felt subjugated to the nurse's decisions and power because parents had to rely on nurses for care of their new children. The nurses managed whether parents could have contact with their babies, and nurses determined the quality of the experience. Mothers also reported feeling judged by some of the

staff. This feeling of staff appraisal affected parents' ability to spontaneously interact with their babies (Guillaume et al., 2013).

Outside of the NICU, PPD also impacts how the new mother handles difficult situations. Zerden et al. (2017) found that PPD was associated with poorer health choices (e.g., smoking) and coping mechanisms by mothers. Mothers with PPD also had an increased risk of becoming homeless in the two to three years postpartum (Curtis, Corman, Noonan, & Reichman, 2014).

In addition to affecting a mother's health, PPD influences her baby's environment, and PPD may have a prolonged effect on a baby's long term physical and mental health. Bozkurt et al. (2017) found that, overall, PPD was negatively associated with preterm neurodevelopment. More specifically, PPD lasting one year postpartum had a negative effect on cognitive and motor development (Bozkurt et al., 2017). While a neonate is in an NICU, a depressed mother is unable to buffer stress for the neonate. This increased exposure to stress apparently decreases brain size and functional connectivity of the temporal lobes (Smith et al., 2011). Mothers may be withdrawn and roughly handle or express hostility towards their neonates (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). A PPD mother's behavior and the baby's experience with her leads to babies being "fussy" or showing discontented facial expressions (Mounts, 2009). Babies of mothers with PPD are less likely to be exclusively breastfeed at three months, and a mother is less responsive to the baby's feeding cues (Brown, & Pridham, 2007; Wouk, Stuebe, & Meltzer-Brody, 2017).

A study performed by the Center on the Developing Child at Harvard University (2009) found that children raised by depressed mothers were less developed on cognitive, emotional, and behavioral levels. Low development in these domains place children at risk for social and behavioral problems (Center on the Developing Child at Harvard University, 2009). Reasons for

these outcomes include the facts that depressed mothers spend less time playing with their children, they exhibit poor attachment to their children, engage in less verbal interaction, and make less consistent use of safety practices (Field, 2010). Children of depressed mothers receive care services at emergency departments more often than children of non-depressed mothers and fail to receive preventative care such as immunizations (Mounts, 2009). Wojcicki et al. (2011) found that Latino babies born to mothers with chronic prenatal or postnatal depression experienced reduced weight gain during the first two years of life. Drewett et al. (2004), in a UK study, found that preterm babies were at increased risk for having mothers with PPD and for failure to thrive; however, PPD was not found to be causative of failure to thrive in both preterm and term babies. Depressed mothers were also more likely to punish their children with harsh methods, i.e., striking with a hairbrush or a metal coat hanger (McLearn, Minkovitz, Strobino, Marks, & Hou, 2006).

Although PPD impacts the mother and family, it also affects community financial health. For example, Wilkinson, Anderson and Wheeler (2017) observed that PPD screening with the EPDS had a positive effect on cost per remission achieved and cost per quality-adjusted life-year (QALY) gained. Their study indicated that screening and intervention helped 29 more women achieve remission than women who received usual care (Wilkinson et al., 2017). Although the initial costs of compensating providers for PPD screening and interventions are higher than for usual care, long-term remission compensates for the expense. Cost per remission achieved was $10,182 and the cost per QALY gained was $13,857. The generally accepted threshold for a cost-effective intervention is $50,000 per QALY gained (Wilkinson et al., 2017). Thus, intervention was cost-effective because the cost was less than the accepted threshold.

Question Guiding Inquiry (PICO)

Population.

This QI project assessed all mothers who had babies admitted to the NICU at a central North Carolina hospital during the summer of 2019. The hospital sees about 800 mothers per year from across the state. Average LOS for neonates in this NICU is 25 days before discharge home or transfer to another unit (W. Price, personal communication, September 11, 2018).

Intervention.

A clinical guideline was developed to ensure that every mother was assessed for PPD while her baby was hospitalized. Mothers were screened using a standardized, self-administered tool, the Edinburgh Postnatal Depression Scale (EPDS). Screening was performed at routine times throughout the baby's hospitalization. The length of hospitalization determined the number of times a mother was screened. Screening was performed at two weeks, one month, four months, six months postpartum, and at discharge. Screening timing and results were recorded by the provider in the health promotion section of the neonate's progress notes. The provider, either a nurse practitioner or resident, determined whether a referral was warranted based on the screening results. If a referral was deemed necessary, the provider completed the referral and documented that fact in the health promotion section of the neonate's progress note. Neonatal discharge documentation included maternal PPD screening score(s) and whether a referral for treatment was initiated.

Comparison.

The rates of positive screens were expected to reflect rates observed from prior research. The comparison in this project was the current, unstandardized practice. Screening was performed if a mother presented her concerns to a provider or if the medical team observed

behavior disruptive to neonatal care. The administration of the screening tool was not formally documented.

Outcome.

The measured outcome was practitioner compliance with the new guidelines. Discharge summaries and progress notes were audited throughout the intervention phase to assess whether screening was being conducted and documented properly. The aim of the project was to initiate standardization for screening and documentation of PPD in the NICU. Because there was no existing standard practice, there were no prior metrics for comparison. Long term screening and documentation rates can be gathered once the project is integrated. These rates will be used to monitor progress in compliance.

Summary

Childbirth changes a family's dynamic and a mother's hormones. These changes can result in maternal depression that ranges in severity and timing of onset. When a neonate is hospitalized in an NICU, depression risk increases. Timely screening, diagnosis, and treatment referral are vital to prevent negative maternal and neonatal health outcomes. A standardized screening guideline in the NICU was expected to increase identification and early treatment referral for mothers with PPD. Further investigation of the evidence-based research on PPD among mothers of hospitalized neonates was necessary to locate current practice standards and whether evidence supports this hypothesis.

Chapter Two: Review of the Literature

This chapter describes literature on PPD, PPD screening tools, and PPD screening in the NICU. The chapter begins with a broad summary of the literature followed by four focus sections: (1) evaluation of screening and screening tools, (2) universal PPD screening, (3) PPD in the NICU, and (4) screening for PPD in the NICU.

Methodology

The Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, and PsychINFO databases were searched initially with the general terms "postpartum depression" and "Neonatal Intensive Care Unit." These searches returned 53, 108, and 49 articles, respectively. From these general searches, other terms and filters were used to refine the results to 87 applicable articles. The Search Strategy Log (Appendix A) presents the specific search terms, filters, and results.

Sampling strategies.

The terms "postpartum depression" and "Neonatal Intensive Care Unit" were amended to ensure that all possible tags were included. MESH terms used were "Postpartum depression", "Depression, Postpartum", "postpartum psychosis", "postnatal depression", "post-partum depression", and "post-natal depression." The term "Neonatal Intensive Care Unit" was expanded to MESH terms "Intensive Care Units, Neonatal", "NICU", "Neonatal Intensive Care Units", and "NICUs." As the search progressed, other terms were added. The term "depression screening" and the following alterations were used: "assessment and screening" and MESH terms "mental health screening", "Beck Depression Inventory, Revised Edition", "Center for Epidemiological Studies Depression Scale", "Edinburgh Postnatal Depression Scale", "Self-Rating Depression Scale", and "Patient Health Questionnaire".

The selected terms were used to search the Cumulative Index to Nursing and Allied Health Literature (CINAHL), CINAHL Evidence Based, PubMed, PsychINFO, Proquest, EBM Reviews - Cochrane Database of Systematic Reviews, Turning Research into Practice (TRIP), and Google Scholar.

Within the different databases, specific filters were adjusted to limit results to publication date within the last five years or published after 2013. Studies were also limited to the human species. The net result was 87 articles for closer evaluation based on inclusion of key terms in title or abstract.

Evaluation criteria.

After filtering, each article was evaluated for relevance to this project. First, article titles were considered as the initial criterion of related articles. If the article title was related to the topic of the project, it was saved to reference management software, Zotero, for further evaluation. Zotero was used to eliminate duplicate articles . After gathering all possible related articles from the searches, each article abstract was read to further determine whether the article was related to the project topic. Articles were retained if they discussed prevalence of PPD in the NICU, validation of screening tools for PPD, a specific PPD intervention in the NICU, or if they discussed screening for PPD in the NICU. An articles was excluded if the population was not mothers with babies in the NICU, if it focused on both the mother and father or just the fathers, if it focused only on an intervention instead of screening plus intervention, or if the article was not in English. The retained articles are presented in the Evidence Matrix (Appendix B). Of all the articles, only two specifically addressed implementing universal screening for PPD in the NICU.

Literature Review Findings

Evaluation of screening and screening tools.

There are several different screening tools described in the literature, but the review here focuses on the Edinburgh Postnatal Depression Scale (EPDS) because the EPDS is currently in use for PPD screenings at the project site. Furthermore, Gibson, McKenzie-McHarg, Shakespeare, Price & Gray (2009) noted that the EPDS is the most widely used screening tool for PPD.

Boyd, Le & Somberg (2005) took 18 studies from a prior systematic review on EPDS, updated the study list, and performed another meta-analysis. Boyd et al. (2005) found that the EPDS had good to moderate reliability across many different languages and cultures. However, Boyd et al. (2005) found that the specificity and sensitivity of the EPDS depended on the cut off score and whether the screening was for (1) minor and major depression or (2) major depression. Boyd et al. (2005) reasoned that different cut off scores were necessary depending on the cultural group to ensure better specificity and sensitivity. The researchers hypothesized that different cultural groups need different cut off scores for minor and major depression secondary to different cultural expectations about maternal changes during the postpartum period, cultural family structures, and perception of risk for developing depression (Boyd et al., 2005).

Gibson et al. (2009) also performed a systematic review with meta-analysis of 37 studies on the sensitivity and specificity rates of the EPDS. Similarly, to Boyd et al. (2005), Gibson et al. (2009) found that these rates varied based on cut off score used. Specificity ranged from 44-97% when the cut off score was nine, and 49-100% when the cut off score was 12. Sensitivity ranged from 59-100% and 34-100%, respectively (Gibson et al., 2009).

Reichenheim, Moraes, Oliveira & Lobato (2011) examined elements of the EPDS to evaluate whether a sub-scale could be developed from its full-scale version. The researchers studied Brazilian women who were not treated for PPD and who had children under five months of age. Reichenheim et al. (2011) found that the EPDS lacked validity when looking at individual questions as independent concepts, thus, it should be used only in its entirety to screen for PPD. This finding does not preclude the EPDS from being a valid screening tool for PPD; however, it cautions providers not to focus on individual questions in attempts to identify other mental health issues.

Although having validated screening tools is an important part of identifying PPD, the tools are useless if providers do not screen. Sofronas, Feeley, Zelkowitz & Sabbagh's (2011) research on PPD screening practices reflected prior studies on screening for other diseases; they noted the important role of provider knowledge and confidence in screening rates. Sofronas et al. (2011) stated that, to increase PPD screening rates, education about screening must accompany education about available resources. When assessing NICU nurses, Sofronas et al. (2011) found that the nurses viewed screening for PPD as part of their responsibilities. However, the nurses cited lack of confidence in their ability to screen and their knowledge of resources as barriers to screening (Sofronas et al., 2011). To increase comfort and confidence in discussing PPD with mothers, Sofronas et al. (2011) suggested that educational opportunities for all providers, especially nurses, include role playing, and explaining screening procedures and the rationale for the screening. In addition to education, the investigators recommended increasing nurses' access to mental health professionals, so nurses would feel supported with decision making and have more comprehensive knowledge of resources (Sofronas et al., 2011).

Universal PPD Screening.

Screening for postpartum depression is an important part of caring for mothers. Evins, Theofrastous & Galvin (2000) noted that, without a standardized screening tool, healthcare providers of all specialties miss the majority of PPD cases. They found that the detection rate of PPD at postpartum gynecology visits was 6.3% for the clinical evaluation group, for which providers simply used observation and questions to assess for depression, compared with 35.4% for the standardized screening group that received the EPDS (Evins et al., 2000).

Different universal screening approaches have produced different increases in the rate of PPD screening. Loudon, Nentin, & Silverman (2016) implemented a universal screening program at postpartum visits via a clinical decision support tool in the EHR. This universal screening created a hard stop in the chart, making providers enter an EPDS score before closing the chart. Loudon et al. (2016) found that this intervention resulted in a screening incidence of 99.5%. From an analysis of the charts, the authors found that the main reasons for not screening mothers were either patient refusal or language barriers. Venkatesh et al. (2016) also implemented universal screening in antepartum and postpartum gynecology visits with EPDS scores documented in the EHR. They screened 98% of women during the antepartum period and 86% of women during the postpartum period. However, unlike Loudon et al. (2016), Venkatesh et al. (2016) also sought to link mothers who screened positively on the EPDS with mental health services. This linking was accomplished by either an in-person or phone referral to a mental health professional. Seventy-nine percent of women referred were evaluated by mental health professionals (Venkatesh et al., 2016). Venkatesh et al. (2016) noted that the two main reasons for lack of evaluation by a mental health professional were patients declining referral services (30%) and patients changing to a different obstetrical office (12%). Berger et al. (2015)

compared universal PPD screening to risk factor-targeted screening and found that, when implementing a risk factor-targeted screening program, there was the potential of missing 36.4% of women who were not considered high risk but would screen positive for PPD. These studies demonstrated that universal screening for PPD can be implemented successfully with minimal barriers in a medical setting, resulting in improved linkage to mental health care.

PPD in the NICU.

Although the significance of the problem is noted clearly in the literature, there have been few studies that specifically addressed universal screening practices in the NICU. Most of the current literature was focused on the effects of PPD on NICU outcomes or on the development of different interventions for PPD. Varela, Spyropoulou, Kalogerakis, Moraitou, & Zervas (2015) found that maternal depression did not affect NICU related outcomes such as birthweight, APGARs or admission to NICU. Neri Agostini, Salvatori, Biasini, & Monti (2015) found that PPD mothers of extremely low birth weight (ELBW) neonates had impaired interactions with the neonates while in the NICU. Vasa et al. (2014) noted that rates of PPD increased initially as length of stay in the NICU increased, but, after about a month, rates began to decline. Additionally, Cherry, Mignogna, et al. (2016) found that a mother's development of PPD alone was not a cause for increased length of stay for neonates in the NICU.

Segre, Orengo-Aguayo, & Chuffo Siewert (2016) found that 90.2% of the mothers that participated in their study stated that they would be willing to submit to depression screening administered by a nurse, and 67% said they would be willing to see a nurse for counseling. It can be difficult to get a mother into treatment during the time that her baby is in the NICU due to her reduced time and energy to seek treatment (Segre et al., 2016). In recognition of this barrier to treatment, research has focused on offering bedside or in-unit interventions. To continue

reducing the location barrier, investigators have identified nurse-driven education/psychotherapy-based interventions that could be conducted in-unit, such as “Listening Visits” and “Problem-Solving Education” (PSE) (Boston Medical Center, 2018; Davila and Serge, 2018). All these studies point to the fact that PPD has a strong impact on mothers and neonates in the NICU, and standardized, universal PPD screening would benefit families.

