Gravens By Design: Selected Abstracts from the 35th Annual Gravens Conference on the Environment of Care for High Risk Newborns: Resiliency and Change in the NICU

Robert White, MD, Joy Brown, PhD, Vincent Smith, MD, Mitchell Goldstein, MD, MBA, CML

Selected abstracts from the the 34th Annual Gravens Conference are presented below:

Poster Abstracts Table of Contents:

Gravens2022-19	Maternal self-report of the impact of COVID-19 restrictions on their presence at bedside in a Level IV NICU
Gravens2022-20	Nurses' implementation of skin-to-skin contact in the NICU is related to their perceptions of family-centered care
Gravens2022-21	Health Equity Beyond the NICU: Perspectives from Family, Staff, and National Experts on Improving Accessibility and Experience in NICU Follow-Up Clinic
Gravens2022-22	Multidisciplinary Approach to the Creation of Developmental Neuroprotective Care Guidelines in a Level IV NICU
Gravens2022-23	Mothers' of Preterm Infants Subjective Experiences of a Newborn Behavioral Observations (NBO) Parenting Support Intervention
Gravens2022-24	Adaptation and Integration of the Family Centered Care team in NICU decision making processes during a pandemic and transformational changes in the NICU.
Gravens2022-25	Nutrition Care Team Experience of Novel Human Milk Fortifier in US Neonatal Intensive Care Units
Gravens2022-26	COVID-19 Pandemic Experiences and Maternal Stress in Neonatal Intensive Care Units
Gravens2022-27	A Music-Based Intervention to Reduce Stress in the Hospitalized Preterm Infant
Gravens2022-28	"My Brigham Baby" App: Using Technology to Advance Parent Engagement and Promote Resilience in the Neonatal Intensive Care Unit
Gravens2022-29	"There's No Place Like Home" -- Improving NICU Discharge Education and Preparation
Gravens2022-30	Identifying Barriers to Quality Mother-Infant Interactions in the NICU through Naturalistic Systematic Observations
Gravens2022-31	You've Got Milk: A NICU Lactation Journey
Gravens2022-32	Quality Improvement Project to Achieve Early Full Enteral Feeds in Preterm Infants at a Level IV Neonatal Intensive Care Unit
Gravens2022-33	Skin Integrity: Reducing Diaper Dermatitis in the NICU
Gravens2022-34	Thermoregulation: A Developmentally Focused, Infant-Driven Transition from Isolette to Open Crib
Gravens2022-35	Incubator-based noise control system: quantifying size of attenuation zone
Gravens2022-36	Characteristics and Outcomes of Neonatal Opioid Withdrawal Syndrome in Preterm Infants: A Retrospective Cohort Study in the Current Era
Gravens2022-37	Empowering Parents, Expediting Discharge, and Promoting Long-Term Feeding Success with Cue-Based Feeding and Telehealth Home NG Follow-Up Clinic
Gravens2022-38	An Educational Approach to Increase

	the Use of Kangaroo Care in the Neonatal Intensive Care Unit
Gravens2022-39	Understanding the Couplet Care Environment and its effect on bonding between the mother and infant dyad
Gravens2022-40	Organizational Health Literacy: Information and Environmental Assessments of a NICU Follow-Up Clinic

Gravens2022-1

Abstract Title: Are We Listening: Addressing Health and Racial Equity in the NICU

Author: Ms. Jenne Johns, MPH

Once Upon A Preemie, Inc

PO Box 471, Essington, PA 19029

267-616-0188

jenneassistant@gmail.com

Background and Purpose: Addressing racial equity and implicit bias is now a top national priority. The United States has a long-standing history of health disparities, many of which are expensive, avoidable and preventable. African American women and babies have experienced these health disparities at alarming rates. African American families are also disproportionately impacted by higher rates of infant and maternal morbidity, mortality and premature birth rates. According to the 2019 March of Dimes Report Card, the United States premature birth rate is 10%, and this rate increased four years consecutively. In addition, the preterm birth rate in African American women is reported 49% higher than all other women. Research studies also suggest that African American women and babies in healthcare settings (including the Neonatal Intensive Care Unit) experience higher rates of implicit bias from the clinical care team if they are not culturally congruent. Closing these health and racial gaps in healthcare and in the NICU requires implicit bias training as a first step to transform organizational culture and improve quality of care delivered to African American babies. The purpose of this presentation is to introduce challenges and solutions for addressing training gaps in perinatal and neonatal care.

Materials and Methodology: In 2020, a nationwide virtual survey was launched to explore current health and racial equity training trends in perinatal and neonatal healthcare institutions. The survey remained open for a two-week period, and engaged healthcare professionals, and neonatal family advocates with professional and personal experiences with health disparities. Survey participants voluntarily completed the survey without compensation. Based on the survey responses, a virtual health and racial equity training academy launched November of 2020 for perinatal and neonatal healthcare professionals and offered free continuing education credits.