When looking beyond the neonatal period, investigators have found that PPD has lasting effects throughout childhood. Diego, Field, Jones, & Hernandez-Reif (2006) reported that, generally, neonates of mothers who scored as depressed on the Center for Epidemiological Studies-Depression scale during pregnancy, regardless of interaction-style, had greater right-frontal EEG activation at the neonatal and 3-6-month assessment. Right-frontal EEG activation is associated with affect regulation and the “expression, regulation and perception of negative/withdrawal emotions” (Diego et al, 2006, p. 221). Babies of mothers who were depressed postpartum and had a withdrawn and intrusive interaction-style showed a distinct pattern compared with other interaction-styles. These babies did not show any right-frontal EEG activation during the neonatal assessment, but they did show activation at the 3-6-month assessment. Diego et al. (2006) concluded that, although the mother’s hormone levels may influence the initial brain activity, it is the interaction with the baby that shapes brain activity in the months after delivery.

Gump et al. (2009) analyzed health information from 176 children who were already enrolled in an ongoing longitudinal study of the effects of environmental toxins. The original study recruited pregnant women for study of their children after birth. Gump et al. (2009) found that, when a mother experienced chronic depressive symptoms during the first 10 years of a child’s life, the child developed increased stroke volume and cardiac output, in addition to

decreased total peripheral resistance response and elevated blood pressures at 9.5 years of age. Gump et al. (2009) also found that these children had decreased cortisol levels and self-reported more depressive symptoms. Thus, identifying mothers who might be experiencing symptoms of PPD and referring them to treatment is vital to the long-term health and development of children.

Many professional organizations support routine screening for PPD, such as the American College of Obstetricians and Gynecologists (2015) and the American Academy of Pediatrics (Earls & Committee on Psychosocial Aspects of Child and Family Health, 2010), as well as the Federal Government. PPD screening was given a grade of B by the U.S. Preventive Services Task Force (USPSTF) as part of their review of depression screening (Siu & USPSTF, 2016). Siu & USPSTF (2016) conducted a literature review and found that, although the amount of data available was smaller compared with general depression, there were six randomly controlled trials that had varying degrees of support post-screening, and that showed a direct benefit from screening. Siu & USPSTF (2016) also found that the available studies showed screening for PPD in postpartum women had a 28% to 59% reduction in risk for depression at follow up compared with usual care. When discussing the potential harm of screening for PPD, the USPSTF report (Siu & USPSTF, 2016) referenced research by Leung et al. (2011) that focused solely on screening for PPD and which did not find any adverse effects of screening. In another systematic review of the literature on routine PPD screening, van der Zee-van den Ber, Boere-Boonekamp, IJzerman, Haasnoot-Smallegange, and Reijneveld (2017) reported that four of the six studies showed increased detection rates of depression or referral rates, along with decreased symptoms of depression at three, six, or 12 months postpartum, after implementation of routine screening. Van der Zee-van den Ber, Boere-Boonekam, IJzerman et al. (2017) hypothesized that the benefits of screening for PPD at well-child visits was linked to the ability

to have repeated screenings, however, they identified only three weak studies that involved repeated screenings. In a prospective, quasi-experimental, comparative study, van der Zee-van den Ber, Boere-Boonekamp, Groothuis-Oudshoorn et al. (2017), for the intervention group, screened 1843 Dutch women for PPD at one, three, and six month well-child visits. The control group consisted of 1246 Dutch women who received usual care during their well-child visits. During usual care visits, depression symptoms may be discussed, but such discussion was not a standard part of the examination and no formal screening tool was used. The designation of screening or care-as-usual was based on the geographic location where the mother received services. The primary outcome assessed in this study was the presence of depression at nine months postpartum. Secondary outcomes consisted of health-related quality of life, maternal anxiety, quality of parenting, and socioemotional development of the child at 12 months postpartum. Screening had a medium effect on the rates of PPD at nine months postpartum and a small effect on secondary maternal outcomes. The investigators did not find any secondary outcomes for the child, but they hypothesized that this absence was due to the short timeframe used to assess socioemotional development (Zee-van den Ber, Boere-Boonekamp, Groothuis-Oudshoorn et al., 2017). Screening offers an effective, low-risk intervention to identify mothers experiencing symptoms of PPD. This identification and treatment can potentially improve long-term health outcomes for both mother and baby.

Screening for PPD in the NICU.

Two projects were identified that specifically investigated screening for PPD in the NICU. These projects found a need to increase screening practices, citing that early intervention reduced length of depression and the negative effects on mother/neonate interaction (Beck, 2002, Zerden et al., 2017). Cherry, Blucker, et al. (2016) implemented a project in a South-Central US

NICU that was similar to the project detailed here. An 18-month implementation consisted of a onetime maternal screening at 14 days postpartum. During the 18-month project, only 48.5% of eligible mothers were screened (Cherry, Blucker, et al., 2016). The authors identified many barriers to implementation, including responsibility for administering the screening, language difficulties, and a lack of referral resources. Scheans, Mischel, Munson, & Bulaevskaya (2016) executed a similar project in a North-Western US NICU. They were able to screen 90% of mothers in the NICU during a two-year period, and they found 18-20% of mothers screened positive for PPD (Scheans et al., 2016).

The two aforesaid projects were dissimilar in most respects except that they both took place in the US and involved screening all mothers in the NICU for PPD. Cherry, Blucker, et al. (2016) used the Postpartum Depression Screening Scale (PDSS), whereas Scheans et al. (2016) used the EPDS. Cherry, Blucker, et al. (2016) performed a one-time screening of all mothers in the NICU at one set point postpartum. Scheans et al. (2016) screened all mothers in the NICU at four different points postpartum: two weeks, one month, two months, and four months. Responsibility for the screening also differed in the two projects. Cherry, Blucker, et al. (2016) first attempted to have the research coordinators contact and screen each mother. This approach was unsuccessful, so they switched to having nurses include the screening in the routine state newborn screen of the neonates. This second approach was also unsuccessful. The intervention devolved to simply leaving information, a screening tool, and a return envelope in the mothers' rooms. Scheans et al. (2016) used lactation consultants as the primary screening coordinators who worked closely with nurses at the bedside to determine when a mother was present. This difference in approaches appears to have affected the major outcome of the two projects, i.e., the percentage of mothers screened.

Other investigators have examined different aspects of universal PPD screening of NICU mothers. Zerden et al. (2017) attempted universal screening for PPD during developmental follow up visits with mothers after discharge from the NICU. The authors found that 11% of the sample had elevated EPDS scores, and 85% recalled discussing mental health screening with their prenatal healthcare provider. The study also assessed the healthcare provider's experience with the screening and referral practices at the clinic. Most providers felt that the screening did not disrupt workflow; however, there were several barriers to referral that centered around the ease of making referrals and access to mental health professionals (Zerden et al., 2017). In another article, Mounts (2009) explored a hypothetical process of developing a universal screening policy in an NICU, but the article did not examine a specific intervention. Hynan, Mounts, & Vanderbilt (2013) conducted a literature review that presented current information related to symptoms, screening, and interventions for PPD and other forms of emotional distress. These articles demonstrated that, although the NICU community acknowledges a need for universal PPD screening in the NICU, there is limited research on the subject.

Limitations of Literature Review Process

One limitation to the literature review is that research has focused mainly on identifying risk factors associated with PPD in the NICU. Few studies have addressed PPD screening and implementation of interventions in the NICU to improve outcomes. Also, no studies were found that tested the validity of the EPDS in the NICU population. In addition, there are few longitudinal studies that have assessed the effect of PPD screening on the health of the child several years after the postpartum period.

The major limitation of current research is the lack of specific content regarding universal screening for PPD in the NICU. The literature review here identified only two papers that

instituted universal screening. The two projects were rated an evidence-level 'VI', meaning that they were single descriptive or qualitative studies. Unfortunately, the investigators did not compare the intervention of PPD screening in the NICU with another intervention. Further research should focus on improving the level of evidence by including RCT and meta-analyses.

Conclusion of Findings

Screening for PPD with a validated tool such as the EPDS has a positive effect on maternal health. Prior studies have shown that universal PPD screening can be implemented successfully in gynecology offices and the NICU.

There is limited literature on the topic of universal PPD screening in the NICU. However, many studies expose the prevalence of PPD in NICU mothers and the effects that PPD have on mothers and neonates. These studies demonstrate the importance of identifying mothers experiencing PPD so that treatment can be initiated, because NICU mothers are at an increased risk for developing PPD compared with mothers of healthy, term newborns (Lefkowitz, Baxt, & Evans, 2010; Lindahl, Pearson, & Colpe, 2005; Segre, McCabe, Chuffo Siewert, & O'Hara, 2014). Screening, specifically with the EPDS, is a valid method of identifying mothers experiencing symptoms of PPD while presenting minimal risks to the mother in the process (Boyd et al., 2005; Evins et al., 2000; Gibson et al., 2009; Sofronas et al., 2011). Consistent with prior research, Segre et al. (2016) showed that mothers felt comfortable with nurses conducting the screenings, thus, the NICU medical team can administer screenings without involvement of mental health professionals prior to diagnosis. Two research groups initiated universal PPD screening in the NICU with mixed experiences. Both groups showed that universal, standardized PPD screening can be developed and implemented. The one project that failed in screening a larger percentage of mothers had barriers related to responsibility for administering the

screening. The other project had more buy-in from the unit and healthcare providers, which ensured that more mothers were screened. Neither study reported any adverse effects to either the mother or neonate in relation to the screening, and more mothers were identified as having symptoms of PPD and referred for treatment. Although both projects had barriers related to implementation, there were clear benefits from the increased referral and treatment. The results support the feasibility of developing and implementing universal, standardized PPD screening, especially if barriers are addressed early in the development phase.

Advantages and disadvantages of findings.

The advantages of universal PPD screening in the NICU are supported by literature that shows early intervention reduces the duration of PPD and its impact on the mother and neonate (Davila & Segre, 2018). The two existing articles that address universal screening for PPD in the NICU report that such a project is feasible with beneficial outcomes.

The limited research on the topic is certainly a disadvantage, but awareness of the issue is growing. The main barriers identified by Cherry, Blucker, et al. (2016) and Scheans et al. (2016) are willingness of providers to participate in the project and ensuring adequate access to referral services.

Utilization of findings in practice.

Research shows that implementing a universal PPD screening guideline in the NICU is feasible, but implementation requires education and buy-in from providers and a strong relationship with community resources to support the referral process. Given the existing relationship between the identified NICU and the local women-focused mental health center, the issue of adequate referral services should not be an obstacle for this project. The focus will be on improving the process to ensure referrals are not skipped due to time constraints or difficulties

with the process. Education prior to initiating the screening will focus on addressing some of the provider concerns identified in other projects, such as scope-of-practice concerns and work-flow disruption.

Summary

An extensive literature review was undertaken to examine the current state of research on universal screening for PPD in the NICU. Multiple databases were searched using different variations of key search terms to gather all possible publications on the topic. The current literature on the topic of PPD focuses on identifying risk factors and impact of PPD. There is some research on interventions that address PPD in the NICU, and there is less literature that addresses universal screening for PPD in the NICU. The current literature supports the need for universal screening for PPD in the NICU. The two studies that attempted universal screening demonstrated what worked and revealed other issues to consider prior to implementation.

Chapter Three: Theory and Concept Model for Evidence-based Practice

When considering systemic changes, it is important that a plan is grounded in theory. This project incorporated features of several theories in the development of different aspects of the project and intervention. The "Model for Improvement", designed by Associated in Process Improvement, was used in the development of the project (Raymond & Dawda, 2016). The topic of PPD is grounded in the "Teetering on the Edge Theory" (Beck, 1993). This theory guides what is known and understood about the disease. The educational material was developed using the "ARCS Model" (Stockdale, Sinclair, Kernohan, & Keller, 2007).

Concept Analysis

A concept analysis enables improved understanding of postpartum depression. This understanding is vital not just for the practitioners in the NICU but for all healthcare providers who have contact with new mothers. Improved understanding of the concept can be translated into improved care.

Conceptual meaning.

The concept of postpartum depression seems like a concrete notion, but definitions vary somewhat depending on the source. According to the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5), no separate diagnosis exists for postpartum depression. Instead, the patient must meet the criteria for a major depressive episode in addition to the peripartum-onset specifier. This specifier states that the onset must occur during pregnancy or within four weeks of delivery. In general, the patient must exhibit five out of nine symptoms in the same two-week period. These symptoms are depressed mood, loss of interest or pleasure, change in weight or appetite, insomnia or hypersomnia, psychomotor retardation or agitation, loss of energy or fatigue, feelings of worthlessness or guilt, impaired concentration or

indecisiveness, and recurrent thoughts of death or suicidal ideation (APA, 2013).

Another definition of PPD comes from the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10), which was developed by the World Health Organization (WHO) (2016). In the ICD-10, PPD is coded as F53.0; "mild mental and behavioural disorders associated with the puerperium [commencing within six weeks of delivery]" (WHO, 2016). According to the ICD-10, a depressive episode involves lowering of mood, reduction of energy, decreased activity, alteration of sleep, marked tiredness, and reduced self-esteem (World Health Organization, 2016.). In the WHO ICD-11, released in 2018, the definition for PPD changed slightly. PPD is now coded as 6E20; "Mental or behavioural disorders associated with pregnancy, childbirth and the puerperium, without psychotic symptoms" (WHO, 2018). This definition states that the symptoms are often depressive in nature but exclude delusions, hallucinations, and other psychotic symptoms. It also differentiates these symptoms from symptoms that occur directly after birth, which are often considered "postpartum blues" (WHO, 2018).

Beck (1993) developed a definition of PPD based on the experiences of the women with whom she worked in her practice. Beck is credited with creating the first theory that defines the different experiences of PPD. The theory, "Teetering on the Edge," was developed in 1993 and is triangulated with Beck's prior theories and qualitative research on the topic of PPD.