Results: The virtual health and racial equity training academy offered four training workshops to healthcare professionals nationwide. Nearly 800 professionals attended four one-hour training sessions, and less than half requested the free continuing education credits. Nearly 50% of participants were nurses, over 65% reported experiences or witnessing racial inequities in their healthcare settings, and 65% of participants reported taking action on health equity based on what they learned during the training program. 100% of participants requested opportunities to continue learning more about health and racial inequalities in perinatal and neonatal healthcare.

Conclusion: Given the nations national priority and attention on the black maternal health crisis, and the alarmingly growing rates of prematurity among African American women, the imperative for professional training is now. Action oriented training solutions offer health care professionals opportunities to decrease rates of racial disparities in clinical outcomes, improve patient satisfaction and increase trust among patients and providers. Adopting lessons learned from health care professionals with solutions to addressing systemic and systematic racial injustices, paired with listening to NICU parents are the key steps to moving the needle on improving the delivery of equitable care for all families.

Learning Objectives:

At the conclusion of this participants will (learning objectives include:)

1. Increase awareness of current racial and ethnic disparities data trends in premature birth rates.
2. Explore current health and racial equity training solutions for perinatal and neonatal healthcare professionals.
3. Address the preemie parent lens on ways that healthcare professionals can deliver culturally competent, family centered, and equitable care.

Gravens2022-2

Abstract Title: Mothers' Quality of Sleep during Their Infants' NICU Hospitalization : Influencing factors and associated characteristics

Authors: Valérie Lebel, Nancy Feeley, Stephanie Robins, Robyn Stremler

Corresponding Author:

Valérie Lebel, RN, PhD

Professor

Université du Québec en Outaouais

5 St-Joseph, St-Jérôme, Québec, Canada, J7Z 0B7

1 800 567-1283

valerie.lebel@uqo.ca

Background and Purpose: Mothers commonly experience sleep disturbances and sleep deprivation when their newborn infant is hospitalized in a NICU (Haddad et al., 2019). Sleep disturbances can negatively affect their quality of life (more negative perception of parent-infant relationship; lower attachment scores; fatigue; lower perception of own physical and psychological well-being). Several factors may influence the sleep of mothers with an infant in the NICU. However, few studies have examined these factors. The aim of the present study is to determine if mothers' perceptions of noise and light, their NICU-related stress, symptoms of postpartum depression, presence on the unit, other children at home, and perception of family-centered care were associated with mothers' sleep quality.

Materials and Methodology: This study is a secondary analysis of data from a quasi-experimental pre-post study (Feeley et

al., 2020). Mothers were invited to participate if they could read French or English, lived within an hour of the hospital during hospitalization, and their infant was hospitalized in the NICU for two weeks or more and considered stable by the medical team at the time of recruitment. Recruitment took place in a level 3 NICU in Montreal, Quebec, Canada. Parents could be present at their infants' bedside at all times but could not sleep at the bedside, as space was limited. One room was available for parents to sleep near the unit and had to be reserved by parents who wished to stay overnight. Some parents were transferred to a single-family room with their infant (for step down care) where a recliner chair was available to sleep overnight.

Once mothers provided written informed consent, they completed an online or paper questionnaire. The sociodemographic questionnaire was completed at enrollment and included questions about mothers' characteristics such as age, level of education and number of children. At enrollment, mothers also self-reported their presence in the NICU in hours per day for the previous 7-day period and indicated whether they were expressing breastmilk. In addition, participants completed the General Sleep Disturbance Scale (GSDS), the Parental Stress Scale: Neonatal Intensive Care Unit questionnaire (PSS:NICU), the Edinburgh Postnatal Depression Scale (EPDS), the noise and light (NL) questionnaire and the Family-Centered Care Questionnaire (FCCQ) at enrollment.

Sociodemographic data were analyzed with descriptive statistics. Pearson correlations were performed to identify associations between variables (GSDS, noise and light subscales of the NL questionnaire, PSS: NICU, EPDS, FCCQ, presence in the unit, other children at home, breast milk expression, infant gestational age and length of stay). Subsequently, to explain mothers' quality of sleep, a binary logistic regression model including the following independent variables was conducted: mothers' perception of noise and light; NICU- related stress; symptoms of postpartum depression; presence on the unit (hours per week); having other children; and family-centered care.

Results: A total of 132 mothers were included. Participants had a mean age of 32 years, and for most (59.8%), the infant in the NICU was their first child. Infants' mean gestational age was 29 weeks. A large proportion of mothers had a junior college or university education (74.2%) and a partner (91.7%). The family income for 59.1% of participants was between $25,000 and $104,999. Most participants were Canadian citizens (83.3%) and the mean hospital length of stay for the infants of participating mothers was 58.21 days.

There were significant positive correlations between sleep disturbances and levels of stress, depressive symptoms, and breast milk expression, suggesting that mothers with greater sleep disturbances experience more NICU stress and more depressive symptoms. Mothers expressing their breast milk also had greater sleep disturbances than those not expressing. In addition, a significant negative correlation was detected between sleep disturbances and family-centered care, suggesting that mothers who reported higher family-centered care experienced fewer sleep disturbances. In addition, the odds that a mother has clinically significant sleep disturbance was 3.12 (95% CI 1.08– 9.00, p = .04) times higher for mothers with other children at home compared to mothers without. Moreover, as mothers spend more time in the NICU, the likelihood of clinically significant sleep disturbances increased (OR 1.36, 95% CI 1.02 −1.81, p = .04). Lastly, as depressive symptoms increased, the likelihood of clinically significant sleep disturbances increased (OR 1.18, 95% CI 1.07– 1.32, p = .00).

Conclusion: In conclusion, our results allow further understanding of the factors that may influence the quality of sleep of mothers whose infant is hospitalized in the NICU. In addition, these results allow the identification of mothers having a higher possibility for sleep disturbance, which enables the implementation of targeted interventions to promote adequate sleep.

Bibliography:

1. *Baumgartel, K., & Facco, F. (2018). An integrative review of the sleep experiences of mothers of hospitalized preterm infants. Nursing for Women's Health, 22(4), 310–326. https://doi.org/10.1016/j.nwh.2018.05.003*
2. *Feeley, N., Robins, S., Genest, C., Stremler, R., Zelkowitz, P., & Charbonneau, L. (2020). A comparative study of mothers of infants hospitalized in an open ward neonatal intensive care unit and a combined pod and single-family room design. BMC Pediatrics, 20(1), 38–46. https://doi.org/10.1186/s12887-020-1929-1*
3. *Haddad, S., Dennis, C. L., Shah, P. S., & Stremler, R. (2019). Sleep in parents of preterm infants: A systematic review. Midwifery, 73, 35–48. https://doi.org/10.1016/j.midw.2019.01.009*
4. *Lebel, V., Feeley, N., Robins, S. & Stremler, R. (2021). Factors influencing mothers' quality of sleep during their infants' NICU hospitalization. Behavioral Sleep Medicine. Pre-publication. https://doi.org/10.1080/15402002.2021.1971985*

Learning Objectives:

1. Recognize the factors influencing mothers' quality of sleep during their infants' hospitalization in a NICU
2. Understand the factors influencing mothers' quality of sleep during their infants' hospitalization in a NICU.

Gravens2022-3

Abstract Title: The value of understanding NICU nurse perspectives on voice use and auditory development in very preterm infants

Authors: Amy Smith, Deanna Hanson-Abromeit, Ashley, Heaton, Brenda Salley

Corresponding Author:

Amy Smith, PhD, MT-BC

Post Doctoral Research Scholar

Children's Mercy Research Institute

2401 Gillham St. Kansas City MO 64108

713-504-4816

arsmith1@cmh.edu

Background and Purpose: Exposure to the voice and language during the critical period of auditory development associated with the third trimester is thought to be an essential building block for language. Differences in the auditory experience associated with early life in the NICU may increase the risk of language delays for premature infants. NICU nurses are fundamental in the care premature infants; how they use their voices and what they understand about early auditory development may be important in

understanding auditory experience in the NICU. To investigate nurses' beliefs about voice use and auditory development, as well as their voice use behaviors in the NICU, we conducted a survey of NICU nurses to examine the following research questions: (1) How do nurses use their voice when interacting with premature infants? (2) Do infant characteristics (age, medical stability, behavior state) influence the voice behaviors of NICU nurses? (3) What do NICU nurses perceive to be the auditory needs of premature infants? (4) Do NICU nurse characteristics (age and years of experience) influence their beliefs or voice behaviors?

Materials and Methodology: Our target population was nurses currently working in the NICU in the United States (U.S.). Nurses who met the following criteria were eligible to participate in this survey study: (1) currently employed full-time or part-time in a neonatal intensive care unit in the U.S.; and (2) hold an active license as a registered nurse (RN).

The questionnaire was organized into the following topic areas: (1) demographics and professional background; (2) characteristics of the NICU; (3) voice use in the NICU; (4) beliefs about auditory development; and (5) experiences with music and exposure to music therapy. Prior to its use in the current study, five NICU nurses tested the questionnaire for clarity, ease of use, and estimated completion time (10–15 min) using the online delivery platform. The development process resulted in a 55-item online questionnaire hosted by an online survey platform (Qualtrics©, Provo, UT, U.S.). The questionnaire included ordinal, nominal, and open-ended responses. Participants were able to skip questions and some questions allowed multiple responses.