Beck used 'grounding theory' to guide her qualitative research and develop her theories. Grounding theory focuses on how individuals view and interact with their environment and how this process changes (Beck, 1993). In "Teetering on the Edge" theory, Beck (1993) identified four stages that a mother with PPD experiences: encountering terror, dying of self, struggling to survive, and regaining control. Within each of these four stages, a mother experiences several

different manifestations of the stage. Encountering terror can be manifested as “horrifying anxiety attacks”, “relentless obsessive thinking”, and/or “enveloping fogginess” (Beck, 1993, p. 43). Dying of self has the consequences of “alarming unrealness”, “isolating oneself”, and/or “contemplating and attempting self-destruction” (Beck, 1993, p. 43). While struggling to survive, the mother may be seen “battling the system”, “praying for relief” and/or “seeking solace at support groups” (Beck, 1993, p.43). Lastly, regaining control may be manifested as “unpredictable transitioning”, “mourning lost time”, and/or “guarded recovery” (Beck, 1993, p. 43).

The EPDS was developed using the definition for depression from the Research Diagnostic Criteria and Goldberg’s Standardized Psychiatric Interview (Cox et al., 1987). In Goldberg, Cooper, Eastwood, Kedward and Shepard’s (1970) study on a standardized psychiatric interview, the domains of somatic symptoms, fatigue, sleep disturbance, irritability, lack of concentration, depression, anxiety and worry, phobias, obsessions and compulsions, and depersonalizations were assessed on a 5-point scale to determine the severity of the domain’s presence. These domains, along with the pre-existing Irritability, Anxiety and Depression scale and the Hospital Anxiety and Depression Scale were used by Cox et al. (1987) to develop the concept of PPD that would guide the development of the EPDS.

Definition of concept.

After analyzing the concept of postpartum depression, it is important to develop a specific definition. On the basis of Beck’s (1993) theory, the definition of PPD for this project was depressed mood, loss of interest or pleasure, changes in appetite, changes in sleep patterns, and inability to bond with the newborn for greater than two weeks during the first year postpartum. This definition was consistent with the EPDS that was used to identify mothers who

met this definition while in the NICU.

Theoretical Framework

In 1979, John Keller developed the ARCS Model of Motivational Design and further refined it in 1983 (Stockdale, Sinclair, Kernohan & Keller, 2007). Since then, Keller and others have continued to refine the concepts and expand the areas for which the model is applicable. Keller used many different models to frame his observations, but Tolman's and Lewin's expectancy-value theory was the most influential (Malik, 2014). The ARCS Model examines motivation, performance, and instructional style at the macro level, assessing the relationship between individual and environmental effort, performance, and consequences (Wongwiwatthananukit & Popovich, 2000). Thus, the model assumes that an individual's effort is the result of his motives and the expectancy for success at the task. Using this assumption, the model identifies several modifiable variables of behavior and teaching that are linked to motivation and performance to ensure maximum effort (Small, 2000). Keller created this model to assist instructors in designing curricula and learning activities that would increase a student's motivation to learn, and to provide specific motivational strategies (Wongwiwatthananukit & Popovich, 2000).

Model components.

Keller identified four major categories that influence the motivation of learners. These four categories make up the acronym ARCS: attention (A), relevance (R), confidence (C) and satisfaction (S). The first two categories, attention and relevance, consider the motives and values of the learner. The category of confidence addresses the expectancy of the learning and satisfaction addresses the influence of consequences. Satisfaction sometimes is referred to as reinforcing value. In addition to these four areas of individual motivations, the model provides

three types of instructional designs: motivational design and management, learning design and management, and reinforcement-contingency design and management (Wongwiwatthananukit & Popovich, 2000).

Attention.

Attention refers to the ability of the educational style to gain and sustain the interest of the learner (ChanLin, 2009). Keller introduced two main ways to develop interest in a topic: perceptual arousal and inquiry arousal. Perceptual arousal involves the educator using specific and relevant examples of the information. The educator can also create conflict by presenting the opposite point of view to stimulate interest. Humor is another option for creating perceptual arousal. Inquiry arousal requires active participation from the learner. It can involve posing questions and problems for the learner to solve using critical thinking skills or having hands-on activities for the learner to complete (Afip, 2014). In addition to the two forms of arousal, an instructor can increase attention by using a variety of instructional methods and media (Malik, 2014).

Relevance.

Relevance refers to the learner's perception that the information is related to his personal or career goals (ChanLin, 2009). Loorbach, Peters, Karreman & Steehouder (2015) noted that, for an individual to be motived to learn, he must first believe that the information is related to personal goals or motives and feel connected to it. Keller suggested that, to increase the relevance of a topic, instructors should use concrete language and examples familiar to the learner. Keller also presented three specific strategies for increasing relevance: goal orientation, motive matching, and familiarity (Afip, 2014). Goal orientation prompts the instructor to create learning objectives for the topic that are relevant to the learner (Small, 2000). Within these

learning objectives, the instructor should discuss the present worth of the information and the future usefulness of the information. Motive matching involves matching the needs of the learner to the presentation of the information (Malik, 2014). Matching can involve allowing the learner to choose from different learning methods. Lastly, familiarity entails using the learner's previous experience and existing knowledge to encourage further learning (Afip, 2014). An instructor can enhance familiarity by using role models and presentation of the instructor's previous experiences (Malik, 2014).

Confidence.

Confidence is the perceived ability of achieving success in learning by personal effort and control. When a learner underestimates his ability to succeed in learning, he creates doubts and fears about the topic that would limit the potential of his learning and skill development (Wongwiwatthananukit & Popovich, 2000). Thus, Keller linked building confidence with increased motivation to learn and accomplish (ChanLin, 2009). He identified three confidence building strategies: performance requirements, success opportunities, and personal control. Performance requirements involve setting learning standards and evaluation criteria at the beginning of a course (Afip, 2014). Providing success opportunities involves providing challenging and meaningful opportunities for the learner to show successful learning (Small, 2000). Malik (2014) noted that being successful in one learning situation can build confidence in the ability to succeed in future endeavors. Personal control means that the learner is in control of the situation around him and is personally responsible for his success (Small, 2000). A course should be designed to minimize external factors for success, such as luck or the lack of challenge (Malik, 2014).

Satisfaction.

The last category is satisfaction. Satisfaction involves creating the continued desire to learn and gratification with the process and learning results (Loorbach et al., 2015). Keller identified three ways for an instructor to develop satisfaction: intrinsic reinforcement, external rewards, and equity. Intrinsic reinforcement involves supporting and encouraging the intrinsic enjoyment of the learning experience with activities such as testimonials from prior learners (Malik, 2014). External rewards provide positive reinforcement and motivational feedback for the learner. Equity ensures that there are consistent standards and consequences for success in a course (Afip, 2014).

Application to practice change.

By implementing standardized screening, we were attempting to identify mothers during the encountering terror stage, before the experience becomes unbearable. Early identification and referral to interventions reduces this period of PPD (Beck, 2002). Shortening the PPD episode will decrease the length of time a mother experiences the four stages identified by Beck, thus improving the mother's quality of life.

Because screening cannot be implemented without providers being motivated to follow the clinical guidelines, the ARCS model was used to develop educational material for the providers to motivate them to participate. The educational material presented to the providers was newly created, so the development phase included utilizing the ARCS principles. To address the attention aspect of learning, the information was delivered in a brief PowerPoint presentation; a resource notebook was also available in the unit. This approach is the common method of information presentation for providers, thus, it is often the preferred method due to time and availability. The presentation was brief to maintain attention while making sure the key points

were addressed. Relevance was presented in terms of how the change would improve outcomes for patients. The topic may not have had personal relevance to the providers, but improved patient outcomes had career relevance. Confidence was stimulated by presentation of expectations and a clear algorithm for determining actions. This information would always be easily accessible in the unit to encourage confidence in providers' ability to follow the new guideline. Finally, satisfaction was addressed by interaction between the researcher and the providers throughout the process, enabling discussion of concerns, barriers, and successes. This feedback would be presented and addressed in the final presentation of the project.

Evidence-Based Practice Change Theory

The "Model for Improvement" is a model for quality improvement. It is composed of two main parts. The first part is the "three questions", and the second part is the "plan-do-study-act (PDSA) cycles" (Raymond & Dawda, 2016). In the first part, the person or organization seeking to make a change asks three questions about the issue: 1. "What are we trying to accomplish?", 2. "How will we know that a change is an improvement?" and 3. "What change can we make that is an improvement?" (Raymond & Dawda, 2016). After answering these three questions, the person or organization proceeds to the second part in which an idea is moved from thought to action. In the "plan" cycle, the idea is molded into a clear objective. The "study" cycle is developed during the "plan" cycle by creating a hypothesis and intervention to meet the objective of the project. During the "do" cycle, the intervention is put in place. Barriers and outcomes are documented and analyzed during this cycle. In the "study" cycle, the data gathered during the "do" cycle are compared to the hypothesis from the "plan" cycle. The information is reviewed to assess for learning opportunities related to what worked and what did not work. In the "act" cycle, the intervention is either placed back into the "do" cycle with changes related to findings

from the “study” cycle or the intervention is released for organization-wide implementation (Raymond & Dawda, 2016). Although the cycles are displayed in a circular direction, they do not always progress cyclically. An idea may be developed during the “plan” cycle, be implemented in the “do” cycle and fail. Then the “study” cycle would assess why the plan failed, make revisions and the “act” cycle would focus on going back to the “do” cycle to test the revised intervention.

Application to practice change.

The Model for Improvement was used for this project. The first part, the three questions, was assessed initially to develop the topic and project goal. The goal was improved PPD screening and referral practices in the NICU. The changes that the project implements would be an improvement if NICU mothers are more consistently screened and referred for mental health services when screening is positive. To achieve this enhancement, a guideline was created so that providers would have a standard for practice.

The “plan” cycle examined how to develop a guideline. The hypothesis was that, if providers refer to a standard screening guideline when appropriate, and screening of all NICU mothers occurs at set time intervals, then providers will be more consistent in screening mothers before symptoms become problematic. Education of providers was provided to ensure awareness of the new guideline. Signs reminding providers to screen and document were placed in the provider office. The “do” cycle involved providing education and placing the signage in the work rooms. Then the charts of patients were audited to assess documentation of screening and referrals. The “study” cycle analyzed information about whether screening and referrals were documented. This information included length of stay and provider type to assess for patterns that may represent a barrier to implementation. The “act” cycle was the development of

recommendations for improvements and presentation of the project and recommendations at the Maternal-Fetal Medicine Division meeting, so that further improvements can be made after project completion .

Summary

When developing a quality improvement project, it is important that the project be strongly grounded in pre-existing research and theories. The guiding theory of the PPD concept is "Teetering on the Edge Theory," developed by Beck in 1993. The concepts of PPD and its manifestations used in this project were based on this theory. When contemplating an improvement to a system, the "Model for Improvement" is a guide to assessing a problem, developing an intervention, and performing implementation and analysis of the intervention. This model helped create the plan for this project. Part of the implementation phase involved educating the providers to the changes in the guideline. In developing the educational material for the providers, the ARCS Model by Keller was used to ensure enhanced learner engagement and retention.

Chapter Four: Pre-implementation Planning

A large amount of planning was undertaken to ensure smooth implementation of the new guideline. The planning portion of the project sought to clearly define the purpose, evaluate the unit's readiness for change, determine associated costs and funding, and identify measurable outcomes to evaluate project effectiveness.

Project Purpose

The specific interplay of PPD and NICU hospitalization course appears to be unknown. Nonetheless, research by Neri et al. (2015) and Vasa et al. (2014) points to the concept that maternal PPD affects the overall health of the mother and neonate during their time in the NICU, and screening would identify at-risk mothers so they could receive treatment.

Therefore, the purpose of this project was to identify mothers of neonates in the NICU who were potentially dealing with PPD and to refer them to mental health services. This identification was accomplished by standardized universal screening of all NICU mothers. Standardized universal screening ensures that mothers are not missed because they are not exhibiting symptoms or expressing their emotions to the medical team. It also helps to decrease the stigma associated with PPD and the mother's feelings that something is wrong with her or that she is a bad mother if she experiences PPD.

Project Management

Prior to implementing the guideline change, the following elements and issues had to be assessed for how they might impact the project .

Organizational readiness for change.

The Organizational Readiness for Change Assessment was used during the development of this project. The first part of the assessment focused on assessing the evidence (change

efficiency). The second part was an assessment of context, which was concerned with whether the environment was conducive to change by embracing innovation or resistant to change due to inflexible policies. The third part of the assessment was facilitation assessment (change valence), i.e., whether organizational members saw the change as beneficial or resource draining (Weiner, 2009).

Helfrich, Li, Sharp, & Sales (2009) used this process to develop a multi-question assessment. The questionnaire was created for the U.S. Department of Veteran's Affairs (VA); thus, non-germane elements of the questionnaire were omitted for assessment of this project. Appendix C presents the questionnaire and responses for this project. The project received a score of 288 out of 350 points (after deletion of VA-focused elements). This score was encouraging with regard to the organization's readiness for change.

Overall, the organization presented an environment focused on improvement and innovation. Elements of this environment that were visible to members of the organization were the focus on quality improvement projects and research studies. During the residency program, new doctors are required to participate in ongoing research or to develop their own research studies or quality improvement projects. This expectation is also extended to nurse practitioners during their careers at the organization. As part of the shared governance model that the organization uses, there is a Nursing Research Council that focuses on supporting research development and dissemination throughout the organization. This support of research and quality improvement projects is part of the culture of the organization, and it creates an environment that is ready for change, which was evident from the organization's 288 change score.

Inter-professional collaboration.

Several different specialties needed to be involved to fulfill this project. The site champion for the project was one of the Neonatal Nurse Practitioners on the unit. Her role was to provide support and guidance in the project development and implementation phases. She had experience working on the unit and going through the current process, which allowed her to give insight about barriers that might be encountered, how to navigate resistance to change, and what interventions could work.

In addition to the site champion, it was important to include other specialties in the discussion. Approval was required from the nursing unit manager and the medical director of the unit. Both were involved in the discussion about whether the unit would be an appropriate fit for the proposed project. The Chair of the Family Advisory Board was consulted to ensure that the project would not be invasive to the mothers, and that there would be an overall acceptability of the screenings. The two social workers on the unit were involved in the development of the guideline and education materials as they related to the referral process because, previously, if a provider was concerned about a mother's mental health, the social worker was enlisted.

Risk management assessment.

The SWOT method of risk assessment focuses on four areas of a project: strengths, weaknesses, opportunities, and threats (Pearce, 2007). Often a chart is used to group the four areas. A SWOT chart was developed during the pre-implementation phase of this project (Appendix D). Overall, the strengths of this project were that the organization was focused on improving patient care, and it had moved to a family-centered care model for the NICU. The main weakness of this project was the fact that residents spend only a few weeks on the unit before moving to a different unit, so there was a need to continually educate residents about the

screening guideline. However, there existed an opportunity to enact change because there was no current guideline that needed changing; the project started on fresh ground. A threat to this project was failure of the providers to invest the time to connect with the mothers and to ensure that screening was completed.