A convenience sample of neonatal nurses was collected through the use of social media, personal networks of the research team, and snowballing as strategies to survey potential participants using the opt-in online questionnaire. The questionnaire was distributed two times. The first questionnaire was distributed to nurses in the personal network of the researchers through email and Facebook posts. The online link could be shared, and participants were encouraged to send it to others in their own personal network. The first distribution lasted two weeks with a reminder email and Facebook post sent at the beginning of the second week. A preliminary review of the results from the first distribution led the research team to make minor revisions to the questionnaire to improve clarity before additional participants were recruited. Specifically, two questions were changed from a sliding scale to a Likert response option for more consistency across responses. Two additional questions were added to the revised questionnaire to understand the role of parents related to infant auditory needs and to understand nurses' voice interactions with infants compared to adults. The revised questionnaire was then distributed to three Facebook groups designed specifically for NICU nurses: (1) Neonatal ICU Nurses Rock, (2) NICU Professionals, and (3) NICU Nurses. The survey link was posted on each group page. The survey remained open for two weeks and reminder messages were posted to each Facebook page at the start of the second week.

There was a combined total of 82 responses collected between the first and second distribution of the survey. Seven responses were excluded due to the participants working outside the U.S. The remaining 75 responses were included in analyses.

Results: A summary of our results include: Nurses reported using their voice more as the age of infants approached term gestation and speaking to infants was the most common type of voice use compared to singing, whispering or humming. Both infant (stability) and nurse (age and years of experience) factors influenced reported voice use decisions in the NICU. Voice sounds rated by respondents as having the most positive impact on auditory development were live parent voice, recorded parent voice, and live singing. Regardless of unit type, nurses endorsed the belief that premature infants are exposed to a sufficient amount of voice sounds in the NICU to meet early auditory needs of premature infants but did believe that premature infants were exposed to sufficient voice sounds.

Nurses indicated that they would be more likely to advocate for auditory intervention for infants who are moderately premature or term and are more medically stable.

The full data set is complete and will be included in the final presentation.

Conclusion: The results of this study provide an important preliminary understanding of what NICU nurses currently believe about premature infant auditory development and how they report using their voices while in the NICU. There may be specific ways that the voice can be used to maximize exposure to speech sounds that are salient in the intrauterine environment yet absent from the extrauterine environment of the NICU. The reported voice behaviors of NICU nurses suggest the need for further investigation of the relationship between infant responses and different auditory experiences at varying gestational ages and levels of medical stability. Findings indicate a gap in knowledge regarding the importance of early exposure to voice sounds. This study is a preliminary exploration into the need of a targeted auditory intervention from the perspective of NICU nurses and provides an emerging understanding of how nurses may benefit from additional education and training on a targeted intervention that supplements auditory experiences for language development.

Learning Objectives:

1. Participants will identify trends in NICU nurse voice use in the NICU
2. Participants will identify the importance of understanding the perspective of key stakeholders when determining possible interventions for complicated healthcare needs.
3. Participants will discuss findings of this survey in relationship to their own observations and experiences.

Gravens2022-4

Abstract Title: Implementation of A Neurodevelopmental Care Bundle to Promote Optimal Brain Development in the Premature Infant

Author: Pamela S Hackman, MSN, RNC-NIC, C_ELBW

Registered Nurse

Hershey Medical Center Children's Hospital, Hershey PA

629 Thoreau Drive

7173301589

phackma@hotmail.com

Background and Purpose: When an infant is born prematurely, the external environment, routine or emergent nursing care actions performed on the infant can be detrimental. Neonatal nurses are keenly aware the premature infant is at risk for developing behavioral, cognitive, and physical impairments which can be short-term or last a lifetime. Purpose: The purpose of a neuroprotective

care bundle is two-fold: First, for nurses, the bundle optimizes the health and well-being of the infant by incorporating seven core measures: healing environment, partnering with families, positioning, and handling, safeguarding sleep, minimizing stress and pain, protecting skin, and optimizing nutrition. Second, for families, therapeutic touch, and skin-to-skin contact cultivates positive neurodevelopmental outcomes, nurturing and health for the infant as well as enhances the bonding experience for the family. Comprehensive, evidence-based research was conducted looking at the role of developmental care and prematurity and how it can correlate to a healthy environment for the premature infant. Result of that research indicates that decreasing negative effects of extrauterine life, decreasing touch times, and implementing a Neuroprotective care bundle in the neonatal intensive care unit can be modified to simulate an intrauterine environment, thereby promoting optimal brain development and outcomes for that infant.

Materials and Methodology: A quantitative research study was conducted in a level 4 neonatal intensive care unit with an average admission rate between 350-400 infants per year, with approximately 120 of those infants are born prematurely. Research was conducted over a twelve-week period. Eighteen premature infants 23-32 weeks gestation were tracked for the first 7 days of life.