Organizational approval process.

The organizational approval process was straightforward. Both the nursing manager and the medical director were presented with a brief review of the current evidence that shows the effects of improved maternal mental health on mothers and neonates. In addition, they were presented with the proposed intervention and a discussion of how the intervention would affect the work group that they represented. After reviewing the information, both managers granted approval to develop and implement the project on the unit. Appendix E contains the letter of support from the unit's Nurse Manager, and Appendix F contains the support letter from the unit's Medical Director. The Nurse Research Council also gave support for the project pending approval of the research application (Appendix G).

Information technology.

Technology is a major component of medical care. This project used technology mainly in the form of the EHR system, EPIC. Mothers completed screenings on paper, but the results were recorded in the neonate's electronic medical chart. This chart was audited to evaluate implementation of the guideline. Information gathered by the chart audits was compiled in an Microsoft Excel spreadsheet and input into SPSS Statistics for analysis.

Cost Analysis of Materials Needed for Project

Anticipated project costs were minimal. There was the cost for printing and paper for the educational material given to the providers. Education was provided at the required classes for

the residents, with encouraged attendance from other providers, so no meals or attendance incentives were needed.

The unit consists of 11 neonatologists, three fellows, 18 neonatal nurse practitioners, and a rotating group of residents and medical students. There are eight residents on the unit per rotation. The budget was constructed using the assumption that 25 providers would attend the education sessions. The education material was presented in printed form to these 25 providers. Color printing was estimated to be $0.50 per page. Printed education material was concise, with additional information provided via email. Therefore, the estimate was three pages per attending provider. This cost was anticipated to be $38. The printed education material and additional information was also distributed at no cost via email to all providers and nursing staff for the unit.

The EPDS is a free screening tool, thus there was no cost associated with using the tool. However, the tool did need to be printed for the mothers. The unit consists of 58 beds. With an average length of stay of 25 days (W. Price, personal communication, September 11, 2018), it was estimated that, during the eight weeks of implementation, the unit would have about 120 mothers to screen. With a printing cost of $0.50 per page and a two-page screening tool, this cost was anticipated to be $120.

Once all materials were created and printed, actual final cost of printing all materials came to $139.72. Funding for this project was supplied solely by the student.

Plan for Institutional Review Board Approval

The project did not require a full IRB approval. East Carolina University (ECU) uses five screening questions to evaluate whether a project requires full IRB approval. After completing these screening questions, the ECU IRB Office determined that this project did not need full IRB

review because the project was deemed a quality improvement project and not human research (Appendix H). The hospital where the project was implemented has a Nursing Research Council that must approval all research and projects that are performed in the hospital and that affect nursing care. Because the project involved nurse practitioners, approval was required from this council. An application was submitted and approval was granted (Appendix I). As part of the Nursing Research Council application, the project was discussed with an IRB representative of the university that is associated with the hospital. It was determined that any IRB decisions would be deferred to the university for which this project was being completed, thus an IRB application for the organization was not required.

Plan for Project Evaluation

There were several aspects of the project that would be evaluated. The rates of positive screens were expected to reflect rates observed from prior research. The rate of screenings with the current practice, which was not standardized, was the main comparison evaluated in this project. It was compared to the rate of screening after implementation of the guideline. Previous screening was performed only when mothers presented a concern to a provider or the medical team noted symptoms that were disruptive to the care of the neonate. Thus, the prior rate of screening was negligible, and, when performed, screening was not documented. The measured outcome was compliance of practitioners with the new guidelines compared to an earlier rate of zero. This outcome was measured by auditing discharge summaries and progress notes throughout the intervention phase and assessing whether screening was being conducted and documented properly. The data collected from these audits included the patient's assigned bed number, admit date, whether the patient was inborn or a transport, term or preterm birth, current day of life, neonatal nurse practitioner or resident provider, was screening due, was screening

documented, was a referral required, if so, was it performed, discharge date, and length of stay (Appendix J).

Secondary outcomes were evaluated from the data for additional information that might show barriers to continued implementation or opportunities for improved education. The data were assessed for a pattern in completed screenings between preterm and term mothers. This information would answer the question whether providers focused more on preterm mothers' needs compared with term mothers. The answer to this question could direct future projects to the patient population that needs more emphasis during provider education. Because neonates were either born at the hospital or transported from an outside hospital, the data were assessed to determine whether the days of life on unit versus actual days postpartum affected the rate of screening. Similar to the preterm vs term question, a pattern in this data would point to an area for increased provider education and a need to reinforce screening practices for a particular patient group. Completed screenings were evaluated to assess patterns between screenings based on the time interval and screenings completed on discharge. Such a pattern would identify barriers for one type of screening being completed compared with another. The data were also assessed for patterns in screening rates by provider type. This knowledge could direct future education of the provider group that would benefit the most. The percentage of completed referrals was evaluated because it could signal potential barriers to referral.

Screening was envisioned to continue after this project was implemented, and the site champion or others would extend the information gathered to improve the screening and referral process and to review the impact of universal screening on PPD rates and treatment rates.

Demographics.

The demographics for this project were term or preterm birth, inborn or transfer, resident provider or nurse practitioner provider, current day of life and length of stay in days. This information was gathered during the chart audits and compiled in the data collection tool (Appendix J).

Primary outcome measurement.

This project had one main outcome, i.e., was screening of the mother completed at the appropriate time. A second outcome was based on if a specific score on the screening tool was obtained.

Evaluation tool. Chart audits were used to evaluate whether the primary outcome was met. The data collection tool (Appendix J) aided in organizing these audits. A simple two-step question was used to evaluate whether the outcome was met: Was screening due and was screening performed, if appropriate? The first question was a *yes* or *no* answer based on the days postpartum, which was noted on the data collection tool. If the answer to the first question was *no*, then the chart audit was complete. If the answer was *yes*, then the chart audit continued to answer the second question (was screening performed?). This question was a *yes* or *no* answer based on whether the screening score was documented in the progress note.

Data analysis. The data gathered from the chart audit were coded and input into the data analysis software SPSS Statistics. The software was used to give the number of mothers that were due for screening and the number of screenings completed. This was converted to a percent, which measured the compliance rate of the unit with the screening guideline.

Second outcome measurement.

The second outcome evaluated whether a referral was performed when appropriate based on the screening score.

Evaluation tool. Similar to the primary outcome, this outcome was evaluated by chart audit. The data collection tool (Appendix J) was used to organize the information. This outcome was also assessed as a *yes* or *no* answer to a two-part question: If a mother was screened, did the screening score require a referral (>/=12), and, if *yes*, was a referral completed and documented? This information was gathered from the neonate's progress note.

Data analysis. The data gathered from the chart audit were coded and input into SPSS Statistics. This software was used to determine the number of mothers that required referral and whether the referral was completed. This number was converted to a percent that measured the proportion of required referrals that were completed.

Data management.

Data were kept in a Microsoft Excel spreadsheet that was stored on the organization's server. After all data were gathered, they were coded in SPSS Statistics to be analyzed. This coding was numeric representations of all data. Information developed in SPSS Statistics was placed in a Microsoft Excel spreadsheet that was also stored on the organization's server. All information in SPSS Statistics was discarded after analysis. Data in the spreadsheets will be kept through the completion of the DNP program and electronically deleted upon graduation.

Summary

Ensuring that a plan is fully developed before implementation is vital to the success of a project. Prior to implementing this project, the organization's readiness for change was evaluated to ensure acceptance of the change. The organization was found to be open to change. A SWOT

analysis was performed to guide development and identify areas that needed to be strengthened prior to implementation. Members of different specialties were involved in the development of the plan to ensure inter-professional collaboration on implementation. Pre-implementation preparations included obtaining approval from nursing management and the unit Medical Director. A plan was developed for the collection, storage, and analysis of the project data. Outcome measures were defined. Once these steps had been taken, the project received Nursing Research Council and IRB approval to proceed to implementation.

Chapter Five: Implementation Process

Project implementation was initiated after assessing the site's readiness for change, receiving all necessary approvals, and developing an implementation plan and education materials.

Setting

The project was implemented on a unit which is part of a large, state hospital. The hospital has both adult and pediatric divisions. The NICU is part of the pediatric hospital. The NICU is a level IV NICU. It is a single unit with 58 beds. The unit admits patients from labor and delivery or via transport from other hospitals. The unit interacts with roughly 800 mothers per year from across the state. The average length of stay for a patient is 25 days. There are 11 Neonatologist attendings and 18 Neonatal Nurse Practitioners, in addition to three to four MD fellows and several medical residents (W. Price, personal communication, September 11, 2018).

Participants

The main participants for the guideline change were the medical providers on the unit. All medical providers were expected to participate in the implementation of the guideline. The medical providers included nurse practitioners, residents, fellows, and attendings. Bedside nurses were informed of the guideline change and asked to be supportive, however, they were not direct participants.

Mothers were not direct participants of the project, but they were involved because they completed the screenings. The guideline did have specific requirements that mothers would need to fulfill. The guideline pertained to all English and Spanish-speaking mothers who had neonates on the unit at one of the designated postpartum times. The goal was to assess every mother daily during medical rounds to determine whether she met these criteria. If guideline criteria were met,

the provider would discuss the screening with the mother and ask her to complete the EPDS. If a mother declined to complete the screening or did not meet inclusion criteria due to a language barrier, the provider would document the fact in the neonate's chart.

Recruitment

This project did not require recruitment of participants because it was a unit procedural change with the expectation that all providers would comply. To encourage compliance, conversations were held with each provider about implementation, and, on the first day of implementation, each provider received a list of the screening due dates for their current patients. Providers also received email or in-person reminders when mothers were due for screening throughout the implementation period.

Implementation Process

Implementation started with the dissemination of educational materials to all medical providers and support staff. This material included a PowerPoint about postpartum depression and the planned changes for screening practices on the unit. In addition to an email providing implementation information and forms, a binder was provided that contained all necessary guideline paperwork. The binder contained a copy of the educational PowerPoint, the existing hospital algorithm for treatment of PPD, a sample parent packet, and all individual components of the packet. This binder was shelved with other information binders in one of the provider work areas.

Several days before implementation, providers were individually educated of the expectations for the screening change. On the first day of implementation, each provider was shown the binder. The components of the parent packet were discussed, education about documentation was provided, and a list of current patients with the screening due dates was

furnished. If a provider had any screenings due that day, a parent packet was given to the provider. Providers also had opportunities to voice concerns or suggestions about implementation.

After the start date, charts were audited at a minimum of every week, but more frequently if there were several mothers due for screenings. The chart audit provided data that were compiled into a Microsoft Excel spreadsheet for later analysis.

During implementation, individual providers received verbal reinforcement when screening was due and how to perform and document screening. Individual issues, such as screening prior to a due date, were addressed as each issue surfaced.

Plan Variation

Throughout implementation, there were slight variations to the plan as challenges arose. The first deviation was the implementation start date. Because new residents were joining the unit, the start date was delayed to provide the new residents time to become oriented and then participate in implementation.

Another plan variation was the education provided to the staff. Due to scheduling issues, there was no formal education provided at the beginning of the implementation phase. Instead, all staff nurses and healthcare providers received the information by email. Then, individual meetings were arranged with each provider to discuss the process and examine the resource binder. After feedback from some of the providers, a presentation of the project was developed and presented at a Maternal and Fetal Medicine Division meeting during the fourth week of implementation. This presentation enabled all levels of providers to learn about the project, provide input, and ask questions. Changes to the project plan were deemed unnecessary. The providers expressed some concerns related to charting maternal information in the neonate's

chart and discomfort with not knowing how to handle a positive PPD screen. The first concern was addressed by presenting prior research studies where similar maternal information was charted in the neonate's chart and the ability to bill for the maternal screening service under the neonate's chart (AAP, 2019). In addressing the second concern, plans were developed for future interventions after the end of the project. Some thoughts for the future included changing the charting in the EHR to accommodate entry of the screening date in the screenings tab, bringing in outside resources to increase provider comfort in handling positive screens, increasing bedside nurse involvement in the screening process, and creating an order set to prompt screening at due dates.

After three weeks of implementation and a meeting with the nurse practitioner manager, a change was made to the documentation plan. While documentation of the screening continued in the progress note, future screening dates were added to the neonate's "stickie note", which is a place in the EHR where discharge and screening information is charted to enable communication between all healthcare providers. This "stickie note" was updated at weekly Interdisciplinary Rounds. This decision was made to improve communication about upcoming screenings. It was also decided to increase the involvement of the two infant care coordinators on the unit. Each infant care coordinator rounds with the two separate medical teams, so all providers were covered. The infant care coordinators started to ask about screening during rounds and remind providers when a screening was due.

As mothers screened positive, more needed to be done to ensure that mothers were evaluated, and the team was aware of the issue. The EHR system used by the organization already had a problem list item developed, "newborn effected by maternal depression". Therefore, once a mother had a positive screen on the EPDS, this problem would be placed on

the neonate's problem list, and further screenings, referrals, and issues related to PPD would be documented in this section of the progress note.

Summary

The project was implemented in a large, state hospital NICU. The participants of the project were the medical team members, including nurses, residents, nurse practitioners, residents, fellows, and attendings. Mothers who had neonates on the unit were secondary participants. The data collected were not specifically about mothers, however, their participation was required because the project assessed whether the medical team was screening and referring mothers appropriately. Recruitment of primary participants was minimal because it was a guideline change that was implemented unit-wide, so all providers were expected to participate as part of the standard of care. Implementation of the project involved educating the medical team about the new screening process and how to document the screening, helping team members to identify when a mother was due for screening, and auditing charts to assess whether screening and/or referral was performed. Project implementation did not match the initial plan exactly, instead it adapted to barriers as they became evident. Some of these adaptations were changing the start date to better fit the resident schedule, providing additional education and rationale, and increasing the participation of the interdisciplinary team to encourage compliance.

Chapter Six: Evaluation of the Practice Change Initiative

After completing the project implementation, it was important to review the results, determine whether the initial objectives were met, and identify areas for improvement to ensure continued implementation.

Participant Demographics

General demographic information was obtained during this project. This information included number of neonates on the unit each week, gestational age, inborn or transferred, discipline of provider (NP or MD), and length of stay upon discharge. For this project, preterm was defined as a neonate born at less than 37 weeks gestation, and term was a neonate born at or after 37 weeks gestation. Inborn referred to neonates born in the labor and delivery unit of the hospital and subsequently reassigned to the NICU during their hospitalization. A transferred neonate referred to one born at a different hospital and brought to the NICU at this hospital, regardless of the day of life. Because this hospital is a teaching organization, neonates in the NICU are assigned to either the neonatal nurse practitioner (NP) or a resident (MD) team. The individual provider will change during the care of the neonate, but the type of provider in charge of the neonate's care does not change.

During the eight weeks of implementation, 178 neonates were in the NICU. The unit saw 126 admissions, with a weekly average of 16 admissions. The unit had an average weekly census of 61.8 neonates. The unit had 96 discharges and 31 transfers out to a different unit or hospital, averaging 12 discharges and four transfers a week. The average length of stay was 18.9 days (S.D. 25.9) for patients discharged during implementation phase.

Of the neonates on the unit, nurse practitioners were the primary providers for 37% (n=66), and residents were the primary providers for the remainder 62% (n=110) with two

excluded due to lack of documentation. Preterm neonates represented 62% (n=110) of the patients and term represented 38% (n=68). Neonates born at the hospital's labor and delivery unit represented 71% (n=90) of the patients, and transfers from other units or hospitals represented 29% (n=36).

Intended Outcomes

Measured intended outcomes were completed screening, appropriate screening documentation (either at specified time interval or discharge), completed referrals when required, and appropriate documentation of referral. A screening opportunity was counted each time a neonate was due for a screening, either related to time interval or discharge. Depending on length of stay, a neonate may have had zero screening opportunities (e.g., neonate transferred from newborn nursery for two days to monitor blood glucose level and then transferred back to newborn nursery) or multiple screening opportunities (e.g., three screening opportunities occurred when a neonate reached the two week and one month postpartum interval and was discharged during implementation). Weekly chart audits were used to assess these outcomes. The raw data from the chart audits were imported into SPSS Statistics for analysis.

The baseline for the primary outcome, completion of screening at appropriate times, was zero because there was no standardized routine screening prior to this project. Therefore, any increase from zero was an improvement from the initial compliance rate. This initial benchmark served to assess feasibility of the project, but it was not a final goal. As barriers are identified and addressed, future re-evaluation of the primary outcome should show improvement from the initial rate identified by this project. The secondary outcome, whether referral was completed when appropriate, likewise was given a baseline of zero because there was no prior

documentation of referral for services. Any increase from zero for both outcomes was viewed as a project success.

Findings

During implementation, 168 screening opportunities were identified. These opportunities were screenings that should have been performed in accordance with the new guideline. Of the 168 opportunities, 43 were documented as completed, for a compliance rate of 25.6%. On closer inspection, 84 of the 168 screening opportunities became due based on the prescribed time interval. Of these 84 opportunities, 26 were completed (31%). Ninety-seven of the 168 screenings opportunities were for patients being discharged. Seventeen of the 97 screening opportunities were completed (17.5 %). Eight of the completed screenings required referrals, and 100% received referrals with appropriate documentation. Eight screenings were provided at times not in accordance with the guidelines. Of these eight, four referrals based on score were identified and documented (included in the prior group of referrals). In addition to the eight required referrals, two were made outside of project guidelines, based on clinical assessment by the provider in conjunction with the mother. One of these two additional referrals came from a screening performed outside of the guidelines. Appendix K presents this information. Using a screening score of >/=12 or admission to the inpatient psychiatric unit as indications of PPD, it can be estimated that the prevalence rate of PPD for this NICU is roughly 23.3% (n=10).

It is important to note that, during the implementation phase, one mother was excluded because her primary language was Mandarin, and one mother was excluded because she was incarcerated and could not be screened. The demographic information for these two mothers was included, but they were not counted as screening opportunities. Mothers who were not involved or unable to come to the bedside were not excluded unless the provider documented that the

screening was not completed because of the maternal situation. Two mothers were on the inpatient psychiatric unit during the implementation period; their admission was not a result of screenings related to this project but was counted as part of the prevalence rate calculations.

On the basis of the interplay of demographic information and intended outcomes, it was found that 27 completed screenings were conducted by residents (62.8%) and 16 were performed by nurse practitioners (37.2%). Of the resident screenings, 27 screening opportunities were based on the prescribed time intervals and 15 (55.6%) were documented. There were 61 discharge screening opportunities and 12 (19.7%) were documented. There were two documented screenings that were not due based on guidelines. The nurse practitioners completed 11 screenings (24.4%) of 45 screening opportunities based on the time interval, and five screenings (14.7%) of 34 screening opportunities for discharges. There were six screenings documented that were not due per project guidelines. Appendix L presents a table of this information.

Overall, 13 (23.2%) of 56 screening opportunities were completed for term neonates and 30 (26.8%) of 112 screening opportunities were fulfilled for preterm neonates. For term neonates, five screenings (35.7%) of 14 screening opportunities were completed based on the time interval and eight screenings (19.5%) of 41 were performed at discharge. One documented screening was not due based on the guidelines. Also, a screening opportunity was due but not completed for a patient transferred off the unit. For the preterm neonates, 21 screenings (36.2%) of 58 screening opportunities were completed based on the time interval and nine screenings (16.7%) of 54 were at discharge. There were seven documented screenings that were not due based on guidelines. Appendix M presents these data.

For neonates that were born in the hospital, there were 31 completed screenings (25.8%) of 120 screening opportunities. Of the screenings due, 21 (38.9%) of 54 screening opportunities

were completed based on time interval, and 10 (15.2%) of 66 screenings due for discharge were completed. There were six additional documented screenings that were not due based on the guidelines. Twelve (25%) of 48 screening opportunities were completed for neonates who were transferred to the hospital. Of the screenings due, five (27.8%) of 18 screening opportunities were completed based on time interval and seven (24.1%) of 29 screenings at discharge were completed. One screening was due for a patient returning to another hospital; this screening was not completed. There were also two documented screenings that were not due based on the guidelines. Appendix M presents these data.

Summary

Prior to implementation, the unit had a 0% PPD screening rate. After eight weeks of implementation of this QI project, the screening rate increased to 26%. Of the mothers screened, eight were identified as requiring referrals to mental health providers. Referral for screenings had a 100% compliance rate. There were also two mothers referred for services based on clinical assessment. Regardless of provider type, screening opportunities based on time interval were documented at a higher rate than screening opportunities based on discharge. Residents had a higher compliance rate than neonatal nurse practitioners, 62.8% and 37.2%. Screening rates for preterm and term neonates were equivalent, 27.3% and 22.8%. Neonates born at the hospital had the same screening completion rate as neonates transferred to the hospital, 26% and 25%.

Chapter Seven: Implications for Nursing Practice

In the nursing profession, growth is facilitated by working towards several similar concepts and practice areas. This project worked to promote growth in the nursing profession in the following areas.

Practice Implications

The American Association of Colleges of Nursing (AACN) developed a set of eight Essentials of Doctoral Education for Advanced Nursing Practice. These Essentials direct doctoral education to ensure that advanced practice nurses have a core set of competencies (AACN, 2006). This project focused on implementing a guideline change in the NICU, however, at its core, the project used the eight Essentials to guide practice change.

Essential I: Scientific underpinnings for practice.

This first Essential focuses on synthesizing science-based research and theories from all domains to provide the highest level of nursing care. Part of advancing nursing care is developing and evaluating new practices based on these theories (AACN, 2006).

For this first Essential, this project was a framework for development of a sustainable program that provides true family-centered care in the NICU. Although the primary patient is the neonate, research shows that the neonate is not isolated from being impacted by the family's health. Therefore, it is vital to address the healthcare needs of the family, such as PPD, that will have a lasting influence on the neonate. This project worked to develop a screening guideline to address this issue. Although barriers were experienced, the project demonstrated that a guideline can be enacted to identify mothers in need of extra support while in the NICU. This project can be expanded to screening for other mental health concerns and offering onsite interventions for mothers who are experiencing mental health issues.

Essential II: Organization and systems leadership for quality improvement and systems thinking.

Essential II focuses on nursing care at the population level. Doctorate-prepared nurses should be able to view patient needs in relation to financial, organizational, and political influences, examining cost-effectiveness and risk management (AACN, 2006).

This project related to Essential II in the sense that federal and state policy makers are beginning to recognize the importance of screening mothers for PPD and the roles that healthcare providers other than obstetricians play in screening. This project showed that it was possible for guidelines to be developed to ensure that mothers are screened at all points of contact with healthcare providers during the first postpartum year. In addition, the cost to the organization was miniscule. This information can be used to establish similar guidelines at other organizations that have NICUs.

Essential III: Clinical scholarship and analytical methods for EBP.

The embodiment of Essential III is the use of new literature to create practice change, development of new quality improvement data, and dissemination of these practice changes to improve healthcare (AACN, 2006).

This project added to the growing body of data which show that creating a PPD screening guideline is feasible, and a guideline can improve overall screening rates in NICUs. Dissemination of the project findings to other Maternal Fetal Medicine programs and discussions with other local NICUs will enable development to improve the screening process and compliance rates and ensure that a greater percentage of mothers is reached.

Essential IV: Information systems/technology and patient care technology for the improvement and transformation of healthcare.

Essential IV stipulates proficiency in information technology as it pertains to patient care and providing leadership around topics related to ethical and legal issues related to healthcare information systems/technology (AACN, 2006).

This project identified PPD screening and documentation barriers that technology can create. These impediments need to be addressed as the practice grows. One potential implication is that, with sufficiently robust data to encourage changes at all hospitals within a system, the specific templates for the problem list could be updated to include cues about screening times and results. This template change would help ensure that screening is not missed or undocumented.

Another issue identified by this project was the unclear legal standards for documenting maternal information in a neonate's medical record. This project assessed current standards and how they aligned with the medical team's experiences and preferences. As more practices and organizations screen mothers with neonates in the NICU, professional organizations will develop the specifics of acceptable information for charting.

Essential V: Healthcare policy for advocacy in healthcare.

The doctorate-prepared nurse can provide guidance in development, advocacy, and implementation of healthcare policy. This role involves working closely with policy makers to campaign for patient needs and the nursing profession (AACN, 2006).

This project added to a growing set of projects and research that demonstrate the importance of PPD screening in the NICU in addition to screening in pediatrician offices. Many states currently require pediatrician screening, but they make no mention of inpatient units.

When a baby is in the hospital, whether in the NICU or another unit, the baby's medical team is the main provider with whom a mother has contact. The mother with a hospitalized newborn will not be visiting a pediatrician during those important first few months postpartum. So, if pediatricians are expected to screen the mother as part of the baby's care during that period, inpatient units should be expected to view the mother's mental health as part of the neonate's medical needs as well. As the value of these types of guidelines continues to be demonstrated, state and federal regulations will begin to include inpatient units in the required PPD screening intervals.

Essential VI: Interprofessional collaboration for improving patient and population health outcomes.

Healthcare requires input and involvement by many different specialties to provide the highest level of patient care. Essential VI focuses on the ability to lead and effectively communicate with an interdisciplinary team (AACN, 2006).

Interdisciplinary involvement is vital to screening and treating PPD. This project demonstrated the need for close communication between provider, social worker, and local counseling services. As PPD screening of NICU mothers becomes universal, the interaction between all these disciplines will increase. This project showed that improved communication by in-person interaction and EHR communication is vital to ensuring that mothers receive assistance. The medical community widely accepts that screening should be performed only in a setting that possesses appropriate resources for the person. The geographical area associated with this project has many resources, but the resources did not connect well to help mothers navigate the system. Changes to how and when these disciplines interact are required to ensure the sustainability of this guideline change.

Essential VII: Clinical prevention and population health for improving the nation's health.

Population health is an essential part of nursing care. This Essential focuses on the integration of epidemiologic and environmental data to improve health promotion and disease prevention, decrease healthcare disparities, and evaluate community healthcare models (AACN, 2006).

This project sought to improve health promotion and disease prevention by the implementation of a new guideline of universal screening. The project created new antidotal information to show the effect that universal screening in the NICU can have on identification of PPD and the importance of meeting mothers where they are. This information can be used to improve screening practices by finding ways to screen mothers who are unable to visit the bedside frequently or the development of a community-based screening program that would include NICU mothers. There are programs that perform in-home well-child checks for new mothers, but these programs do not currently involve NICU mothers; perhaps future programs can include NICU mothers at home while their neonates are still in the hospital.

Essential VIII: Advanced nursing practice.

This Essential focuses on the development of advanced assessment skills and the ability to provide holistic care to individuals and communities with complex healthcare needs. It also involves the development of skills to mentor and guide other nurses in advancing nursing excellence (AACN, 2006).

This project identified the discomfort that many NICU providers, especially nurse practitioners, had with screening mothers; NICU providers were unsure about their abilities to screen, they were concerned about having knowledge of what to do with a positive screen, and

they were generally uncomfortable caring for adults. Thus, the findings from this project can guide NICU healthcare providers in education about PPD and screening practices and in identifying and creating relationships with community resources to help mothers experiencing PPD.

Summary

The AACN (2006) developed eight Essentials to guide education and development of a doctorate-prepared nurse practitioner. Reference to these Essentials identified how this project can contribute to the nursing field and future implications for practice. Overall, this project adds to the growing data about the importance of screening NICU mothers for PPD and the barriers and facilitating factors for a universal screening program. The project findings point towards the feasibility of such a program, but the program still needs improvement in provider comfort with PPD screening, in integration of the EHR system to improve documentation of screening, and in interdisciplinary relationships to increase use of community resources for mothers who experience PPD.

Chapter Eight: Final Conclusions

After completing any QI project, it is important to reflect on what the project showed, its strengths and weakness, and the next steps for improvement. This reflection is part of the study section of the PDSA cycle. After completing this reflection, the information is used to take action and either re-implement with changes or return to the planning stage.

Significance of Findings

This project demonstrated that it is feasible to develop and implement a guideline for universal screening of mothers with babies in the NICU. Screening rates increased from zero to 26% during the 8-week implementation. Although the project successfully showed that a guideline can be developed and implemented, the most significant information obtained came from analysis of barriers to compliance and strengths of implementation.

Project Strengths and Limitations

This project identified several strengths and limitations of both the organization and the project design. Strengths of the organization included an openness to quality improvement projects, availability of multiple resources to help mothers with PPD, and strong interdisciplinary cooperation. Strengths of the project design were minimal impact on budget, flexibility to adjust to identified barriers, and easy integration into current practices.

Limitations of the organization included saturation with new projects and research and lack of a central database of current projects and research underway in all departments. The main limitation of the project design was less than full buy-in by the medical team; the medical team placed a low priority on completing screening and discussions during daily rounds. Some practitioners chose not to participate regardless of whether their concerns were addressed.

Project Benefits

The main benefit from the project is the demonstration that a standardized screening procedure is possible in the NICU at this organization. Improved universal screening connects more mothers with mental health resources, resulting in improved maternal and neonate health. Another benefit was discovering that the NICU at this organization had an incidence of PPD similar to national averages. This knowledge can help identify possible budgetary needs for PPD resources.

Recommendations for Practice

Universal recommendations.