A Pareto chart was developed. Information on the chart included: birthweight, and gestational age. The chart was divided into 4-hour increments for a 24-hour (1day total). A list of variables-disturbances to the infant included such interventions as opening the top of the isolette for CXR, or other medical test, opening the port holes to the isolette for attaining vital signs including blood pressure, diaper change, repositioning, suctioning, heel stick for blood, parental interaction with infant, answering an apnea, bradycardia, or desaturation alarm, consoling a crying infant, and assessment by medical team. The goal of the project was for the nurse to check off each intervention during an identified time slot. Data was collected for 7 days.

At the end of twelve weeks, each variable in the time interval and tic mark for that time was tabulated. Then all interventions were added together for each day. To find out the average number of times an infant was disturbed, the total number of disturbances per day divided by 7 for the total study period was identified. This information indicated the number of times in a day that an infant was disturbed. Further calculation was done to figure out the number of times per day the infant was disturbed by dividing total number of interventions per day by 24 (hours in a day).

Results: Main outcome results indicated an infant was disturbed between 89 to 242 times during the first week of like. Further breakdown indicated that infants were disturbed 3.7 to 10.1 times per hour. Barriers recognized when research study complete included: staff unaware of study so did not complete project, despite education and communication to all staff members. Multiple shifts did not have documentation complete. Documentation of tic mark for variable but no tic mark for opening port holes (assumption made here). No report of position change. No documentation noted on one patient for one shift. One patient did not have documentation for 2.5 days. Not all activities/interventions were captured. Too busy/ high acuity/ did not understand project request. Multiple pts/activities due at the same time. Totally dependent on RN to document data. Some variables were documented but no documentation for opening the port holes or popping the top of isolette that needed to happen first before taking care of the infant (assumption made here when looking at the intervention completed). Despite interventions being missed in the total tabulation of disturbances to the infant, the study was an eye-opening experience for the nurse to see the total number of times an infant is disturbed per day and per hour. The number of disturbances to the premature infant is detrimental to their health and something that is not often thought about when caring for the infant. Based on the limited results of this study, the intensive care unit in which this study was conducted is currently looking at interventions that promote the developing behavioral, cognitive, and physical needs of the premature infant by instituting specific touch times with infant that correlate with the infant's wake cycle, implementation of a neurodevelopmental care bundle and promoting a family centered approach to care. To assimilate the intrauterine environment a neurodevelopmental care bundle ought to be utilized.

Conclusion: A family- care, neuroprotective and d velopmentally supportive care approach, in conjunction with standard of care practices, promote brain development and a healthy environment. The implementation of a neurodevelopmental care bundle provides an opportunity to promote optimal brain development as the infant grows in the intensive care, thereby, fostering a positive experience for the family, decreasing length of stay, decreasing hospital cost, and improving medical outcomes.

Learning Objectives:

At the end of this presentation the learner will be able to:

1. Identify the how the implementation of a neurodevelopmental care bundle promotes the developing behavioral, cognitive, and physical aspects of the premature infant.
2. Identify external environmental factors that are detrimental to the premature infant and how the intrauterine environment can be assimilated in the external environment.
3. Identify the positive outcomes of promoting a neurodevelopmental care bundle.

Gravens2022-5

Abstract Title: Transforming the Culture of Care: Developmental Care Rounds in the Neonatal Intensive Care Unit

Authors: Jessica Bullock, RN, BSN, RNC-NIC, Myra Rolfes, MN, BSN, RNC-NIC, Martha Herbers-Sanger, MOT R/L, NTMTC, CNT

Corresponding Author:

Jessica B. Bullock, BSN

Clinical Nurse IV

Children's Healthcare of Atlanta

Egleston NICU, 1405 Clifton Road, Atlanta, GA 30322

678-596-5451

jessica.bullock@choa.org

Background and Purpose: The developmental care council in our unit observed the need for continuing education to maintain consistency and best practices in developmental care. Previous educational efforts around cycled lighting, appropriate positioning and use of positioning aids, kangaroo care, and intubated mobility were followed by a period of desired and consistent practice. However, the use, consistency, and appropriate application of these efforts decreased over time. The purpose of developmental care rounds (DCR) was to promote the consistency and imple-

mentation of developmental care practices and to contribute to a unit culture where developmental care is included in every infant and family interaction.

Materials and Methodology: DCR are conducted weekly with the patients' primary rehab therapist, a nurse who is part of the developmental care council, the bedside nurse, and the patients' family, if available. The DCR team meets at the patient's bed space for an average of 15 minutes. There are two nurses from the developmental care council, and each sees an average of 5 patients a week for a total time of 3 hours, during which time they complete paperwork, speak with families, participate in DCR, and educate staff. If parents are not present at the bedside for rounds, the nurse calls them to discuss developmental recommendations and answer any questions they may have.

Staff availability prevents the feasibility of including every patient in DCR, so the most at-risk patients are selected. The criteria for DCR includes infants admitted to the unit less than 28 weeks PMA as well as selected infants referred to the team because of their challenging physiological or anatomical needs.

The framework for DCR is based on Mary Coughlin's five core measures of developmental care: family-centered care, healing environment, developmental activities of daily living, management of pain and stress, and protecting sleep. A form based on these tenets highlights each patient's needs and is reviewed and updated weekly during DCR. The form is placed at the patient's bed space as well as in their EMR.

The Infant Positioning Assessment Tool (IPAT) is used to evaluate the patient's position each week until 38 weeks PMA. After 38 weeks PMA, depending on patient stability, head shape measurements are taken with a caliper to guide positioning recommendations as well as screen for the development of cranial asymmetry using the plagiocephaly severity scale.

In addition to IPAT scores and head shape measurements, parental and staff surveys are also conducted to evaluate satisfaction and perceived value of weekly developmental care rounds. From May 2019 to November 2021 a total of 82 patients were seen for 794 rounds

Results: DCR has helped influence unit culture to ensure that developmental care is a forefront of practice. Staff and parents report high levels of satisfaction with the program when surveyed. Parents expressed feeling up to date on their child's development and reported an improvement with their engagement following DCR. Staff report a better understanding of how to support their patients' development and appropriate use of positioning aids. They appreciated the interdisciplinary collaboration that supports patients' development by providing input and advice to staff. When asked what staff disliked about DCR the most frequent complaint was that not every patient was included. The second most frequently reported complaint was that there are not DCR on night shift. The IPAT was a useful and educational tool for staff, but IPAT scores continued to be variable throughout DCR due to patient acuity, staff inconsistency, and appropriate use and availability of positioning aids. Despite the variable, when staff appropriately used positioning aids patients were found to have "ideal" and "acceptable" IPAT scores. This finding presented a great opportunity to educate staff on positioning aid use and best practices for positioning.

Head shape measuring was also a useful tool for an objective shape assessment. While visually some patients appeared to have asymmetries when measured the results were not as drastically abnormal as predicted. Conversely, some patients appeared to be symmetric but the caliper measurements contradicted this. DCR was a great way to raise awareness of head shape, and positioning plans were created to address asymmetries as well as work to prevent them. Because of early intervention many patients went from abnormal head shape measurements to normal in as short as one week.

Conclusions: DCR is a staff-led initiative that was implemented to improve the consistency of developmental care practices in the unit. It has been successful in raising awareness and providing education for both staff and families. For staff it has been a helpful reminder to address the tenets of developmental care when interacting with patients, which helps embed it into their daily routine. For families we found that the most important things that happened as a result of DCR were personal and deeply impactful to each infant and their caregivers:

- struggling parents were connected with support

- parents looked forward to DCR and actively sought out updates from the team

- patients were fitted for cranial remolding helmets prior to discharge to reduce a delay in care

- for some families, the DCR team was a familiar and trusted face during lengthy hospital stays

- a mom held her baby for the first time after encouragement from the DCR team

The more patients and families have these experiences as a result of DCR the more developmental care transforms the culture of care in the unit.

Learning Objectives:

1. Discuss the benefits of a DCR program
2. Address the challenges of maintaining a DCR program

Gravens2022-6

Abstract Title: The STEP Program-A Qualitative Study of Perception & Experience with Supportive Therapeutic Excursion Program

Authors: Church PT; Brown M; Ng Eugene; Banihani R; Dunn M; Watson J

Corresponding Author:

Paige Terrien Church, MD

Medical Director, Neonatal Follow Up

Sunnybrook Health Sciences Centre

2075 Bayview Avenue, M4-234, Toronto ON M4N3M5

416-786-0825

paige.church@sunnybrook.ca

Background and Purpose: The birth of a child is a sentinel moment for a family. As the child is born, parents are born with new roles assumed. Early days thereafter are ones of discovery, with the parents learning about their newborn and the newborn discovering new sounds, sights, touches, and experiences. In these moments, attachment is secured and parents quickly become ex-

perts in their child(1). With extreme preterm birth, however, this essential period of discovery is interrupted. While parents are welcomed as partners in the NICU, parents describe feelings of loss, grief, and anxiety(2). This aberrant parenting experience has been described as traumatizing and role altering(2). As the infant approaches discharge, parents assume a greater degree of the care, practicing with experienced team members available to support emerging skills. The limitation with this approach is that there are never moments of time truly alone with their child, those windows of time for a parent to get to know their child and become the experts(1). There is always an 'expert' outside the door. This phenomenon contributes to the seismic nature of discharge, when that supportive presence is withdrawn leaving parents with fledging skills but no certainty of capacity. The Supportive Therapeutic Excursion Program (STEP), was developed for parents to take their baby for walks in a stroller.