Recommendations focus on improving compliance by streamlining the screening process. One recommendation is to increase involvement of the nursing staff to help with administration of the screenings. Nurses are at the bedside with the parents throughout the day, thus, nurses have more opportunities to screen mothers. To ensure that screenings are completed at the correct intervals, the providers would still monitor the necessary timing of the screenings during rounds and would review the results so that appropriate referrals are made. Reminders of when screenings are due would be accomplished by an order set placed upon admission to the NICU. The order would be timed at the correct intervals and prompt the nurse to complete the screening and document screening in the EHR. The provider could then see the results in the EHR and make a referral if necessary. This procedure is similar to how immunizations are managed at the organization.

To ensure completion of the first recommendation, the method of documenting screenings in the EHR needs to be changed. Requiring providers to write a note about the screening in the progress note resulted in varied wording and incomplete information. Having a

designated place to put the score and the date would simplify the required documentation. This designated place would also address a concern voiced by some providers that it was difficult to track completed screenings. Documentation of screening results in the EHR flowsheet would enable the results to be automatically pulled into the discharge summary and be searched easily, enabling providers to quickly verify that screening was completed.

Organization specific recommendations.

The organization is currently working to implement these recommendations and reassess their impact on compliance rates. Moving forward, nursing will become more involved in the screening process. Champion nurses are being identified to assist implementation and promoting buy-in from the nurses. There is a plan to add a line for the date and screening score to the nursing family interaction flowsheet. This score will be visible to the providers so they can verify completion of screening and make a referral as needed. Although changes are being made to the EHR system, a smart text has been created for the providers so that they need to fill in the blanks for only a few pieces of information, instead of typing an entire note.

As the project grows on the unit, it has prompted collaboration with different aspects of the organization and other organizations. There is a partnership developing between the unit and both the inpatient and outpatient mental health programs at the organization. Another partnership is developing between the unit and an NICU in another local organization that is beginning to address PPD. Meetings are planned to help providers identify area resources to help mothers who screen positive. These meetings involve representatives from different support organizations. This networking will help the unit to build its list of resources for mother who expresses emotional distress or PPD symptoms. In addition to improving relationships with outside

organizations, there is a renewed focus on improving communication and the relationship with resources within the organization that can assist mothers needing mental health support.

Finally, the project will be converted into a formal policy for the organization and undergo the approval process for policies. This approval will help to ensure the longevity of the project after site champions grow in their careers and assume new roles.

Dissemination plan.

Results of this project will be presented to nursing staff at a monthly staff meeting and to the medical providers at a monthly Division meeting. Final data and analyses were submitted to the Nursing Research Council at the organization and to the IRB at ECU. There is a plan to submit a poster of this project to area conferences that focus on mental health and neonatology. A shortened version of the project will also be submitted for publication in a journal related to neonatology. After further development of the policy and procedure, the project leader will apply to be a presenter at the state nursing organization's mental health symposium.

Final Summary

Enacting change in an organization takes planning and collaborations with many different aspects of healthcare. As research expands our knowledge of different health needs and interventions, quality improvement projects must be developed to assess the feasibility to implement these research recommendations and establish new ways to provide evidence-based patient care. Creating a project to increase screening of mothers of neonates in the NICU required a paradigm shift in the NICU at a North Carolina organization, taking family-centered care beyond involving families in medical rounds to viewing the family health system as a necessary part of caring for the patient. This project focused on assessing the feasibility of a guideline to universally screen mothers for PPD at set intervals while their babies were patients

in the NICU. The project was a success and showed that, although barriers to implementation existed, the goal was obtainable. Barriers such as provider buy-in and ease of documentation need to be addressed to make this guideline sustaining and to ensure that mothers are connected with resources for mental health support during the time their babies are in the NICU.

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Appendix A

Search Strategy Log

Database	Date	Search Terms	Limits	Results	Rationale for Inclusion / Exclusion
PubMed	8/24/2018	postpartum depression and NICU	none	86	
			Publication Date: 5 years	45	
			5 years, human species	37	18 kept- directly related to project question
PubMed		postpartum depression and neonatal intensive care unit	none	108	
			Publication Date: 5 years	61	31 kept- directly related to project question
PubMed		("Depression, Postpartum"[Mesh]) AND "Intensive Care Units, Neonatal"[Mesh]	none	48	
			Publication Date: 5 years	27	
			5 years, human species	27	15 kept- directly related to project question
PubMed		depression screening and neonatal intensive care unit	none	107	
			Publication Date: 5 years	51	28 kept- directly related to project question
			5 years, human species	36	21 kept- directly related to project question

CIHNAL	8/24/2018	(MH "Depression, Postpartum") AND (MH "Intensive Care Units, Neonatal")	none (was 2004-2018 avail)	53	23 kept- directly related to project question
PsycINFO	8/24/2018	postpartum depression and neonatal intensive care unit	none	49	
			publication date: 2013-2018	22	12 kept- directly related to project question
PsycINFO		maternal depression and neonatal intensive care unit	none	106	
			publication date: 2013-2018	64	17 kept- directly related to project question
PsycINFO		depression screening and neonatal intensive care unit	none	25	
			publication date: 2013-2018	17	9 kept- directly related to project question
CIHNAL Evidence Based Care Sheets	8/24/2018	postpartum depression: assessment and screening	none	1	1 kept
		postpartum depression in fathers	none	1	1 kept
Proquest	9/4/2018	postpartum depression and neonatal intensive care	publication date after 2013	50	10 kept- directly related to project question
		mesh.Exact("Intensive Care, Neonatal" OR "Intensive Care Units, Neonatal" OR "Depression, Postpartum")	publication date after 2013	27	3 kept- directly related to project question

		depression screening and neonatal intensive care	publication date after 2013	605	28 kept- directly related to project question
CIHNAL	9/11/2018	["depression screening" OR (MH "Mental Health Screening (Saba CCC)") OR (MH "Beck Depression Inventory, Revised Edition") OR (MH "Center for Epidemiological Studies Depression Scale") OR (MH "Edinburgh Postnatal Depression Scale") OR (MH "Self-Rating Depression Scale")] AND [(MH "Intensive Care Units, Neonatal") OR "neonatal intensive care unit" OR "NICU" OR "neonatal intensive care units" OR "NICUs"] AND ["postnatal depression" OR (MH "Depression, Postpartum") OR "postpartum depression" OR (MH "Postpartum Psychosis")]	none	102	
			English, 2013-2019	54	19 kept- strictly related to screening and NICU

PubMed	9/11/2018	((("Patient Health Questionnaire"[Mesh] OR depression screening OR depression scale OR Beck Depression Inventory, Revised Edition OR Center for Epidemiological Studies Depression Scale OR Edinburgh Postnatal Depression Scale OR Self-Rating Depression Scale)) AND ("Intensive Care Units, Neonatal"[Mesh] OR neonatal intensive care unit OR neonatal intensive care units OR NICU or NICUs or newborn ICU or newborn ICUs)) AND ("Depression, Postpartum"[Mesh] OR postpartum depression OR postnatal depression OR post-partum depression OR post-natal depression)	none	85	
			5 years	49	11 kept- strictly linked to screening and NICU
PsycINFO	9/11/2018	[DE "Neonatal Intensive Care" OR neonatal intensive care unit OR neonatal intensive care units OR NICU OR NICUs OR newborn intensive care unit OR newborn ICU OR neonatal ICU] AND [DE "Beck Depression Inventory" OR depression screening OR depression scale OR Beck Depression Inventory, Revised Edition OR Center for Epidemiological Studies OR OR Edinburgh Postnatal Depression Scale OR Self-Rating Depression Scale] AND [DE	none	85	14 kept- strictly linked to screening and NICU

		"Postpartum Depression" OR DE "Postpartum Psychosis" OR postpartum depression OR postnatal depression OR post-partum depression OR post-natal depression]			
ProQuest	9/11/2018	(neonatal intensive care unit OR NICU OR neonatal intensive care units OR NICUs OR newborn intensive care unit OR newborn ICU OR neonatal ICU) OR Exact("neonatal units") OR mesh.Exact("Intensive Care Units, Neonatal")) AND ("Patient Health Questionnaire" [Mesh] OR depression screening OR depression scale OR Beck Depression Inventory, Revised Edition OR Center for Epidemiological Studies Depression Scale OR Edinburgh Postnatal Depression Scale OR Self-Rating Depression Scale) AND ((postpartum depression OR postnatal depression OR post-partum depression OR post-natal depression) OR Exact("depression, postpartum" OR "postpartum depression") OR mesh.Exact("Depression, Postpartum"))	After 2013	164	3 kept- directly related to project question
Proquest	9/11/2018	postpartum depression screening and neonatal intensive care unit	After 2013	205	0 kept- didn't directly relate to project question
EBM Reviews Cochrane Database of	9/11/2018	depression screening and neonatal intensive care unit	none	2	neither fit project topic

Systematic Reviews					
TRIP	9/11/2018	(postpartum depression OR postnatal depression) AND (depression screening OR depression scale) AND (neonatal intensive care unit OR NICU OR newborn intensive care unit) from:2013	Since 2013	205	2 kept- directly related to project question
Google Scholar Search	9/11/2018	screening for postpartum depression in the NICU	2013-2019	2700	didn't go through
PubMed	9/11/2018	looked through saved articles- multiple search topics			
PubMed	9/28/2018	(edinburgh postnatal depression scale) AND neonatal intensive care unit, NICU	none	31	0 kept- didn't directly relate to use of screening tool in NICU
PubMed	9/28/2018	("edinburgh postnatal depression scale") AND validity	none	141	22 kept- related specifically to validation of EPDS in US population
Google Scholar Search	9/28/2018	for original EPDS article by Cox et al.			
		then looked at cited by list		4373	
		used Find for "NICU"		3	none related to validity of EPDS
		used Find for "neonatal"		24	none related to validity of EPDS
PubMed	10/1/2018	Beck theory of postpartum depression	none	11	7 kept (6 written by Beck)
Scopus	10/10/2018	Scheans, P., Mischel, R., Munson, M., & Bulaevskaya, K. (2016). Postpartum mood disorders screening in the NICU. *Neonatal network: NN*, *35*(4). 240-242. doi: 10.1891/0730-0832.35.4.240	none	1	no related citations noted, but did then link to a reference from article

Congress.gov	10/16/2018	postpartum depression	none	101	
			115 (2017-2018)	13	1 bill identified that could impact screening for PPD
Congress.gov		postpartum depression	none	101	
			became law	13	1 bill identified that could impact screening for PPD
Congress.gov		maternal mental illness	none	711	
			115 (2017-2018)	40	0 directly related to PPD
Congress.gov		maternal mental illness	none	711	
			became law	88	
Ncleg.net	10/16/2018	postpartum depression	2017-2018	1	did not apply
			2015-2016	0	
			2013-2014	0	
			2011-2012	0	
Ncleg.net		maternal mental illness	2017-2018	7	none related to PPD
			2015-2016	6	none related to PPD
			2013-2014	6	none related to PPD
			2011-2012	9	none related to PPD
PubMed	12/3/2018	“universal screening for postpartum depression”	Last 5 years	40	Kept 3- related to PPD screening

Appendix B

Evidence Matrix
Evidence as the Basis for Practice Change

Levels of Evidence

Level 1 - Systematic review & meta-analysis of randomized controlled trials; clinical guidelines based on systematic reviews or meta-analyses
Level 2 - One or more randomized controlled trials (RCT)
Level 3 - Controlled trial (no randomization)
Level 4 - Case-control or cohort study
Level 5 - Systematic review of descriptive & qualitative studies
Level 6 - Single descriptive or qualitative study
Level 7 - Expert opinion
Source: Melnyk, B.M. & Fineout-Overholt, E. (2011). *Evidence-based practice in nursing and healthcare: A guide to best practice.* Philadelphia: Lippincott, Williams & Wilkins. Retrieved from http://guides.lib.umich.edu/c.php?g=282802&p=1888246

Article (APA Citation)	Level of Evidence (I to VII)	Data/Evidence Findings	Conclusion	Use of Evidence in EBP Project Plan
Beck, C. T. (2002). Postpartum depression: A metasynthesis. *Qualitative Health Research, 12*(4). 453-472. doi: 10.1177/104973202129120016	Level V	A meta-synthesis of 18 qualitative studies on postpartum depression published between 1990-1999. Four perspectives on PPD emerged from research: incongruity between expectations and reality of motherhood, pervasive loss, spiraling downward, and making gains.	Mothers experiencing PPD experience many different symptoms, but four main themes are identified as central to the experience. These themes can help direct theory and intervention development related to PPD.	This study provides a strong theory that can be used to direct education for providers about the development and signs and symptoms of PPD.
Beck, C. T. (2002). Theoretical perspectives of postpartum depression and their treatment implications.	Level VI	Beck compares the different theoretical perspectives for assessment and treatment of PPD.	PPD in not a one-dimensional diagnosis that has one specific treatment.	These different theories are what screening and diagnosis is built upon.

American Journal of Maternal Child Nursing, 27(5), 282–287.		Five different theories were presented: medical model, feminist theory, attachment theory, interpersonal theory and self-labeling theory. Beck proposes that nurses can use different aspects of these theories to help mothers with PPD in different manners that address the many different aspects of PPD.	Depending on the theoretical lens used to view the diagnosis, treatment will vary. Nursing can combine theories to provide patients with holistic treatment options.	They provide a theoretical foundation for the identification of the disease and later development of specific screening tools.
Siu, A. L. & US Preventative Services Task Force. (2016). Screening for Depression in Adults US Preventive Services Task Force Recommendation Statement. *JAMA, 315*(4). 380-387. doi: 10.1001/jama.2015.18392	Level I	This was a meta-analysis done for the USPSTF to assess the available research on depression screening. This literature review assessed the areas of burden of disease, effectiveness and accuracy of screening options, risk of harm associated with screening and cost effectiveness of screening. The USPSTF also looked at the impact on specific populations, primarily the elderly and pregnant/postpartum, in each of these areas. Findings related to pregnant and postpartum women include: - there were six fair to good trials assessing the effectiveness of screening for depression in pregnancy and postpartum, which all showed some degree of benefit - there was one study that assessed potential harm of	The USPSTF concluded that it recommends screening for depression in the adult population, including pregnant and postpartum women. It also recommends the development of appropriate systems to ensure accurate diagnosis, treatment and follow-up.	This recommendation by the federal government to screening postpartum women for PPD supports the basis of this project.

		screening in pregnant and postpartum women and it found no harm associated with screening - Six RCT found a direct benefit to screening in pregnant and postpartum women - 23 studies found the EPDS accurate in identifying major depressive disorder - 10 RCTs found benefits for the use of cognitive behavioral therapy (CBT) for treatment in pregnant and postpartum women - Minimal to no harm associated with CBT in pregnant and postpartum women - There is evidence of potential harm to the fetus from the use of antidepressants during pregnancy, however the overall magnitude of harm is low - More research in the area of screening accuracy and potential harm of treatment options in pregnant and postpartum women is needed		
Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry, 150*. 782-786.	Level III	This study sought to test the validity of 10-item depression scale. A sample of non-depressed and depressed women were recruited. A researcher had the mother complete the depression	The 10-item Edinburgh Postnatal Depression Scale was found to be a valid screening tool for identifying postnatal	This research supports the use of the EPDS as a screening tool in the postpartum period for NICU mothers.

		scale during a home visit six weeks postpartum. This test scale was sealed so the research was blind to the results. Then the researcher administered Goldberg's Standardized Psychiatric Interview and using the Research Diagnostic Criteria to determine depressive illness. The scale was found to have a sensitivity for true positives of 86% and for true negatives of 78% when compared to whether the mothers met the research diagnostic criteria for depression. The results showed that women who scored above a 12/13 were likely to be suffering from depression and women who scored above 9/10 might be applicable in routine primary care settings.	depression in the first six weeks after delivery.	
Martin, C. R., & Redshaw, M. (2018). Establishing a coherent and replicable measurement model of the Edinburgh Postnatal Depression Scale. *Psychiatry Research, 264*. 182-191. doi: 10.1016/j.psychres.2018.03.062	Level II	This study looked at the use of the EPDS in two randomly selected sets of women at three and six months postpartum. A between-subject design was used to assess the EPDS fit model and the replicability and stability of this model. There were some statistically significant differences noted between the total EPDS scores, the EPDS-7 and a few of	The three factors models of the EPDS are best fit to the data for women at three and six months postpartum.	More current literature continues to show that the EPDS is a valid screening tool for assessing postpartum depression in women.

		the sub-scales in mean score coherence. Overall it was found that the three factor models of the EPDS had the best fit to the data and was replicable between two data sets.		
Gibson, J., McKenzie-McHarg, K.., Shakespeare, J., Price, J., & Gray, R. (2009). A systematic review of studies validating the Edinburgh Postnatal Depression Scale in antepartum and postpartum women. *Acta Psychiatrica Scandinavica, 119.* 350-364. doi: 10.1111/j.1600-0447.2009.01363.x	Level I	This was a systematic review with meta-analysis of studies that looked at the validity of the EPDS. 37 studies were identified and reviewed. The results showed there were mixed cut-off points for a positive screen, which influence the sensitivity and specificity of the screening tool. Overall, the sensitivity results were between 34 and 100%. The specificity results ranged from 44 to 100% and the positive likelihood ratios ranged from 1.61 to 78.	The studies had many varying results about the validity of the EPDS for screening for PPD, leading to the conclusion that the EPDS may not be appropriate in all settings.	This study validates the current policy at the medical center to use the EPDS to screen mothers. However, it does allow for some questioning of whether the EPDS is the most appropriate tool in the NICU population.
Boyd, R. C., Le, H. N., & Somberg, R. (2005). Review of screening instruments for postpartum depression. *Archives of Women's Mental Health, 8*. 141-153. doi: 10.1007/s00737-005-0096-6	Level IV	This review looked at eight self-reported screening tools for PPD. It performed meta-analysis for the studies found related to each screening tool. The results found that: - The Beck Depression Inventory had a high sensitivity - The Bromley Postnatal Depression Scale had	The authors conclude that the type of screening tool used should be impacted by the setting and population. It is also noted that screening timing can impact the validity of the tools and recommend that initial screening happened between two weeks and six months.	This study provides support for the use of the EPDS to screen for PPD and the importance of screening timing.

		moderate sensitivity and PPV with excellent specificity, however there was a lack of studies on this scale - The Center for Epidemiological Studies Depression Scale allows for easy administration in community samples, it has a low sensitivity rate - The Edinburgh Postnatal Depression Scale had good to moderate reliability - The General Health Questionnaire had good reliability and validity in general populations, however it is not widely studies - The Inventory of Depressive Symptomatology did not have enough available data to analyze yet its validity seems promising - The Postpartum Depression Screening		

		Scale has good internal consistency on the many aspects of the scale, however there is a lack of studies to assess the validity in different cultural settings The Zung Self-Rating Depression Scale had low sensitivity and PPV		
Reichenheim, M. E., Moraes, C. L., Oliveira, A. S. D. & Lobato, G. (2011). Revisiting the dimensional structure of the Edinburgh Postnatal Depression Scale (EPDS): Empirical evidence for a general factor. *BMC Medical Research Methodology, 11*(93). doi: 10.1186/1471-2288-11-93	Level V	This study looked at the validity creating a subset of scales from the EPDS in a population of Brazilian women with children less than five months. Confirmatory factor analysis (CFA) and exploratory factor analysis modeled within a CFA framework (E/CFA) were used to review the scores for the different questions on the EPDS. The results showed that poor discriminatory validity when using CFA.	While the EPDS appears to have independent dimensions within it, these dimensions do not have a strong enough discriminatory validity to be used as sub-scales.	This study shows that the EPDS can be a useful tool for screening for PPD but that when using it, it is important to not read too much into the answer for each individual question.
van der Zee-van den Ber, A. I., Boere-Boonekamp, M. M., IJzerman, M. J., Haasnoot-Smallegange, R. M. E., & Reijneveld, S. A. (2017). Screening for Postpartum Depression in well-baby care settings: A systematic review. *Maternal Child Health Journal, 21*. 9-20. doi: 10.1007/s10995-016-2088-8	Level I	This meta-analysis of 6 articles assessed the impact of screening for PPD at the well-child visit. It found that the interventions in the studies as well as the specific screening tools differed between many of the studies. This limited the ability to full evaluate the	The results show that there is great potential that screening for PPD in well child visits with an effective tool, such as the EPDS, can improve detection of PPD and when combined with treatment,	This study further supports the universal screening of women for PPD in health settings outside of the obstetrics and gynecology office.

		impact of screening for PPD. Overall, three of the six studies presented detection and referral rates. Four of the six studies that combined screening with enhance care, showed improvement in depression scores after intervention. None of the studies assessed for impact of screening on child development or socio-emotional well-being.	improve depression scores. Further research on long term impact for mothers and their children is needed.	
van der Zee-van den Ber, A. I., Boere-Boonekamp, M. M., Groothuis-Oudshoorn, C. G. M., IJzerman, M. J., Haasnoot-Smallegange, R. M. E., & Reijneveld, S. A. (2017). Post-Up study: Postpartum Depression screening in well-child care and maternal outcomes. *Pediatrics, 140*(4). doi: 10.1542/peds.2017-0110	Level IV	This was a prospective, comparative study of PPD screening at one, three, and six months well child visits and care as usual (CAU). All Dutch women visiting the Well-Child Care (WCC) centers were recruited into the study and assignment to intervention vs CAU group was based on registered home address and WCC used. The EPDS was used to screen mothers in the intervention group. The intervention group had 1834 mothers and the CAU group had 1246 mothers. General demographic information for both groups was similar. At nine months, 0.6% of mothers in the intervention group had depression compared to 2.5% in the CAU	This study showed universal screening for PPD in WCC centers had a significant impact on maternal depression and overall well-being.	This study supports the use of universal screening for PPD in primary care settings.

		group. For major depression, the OR was 0.28, 95% confidence interval of 0.12 to 0.63).		
De Magistris, A., Coni, E., Puddu, M., Zonza, M., & Fanos, V. (2010). Screening of postpartum depression: Comparison between mothers in the neonatal intensive care unit and in the neonatal section, *Journal of Maternal-Fetal & Neonatal Medicine, 23*(sup3). 101-103. doi: 10.3109/14767058.2010.506759	Level IV	This study looked at prevalence and associated risk factors for PPD in two groups of women: the first were women with babies admitted to the NICU and the second group were women with healthy term babies. The EPDS was used to screen the women in both groups for PPD and an informal in person interview was used to obtain personal information about the women. The EPDS scores and demographic/personal information was compared between the two groups. 23% of women with babies in the NICU screened positive for PPD compared to 8% of women with health term babies. It was also found that among the women with babies in the NICU, having a lower gestational aged baby, a longer hospitalization and more serious clinical problems correlated with increased rates of screening positive.	The study found that women with babies in the NICU were at an increased risk for PPD when compared to mothers with healthy full-term babies.	This article helps to strengthen the value of screening for PPD in the NICU since it proves that these mothers are at an increased risk for developing PPD.
Hynan, M. T., Mounts, K. O., & Vanderbilt, D. L. (2013). Screening parents of high-risk infants for emotional	Level VII	The authors present current literature on the prevalence and severity of PPD and offer	Screening in the NICU can be beneficial for parents if there are resources	The review of literature supports screening NICU mothers for PPD,

distress: rationale and recommendations. *Journal of Perinatology, 33*(10). 748-753. doi: 10.1038/jp.2013.72		recommendations on screening and interventions for PPD based on this information. - Screening is recommended only if appropriate referral services are available. - Early screening can result in false positive, mistaking baby blue for PPD - Parents with LOS >10-14 days should be screened upon discharge - Monitor parents with positive screens for emotionally and socially supportive environments - All NICUs should have a referral process for parents needed psychological assistance	available for support once positive screening is identified.	however the best timing of this screening is not clear.
Mounts, K. O. (2009). Screening for maternal depression in the Neonatal ICU. *Clinics in Perinatology, 36* (1). 137-152. doi: 10.1016/j.clp.2008.09.014	Level VII	This article reviews current literature about the implementation of universal screening for PPD in the NICU and addressed how to develop and implement a standardized program. Barriers are grouped into patient-centered, staff-centered and system-based barriers. Different screening tools are evaluated. How to choose the	Universal screening is feasible in the NICU with adequate preparation and referral resources, however more research is needed to optimize the process.	This article helps to bring together prior research and literature on the different components of developing the implementation of standardized universal screening for PPD in the NICU.

		person responsible for screening and follow up care is also discussed. The author concludes that universal screening is feasible in the NICU with adequate preparation and referral resources, however more research is needed to optimize the process.		
Zerden, M. L., Falkovich, A., McClain, E. K., Verbiest, S., Warner, D. D., Wereszczak, J. K., & Stuebe, A. (2017). Addressing unmet maternal health needs at a pediatric specialty infant care clinic. *Women's Health Issues, 27*(5), 559–564. doi: 10.1016/j.whi.2017.03.005	Level VI	This article sought to assess the feasibility of screening for depression, tobacco exposure and family planning in mothers at a post-NICU follow-up visit. Screenings were given to 100 caregivers at follow-up appointments. Responses were evaluated, and appropriate referrals made. Staff surveys were also conducted to evaluate satisfaction with the screening process. Of the caregivers screened, 25% referral criteria in at least one area. Staff felt comfortable giving and evaluating the screenings. There was also minimal disruption of workflow reported by staff.	It is feasible to institute universal screening for specific health issues in a post-NICU follow-up visit with minimal disruption to staff work flow.	This study helps to dispel provider concerns about the disruptiveness of instituting universal screening of PPD.
Scheans, P., Mischel, R., Munson, M., & Bulaevskaya, K. (2016). Postpartum mood disorders screening in the NICU. *Neonatal network: NN, 35*(4). 240-242. doi: 10.1891/0730-0832.35.4.240	Level VI	Universal screening of mothers of infants in the NICU was performed at two weeks, one month, two months and four months postpartum using the Edinburgh Postnatal Depression	Implementation of universal screening can be implemented in the NICU environment.	The barriers and outcomes of this study can guide the development of the current study to reduce barriers and improve

		Scale. Screening and referral were the primary responsibility of lactation consultants. An algorithm was created to guide the referral process. Over the first two years of the program, 90% of mothers were screened, with 18-20% screening positive for PPMD.		outcomes in a NC NICU.
Lambarth, C. H., & Green, B. L. (October 2015). *Maternal post-partum mood disorder screening implementation in a neonatal intensive care unit: Lessons learned through Multnomah Project LAUNCH*. Portland, OR: Portland State University Center for Improvement of Child & Family Services. Retrieved from https://www.pdx.edu/ccf/sites/www.pdx.edu.ccf/files/PPMD%20Screening%20Implementation%20Issue%20Brief_2015-10-31.pdf	Level VI	More detailed release on LAUNCH project presented in Scheans, Mischel, Munson, & Bulaevskaya, (2016) article - Education provided in conjunction with Oregon's Pediatric Society's START (Screening Tools and Referral Training) program - Used EPDS to screen at two weeks, one month, two months and four months postpartum - Screening done by lactation consultant - Screener would document score and referral in EHR - Documented information would be included in discharge summary - First two years of the program, 90% of mothers	Implementation of universal screening can be implemented in the NICU environment. Barriers identified were mothers declining screening or referral for multiple reasons and provider concerns about HIPPA and impact to workflow.	The barriers and outcomes of this study can guide the development of the current study to reduce barriers and improve outcomes in a NC NICU

		were screened, with 18-20% screening positive for PPMD.		
Cherry, A., Blucker, R., Thornberry, T., Hetherington, C., McCaffree, M. A., & Gillapsy, S. (2016). Postpartum depression screening in the Neonatal Intensive Care Unit: Program development, implementation, and lessons learned. *Journal of Multidisciplinary Healthcare, 9*. 59-67. doi: 10.2147/JMDH.S91559	Level VI	One-time screening of mothers at 14 days postpartum was done over an 18-month period in a south, central US NICU. Prior to implementation, multiple changes were made to who had responsibility for completing the screening. The Postpartum Depression Screening Scale (PDSS) was used. Many different barriers were identified and grouped into the following categories: establishing contact, administrative and referral barriers. The study screened 48.5% of eligible mothers during the 18-month period.	The different areas of barriers identified show the difficulty of implementing standardized screening for PPD in the NICU.	When developing this project, some of these barriers can be addressed prior to implementation, potentially helping to increase the compliance rate for screening.