The program allows parents to have independent time to practice parenting and to foster parental capacity, with an extending distance of support, starting with walks around the NICU and advancing to walks on the hospital property. Anecdotally, parents described these walks as transformative, some becoming tearful as they stepped into the sunshine with their baby for the first time. As there is no reported program of this nature, the purpose of this qualitative study was to explore parental and staff perceptions. We aimed to learn about barriers, facilitators and the overall experience. Determining the impact is critical as this may identify an inexpensive but safe and needed intervention to better facilitate transition to home.

Materials and Methodology: This was an observational qualitative interview study (REB approved) with ten parents and ten NICU staff members to examine the experiences around the STEP program, 2016-2021.

Protocol: STEP was initiated in 2016 with parents after significant barriers addressed by input from Infection Prevention and Control, Risk Management, and Legal (these will be articulated in more detail).

Eligibility for STEP include: no longer require invasive ventilation, greater than 35 weeks corrected gestational age, no longer have clinically significant apneic or bradycardia events, covered stroller with a flat pram.

Sanitizer and portable cardiac/respiratory monitor are sent with the parent. For those infants on supplemental oxygen, portable oxygen provided. Tours initiated in NICU, advanced to the hospital and outside, weather permitting.

Methods: Invitations to parents and staff through social media, clinic advertising, and emails. Interviews were audio recorded and transcribed. Thematic analysis was employed for interview data.

Results: Throughout the interviews, the following themes emerged consistently:

1. Normalcy: Both staff and parents consistently conveyed the normalcy of a walk with the parents. "I was just a regular mom walking through the halls." "A regular activity like going out for a walk was so like magical." "It was some small semblance of normalcy."

2. Autonomy: Both staff and parents identified the experience of emerging independence from the NICU associated with the walks. "Like I didn't know how to be a parent, right? It was a bit of a necessary push for me to take ownership." "I was in charge of my child." "The walks empower them…Lord knows that they need that when they go home because for most of their child's life, they have not been a huge part, as much as we try to have them involved."

3. Freedom: Parents and staff independently acknowledged the benefit of taking a break from the NICU. "It feels good that the medical professionals are putting their faith and confidence in you as a parent to be alone with your kid." "Benefits to staff are the benefits to parents…freedom to breathe."

4. Shift of control: Parents expressed gratitude to have the faith of the providers to go outside. Staff did express mixed feelings about giving up control with the walks but acknowledged the need to do so.

5. Concerns: Parents and staff conveyed concerns of disparate nature. Parental concerns were mainly around navigation of the hospital and weather not being optimal at times. Staff concerns were around equity as some parents may not be able to afford a stroller. For both, infection prevention was raised but acknowledged to be manageable. Lastly, both parents and staff acknowledged the concern around the extra time to go for a walk, with the nurses busy schedules. Both, however, reported communication and a commitment to making it work as strategies to manage this.

Conclusion: The simple act of taking a child for a walk, even in the NICU, appears to be therapeutic for parental mental health, autonomy, and capacity. There were shared concerns around infection control but the protocol developed appeared to be effective at prevention and safety. While more work for staff, it was consistently reported that strategies to divide the workload were feasible and staff articulated the observed benefits, outweighing the added work. The main obstacle is the barrier of risk management and infection control but this was minimized with a safety protocol developed. More research on this important and simple intervention is warranted.

References:

1. *Stein MT. 2006. The NICU: Special Issues for the At-Risk Infant and Family. In Dixon SD, Stein MT editors' Encounters with Children: Pediatric Behavior and Development, 4th Edition.*

2. *Erdei C, Liu CH, Machie M, Church PT, Heyne R. Parent mental health and neurodevelopmental outcomes of children hospitalized in the neonatal intensive care unit. EHD 2021;154:105278.*

Learning Objectives:

1. Explore parental perception on the impact of stroller walks as well as that which they found helpful or barriers

2. Explore NICU staff perception on the impact of the stroller walks, the potential barriers and facilitators to these walks

Gravens2022-7

Abstract Title: Implementation of an Infant Massage Program in a Community Level 3 NICU

Authors: Malathi Balasundaram MD, Karen Brady PT, Dharshi Sivakumar MD, Georgette Aquilina BSN,RNC-NIC,C-ELBW, Katherine McCallie MD

Corresponding Author:

Malathi Balasundaram MD

Clinical Associate Professor

Stanford University/El Camino Health

1870 Limetree Ln,Mountain View, CA -94040

6506055787

malathib@stanford.edu

Background and Purpose: Massage therapy is a cost-effective intervention that has a positive impact on the health of infants and their parents. Greater weight gain, better feeding tolerance, lower incidence of gastro-esophageal reflux and earlier discharge are frequently reported positive effects. Researchers found preterm infants massaged by their mothers had higher cognitive scores at 12 months' corrected age.1 Parents who performed massage in the NICU reported experiencing less stress, anxiety, and depression.2-4 It has been noted that the massager (therapist, parents and nurses) can benefit as much as the massagee.4