Appendix C

Organizational Readiness for Change Assessment

Adopted from Helfrich, Li, Sharp, & Sales (2009)

Area	Question scored 1 (strongly disagree) to 5 (strongly agree)	Score
Evidence Assessment	1. Based on your assessment of the evidence basis for this statement, please rate the strength of the evidence in your opinion	4
	2. Rate the strength of the evidence basis for this statement based on how you think respected clinical experts in your institution feel about the strength of the evidence	4
	3. The proposed practice changes or guideline implementation:	
	a. are(is) supported by RCTs or other scientific evidence from other health care systems	3
	b. should be effective, based on current scientific knowledge	4
	4. The proposed practice changes or guideline implementation:	
	a. are supported by clinical experience with patients in other health care systems	4
	b. conform to the opinions of clinical experts in this setting	5
	5. The proposed practice changes or guideline implementation:	
	a. are consistent with clinical practices that have been accepted by patients	4
	b. take into consideration the needs and preferences of patients	4
	c. appear to have more advantages than disadvantages for patients	5
Context Assessment	1. Senior leadership/clinical management in your organization:	
	a. reward clinical innovation and creativity to improve patient care	5
	b. solicit opinions of clinical staff regarding decisions about patient care	3
	c. seek ways to improve patient education and increase patient participation in treatment	4
	2. Staff members in your organization:	
	a. have a sense of personal responsibility for improving patient care and outcomes	4
	b. cooperate to maintain and improve effectiveness of patient care	5
	c. are willing to innovate and/or experiment to improve clinical procedures	5
	d. are receptive to change in clinical processes	4
	3. Senior leadership/Clinical management in your organization:	

	a. provide effective management for continuous improvement of patient care	4
	b. clearly define areas of responsibility and authority for clinical managers and staff	5
	c. promote team building to solve clinical care problems	5
	d. promote communication among clinical services and units	5
	4. Senior Leadership/clinical management in your organization:	
	a. provide staff with information on performance measures and guidelines	3
	b. establish clear goals for patient care processes and outcomes	5
	c. provide staff members with feedback/data on effects of clinical decisions	3
	d. hold staff members accountable for achieving results	4
	5. Opinion leaders in your organization	
	a. believe that the current practice patterns can be improved	5
	b. encourage and support changes in practice patterns to improve patient care	5
	c. are willing to try new clinical protocols	5
	d. work cooperatively with senior leadership/clinical management to make appropriate changes	4
	6. In general, in my organization, when there is agreement that change needs to happen:	
	a. we have the necessary support in terms of budget or financial resources	4
	b. we have the necessary support in terms of training	4
	c. we have the necessary support in terms of facilities	4
	d. we have the necessary support in terms of staffing	4
Facilitation Assessment	1. Senior leadership/clinical management will:	
	a. propose a project that is appropriate and feasible	4
	b. provide clear goals for improvement in patient care	4
	c. establish a project schedule and deliverables	5
	d. designate a clinical champion(s) for the project	5
	2. The Project Clinical Champion (Clive Tucceri, Mary B. Lee):	
	a. accepts responsibility for the success of this project	4
	b. has the authority to carry out the implementation	4
	c. is considered a clinical opinion leader	3
	d. works well with the intervention team and providers	5
	3. Senior Leadership/Clinical management/staff opinion leaders:	
	a. agree on the goals for this intervention	5

b. will be informed and involved in the intervention	5
c. agree on adequate resources to accomplish the intervention	5
d. set a high priority on the success of the intervention	3
4. The implementation team members (Clive Tucceri, Mary B. Lee):	
a. share responsibility for the success of this project	4
b. have clearly defined roles and responsibilities	5
c. have release time or can accomplish intervention tasks within their regular work load	5
d. have staff support and other resources required for the project	5
5. The implementation plan for this intervention:	
a. identifies specific roles and responsibilities	5
b. clearly describes tasks and timelines	5
c. includes appropriate provider/patient education	5
d. acknowledges staff input and opinions	4
6. Communication will be maintained through:	
a. regular project meetings with the project champion and team members	4
b. involvement of quality management staff in project planning and implementation	3
c. regular feedback to clinical management on progress of project activities and resource needs	4
7. Progress of the project will be measured by:	
a. collecting feedback from patients regarding proposed/implemented changes	2
b. collecting feedback from staff regarding proposed/implemented changes	4
c. developing and distributing regular performance measures to clinical staff	4
d. providing a forum for presentation/discussion of results and implications for continued improvements	5
8. The following are available to make the selected plan work:	
a. staff incentives	0
b. equipment and materials	5
c. patient awareness/need	4
d. provider buy-in	4
e. intervention team	4
f. evaluation protocol	3
9. Plans for evaluation and improvement of this intervention include:	
a. periodic outcome measurement	4
b. staff participation/satisfaction survey	2

	c. patient satisfaction survey	0
	d. dissemination plan for performance measures	5
	e. review of results by clinical leadership	5
Total		288/350

Appendix D

SWOT Analysis

Strengths	Weaknesses
• Use of SmartText for charting creates uniform documentation • Supported by current literature • Organization is innovation focused • Organization supports family centered care in NICU	• Needs buy in from multiple specialties • Residents frequently change rotations/sites • Not specifically focused on patients, more family focused • Not a topic frequently discussed during patient rounds
Opportunities	**Threats**
• No current policy that needs to be changed • Topic is beginning to be discussed more in interdisciplinary rounds and literature	• Concerns about score of practice • Lack of time and resources for connecting with mothers to complete screening

Appendix E

Nurse Manager Approval Letter

Dear Sir or Madam,

I approve of Clivey Tucceri's DNP project in the Newborn Critical Care Center at UNC Hospital.

Sincerely,

[redacted]

University of North Carolina Hospitals, 101 Manning Drive, Chapel Hill, North Carolina 27514

Appendix F

Medical Director Approval Letter

UNC SCHOOL OF MEDICINE

UNC HEALTH CARE Children's

The University of North Carolina at Chapel Hill
Department of Pediatrics
Division of Neonatal-Perinatal Medicine
101 Manning Drive, 4th Floor, CB # 7596
Chapel Hill, NC 27599-7596
Office: (984) 974-5063 • Fax: (984) 974-7857

November 29, 2018

East Carolina University
Re: DNP-FNP project for Clivey Tucceri, RN

To Whom it May Concern:

I reviewed the proposal and approve the DNP-FNP project for Clivey Tucceri, RN involving screening for postpartum depression.

The Newborn Critical Care Center at UNC Hospitals can serve as a site for this project and can provide support for Clivey Tucceri, RN in this endeavor.

If there are questions, I can be reached at the enclosed address.

Sincerely,

[redacted]

Appendix G

Nursing Research Council Pre-Approval Letter

UNC HEALTH CARE

November 20, 2018

Dear Ms. Tucceri,

Thank you for your interesting in conducting a nursing-related research study at UNC Medical Center. Please refer to the proposal application and deadline calendar that I previously sent to you, and when ready, submit your application to nursingresearch@unchealth.unc.edu. Additional details, including a Frequently Asked Questions document, are available on the Nursing Research Council's (NRC) SharePoint site (https://collab.unchealthcare.org/sites/NRC/SitePages/House-wide%20Nursing%20Research%20Research%20Council%20Homepage.aspx).

If your proposal is reviewed and approved by the NRC and UNC-CH IRB, and has the approval of the Nurse Manager for the unit where the proposed project would take place, you will receive a letter stating that your project can be conducted. Studies cannot proceed without these approvals. If you have additional questions, please e-mail nursingresearch@unchealth.unc.edu.

Kind Regards,

[redacted]

Appendix H

ECU IRB Submission

ECU

Click "download PDF" to save a copy of this page for your records.
Note: The IRB Office does not maintain copies of your responses.

Below is a summary of your responses Download PDF

Quality Improvement/Program Evaluation Self-Certification Tool

Purpose:
Projects that do not meet the federal definition of human research pursuant to 45 CFR 46 do not require IRB review. This tool was developed to assist in the determination of when a project falls outside of the IRB's purview.

Instructions:
Please complete the requested project information, as this document may be used for documentation that IRB review is not required. Select the appropriate answers to each question in the order they appear below. Additional questions may appear based on your answers. If you do not receive a STOP HERE message, the form may be printed as certification that the project is "not research", and does not require IRB review. The IRB will not review your responses as part of the self-certification process.

Name of Project Leader:

Clive Tucceri

Project Title:

Standardized Universal Screening for Postpartum Depression in NICU Mothers

Brief description of Project/Goals:

The question that this project seeks to answer is whether creating a clinical guideline for standardization of PPD screening in the NICU will increase the rate of mothers who receive PPD screening and referral if a positive screening occurs while their infant is admitted? Population. This QI project assesses all mothers who had babies admitted to the NICU at a central North Carolina hospital during the summer of 2019. The hospital sees roughly 800 mothers per year from across the state. The average length of stay for these neonates in the NICU is 25 days before discharge home or transfer to another unit (W. Price, personal communication, September 11, 2018). Intervention. A clinical guideline will be developed to help ensure that every mother is assessed for PPD during the time their baby is admitted to the NICU. If screened positive, a referral for treatment is made. Mothers will be screened utilizing a standardized, self-administered screening tool, the Edinburgh Postnatal Depression Scale (EPDS). Screening will be done at routine times throughout the admission and the number of times a mother is screened will be determined by the length of the admission. Screening will be done at 2 weeks, 1 month, 4 months, 6 months postpartum, and then once more upon discharge. The provider for the neonate, either a resident or nurse practitioner, will review the results and determine if a referral is warranted. Screening timing and results will be noted in the health promotion section of the neonate's progress notes. Discharge documentation for the neonate will include the screening score of the mother and if referrals were made for services. Comparison. It is expected that the rates of positive screens will reflect those of prior research. The comparison in this project is the current, unstandardized practice. Screening is done only as mothers present a concern to a provider or the medical team notes symptoms that are disruptive to the care of the neonate. Outcome. The measured outcome will look at compliance of practitioners with the new guidelines. Discharge summaries and progress notes will be audited throughout the intervention phase to assess whether screening is being done and properly documented. The aim of the project is to initiate standardization for screening and documentation of PPD in the NICU. Since there is no existing standard practice, there are no prior metrics for comparison. Once the project has been integrated, screening, and documentation rates can be gathered. These will be used to monitor the progress; however, establishing rates is beyond the scope of this project.

Will the project involve testing an experimental drug, device (including medical software or assays), or biologic?

☐ Yes

■ No

Has the project received funding (e.g. federal, industry) to be conducted as a human subject research study?

☐ Yes

■ No

Is this a multi-site project (e.g. there is a coordinating or lead center, more than one site participating, and/or a study-wide protocol)?

- [ ] Yes
- [x] No

Is this a systematic investigation designed with the intent to contribute to generalizable knowledge (e.g. testing a hypothesis; randomization of subjects; comparison of case vs. control; observational research; comparative effectiveness research; or comparable criteria in alternative research paradigms)?

- [ ] Yes
- [x] No

Will the results of the project be published, presented or disseminated outside of the institution or program conducting it?

- [x] Yes
- [ ] No

Would the project occur regardless of whether individuals conducting it may benefit professionally from it?

- [x] Yes
- [ ] No

Does the project involve "no more than minimal risk" procedures (meaning the probability and magnitude of harm or discomfort anticipated are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests)?

- [x] Yes
- [ ] No

Is the project intended to improve or evaluate the practice or process within a particular institution or a specific program, and falls under well-accepted care practices/guidelines?

- [x] Yes
- [ ] No

Based on your responses, the project appears to constitute QI and/or Program Evaluation and IRB review is not required because, in accordance with federal regulations, your project does not constitute research as defined under 45 CFR 46.102(d). If the project results are disseminated, they should be characterized as QI and/or Program Evaluation findings. Finally, if the project changes in any way that might affect the intent or design, please complete this self-certification again to ensure that IRB review is still not required. Click the button below to view a printable version of this form to save with your files, as it serves as documentation that IRB review is not required for this project. 4/12/2019

Appendix I

Nursing Research Council Approval Letter

UNC HEALTH CARE

April 4, 2019

To: Clive E. Tucceri

Re: Proposal Number 2/17/19_70

Dear Clive,

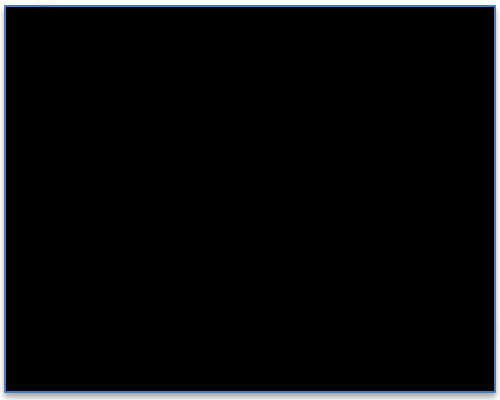
Thank you for submitting your proposal to the UNCH Nursing Research Council (NRC). The NRC has approved your proposal, *Standardized Universal Screening for Postpartum Depression in NICU Mothers*. Mary Kime will be the NRC contact to assist you. You may reach her at Mary.kime@unchealth.unc.edu. If you have any questions, please do not hesitate to contact either Mary or Jennifer Myers, NRC Chairperson.

Because your project may be included as part of Magnet site visit materials, you are required to do the following:

1. Keep the NRC updated on the progress of your study.
2. Include "*submit a final report to UNCH Nursing Research Council*" as part of the "Dissemination" plan in your IRB application.
3. Submit your NRC Final Report Form to nursingresearch@unchealth.unc.edu when your data analysis and conclusions are completed. If you have questions about the final report form, please email the Nursing Research Council email address listed above.

Thank you for choosing UNCH as the site for your project and we appreciate the opportunity to review. We look forward to hearing the results of your project and would enjoy having you present at an NRC meeting to share your findings. If you have any questions about the above requirements please do not hesitate to contact me.

We wish you the best.



Appendix J

Data Collection Tool

Bedspot	Admit Date	Inborn/Transfer	Term/Preterm	Day of life	NNP or Resident?	Screening Due?	Screening Documented?	Referral Needed	Referral Documented	Discharge Date	Length of Stay (days)

Appendix K

Implementation Data

	Screening Opportunities	Screenings Completed	Percent
Total	**168**	**43**	**25.6**
Set Interval	80	26	32.5
Discharge	96	17	17.7
Referrals	**8**	**8**	**100**

*plus eight screenings performed when not required by guidelines

Appendix L

Provider Type Data

	Screening Opportunities	Screenings Completed	Percent
Residents Total	**88**	**27**	**30.7**
Residents Interval	27	15	55.6
Residents Discharge	61	12	19.7
Nurse Practitioner Total	**79**	**16**	**20.3**
Nurse Practitioner Interval	45	11	24.4
Nurse Practitioner Discharge	34	5	14.7

Appendix M

Patient Type Data

	Screening Opportunities	Screenings Completed	Percent
Preterm	**112**	**30**	**26.8**
Preterm Interval	58	21	36.2
Preterm Discharge	54	9	16.7
Term	**56***	**13**	**23.2**
Term Interval	14	5	35.7
Term Discharge	41	8	19.5
Inborn	**120**	**31**	**25.8**
Inborn Interval	54	21	38.9
Inborn Discharge	66	10	15.2
Transfer	**48***	**12**	**25.0**
Transfer Interval	18	5	27.8
Transfer Discharge	29	7	24.1

* Totals include one screening conducted off guidelines for a neonate returning to another hospital