Materials and Methodology: Setting: Our 20-bed, community level 3 NICU is located on the Mountain View campus of the El Camino Health system in Santa Clara County, California. The hospital has approximately 4500 newborn deliveries and 400 NICU admissions per year. Our NICU provides care to infants less than 1000 g at birth, less than 28 weeks gestational age, and/or those with severe or complex illnesses. The unit is staffed by board-certified neonatologists and does not utilize advanced practice providers or pediatric trainees. Three neonatal physical therapists are on staff. Methods: The main output of this project was the development of an "Infant Massage Program." An interdisciplinary team of neonatologists, clinical nurse specialist, physical therapist, parents, and nurses developed an educational video and parent informational handout. The program focused on empowering parents' participation in their infants' care by educating caregivers about the importance of massage therapy and the techniques to perform massage. Figure 1 shows the PDSA cycles for the development of our Infant Massage Program.

The Infant Massage Program was initially created for infants less than 35 weeks' gestational age at birth and included massage performed by physical therapy (PT) and/or parents at least twice a week on medically stable infants once they were 32 weeks' corrected gestational age. PT provides a hands-on learning demonstration of infant massage to parents. We created an instructional video, in English with Spanish subtitles, for parents to review as a supplemental part of the training. The informational handout described the benefits of infant massage in both English and Spanish. The handout was ultimately incorporated into the electronic health record (EHR) education available in the hospital's patient portal, MyChart Bedside, with a link to the video on our private YouTube channel (Figure 2). With expansion of the education to MyChart Bedside, parents of all NICU infants have access to the video and can also learn the technique, practice and ask questions.

Procedure: Our massage technique is very simple due to the sensitivity of preterm infants' skin. During training, PT discusses the types of oil to use and determining the best time for massage. Parents learn to assess the infant for readiness to ensure that they are in a quiet, alert state, and well positioned in the crib/isolette. Parents are trained to monitor their baby's response to the massage. Babies might withdraw during the first few strokes, but ultimately, they should relax and settle down. Massage therapy is a slow, and even rhythm stroke from head to toe, while maintaining contact on the body. The appropriate level of pressure is described as their hand resting on the part being massaged with relaxation of the fingers to give full, even tactile input. Pressure should not be either light, like a tickle, or heavy, like pushing into the skin. During training, PT demonstrates the stroke and observes the parent's performance to provide suggestions. Each massage session is done on the back and extremities for about 10 minutes.

Results: Impact: We implemented the Infant Massage Program successfully in our community Level 3 NICU in one year. We doubled the parental viewing of the infant massage video within eight months (Figure 3). As a part of our Family Centered Care program, we do follow-up phone calls where we learned that parents continued the massage even after discharge.

Barriers: Time commitment to create and subtitle the video, disseminating information to staff and parents about the benefits of massage, difficulties tracking video viewing in MyChart Bedside portal, delay in obtaining EHR flowsheet access for PT to document massage provision on their own instead of relying on nurses.

Conclusion: Parents verbalized improved knowledge of this practice and slowly increased their comfort level with infant massage. Next steps: Begin more regular documentation of massage provision in the EHR, which will allow tracking the number of massages performed during an infant's hospital stay. Then, evaluate short-term outcomes such as weight gain, feeding tolerance, and length of stay in relation to quantity of massage received.

Acknowledgements: Stephanie & Ryan (Parent), Emerson (Baby Actor), Stephanie Miller MD, Ying-ju Horng RNC, Cheryl Sidel PT, Eilish Byrne PT, ECH staff, ECH neonatologists, Kavya Wazhi (helped with data collection).

Bibliography:

1. *Abdallah B., Badr L.K., Hawwari M.: The efficacy of massage on short term and long term outcomes in preterm infants. Infant Behav. Dev. 2013; 36: pp. 662-669.*
2. *Pados BF, McGlothen-Bell K. Benefits of Infant Massage for Infants and Parents in the NICU. Nurs Womens Health. 2019 Jun;23(3):265-271.*
3. *Field T. Massage therapy research review. Complement Ther Clin Pract. 2014;20(4):224-229.*
4. *Álvarez MJ, Fernández D, Gómez-Salgado J, Rodríguez-González D, Rosón M, Lapeña S. The effects of massage therapy in hospitalized preterm neonates: A systematic review. Int J Nurs Stud. 2017 Apr;69:119-136.*

Learning Objectives:

1. To increase caregivers' knowledge of infant massage, including how and when to implement these practices
2. To enhance parental bonding with their infants while in the NICU and at home

Gravens2022-8

Abstract Title: Infant Massage as a Stress Management Technique for Parents of Extremely Preterm Infants

Authors: Dana B. McCarty PT, DPT, PCS; Rachel A. Silver SPT, CISSN; T. Michael O'Shea, MD, MPH

Corresponding Author:

Dana McCarty

Assistant Professor

University of North Carolina at Chapel Hill

3024 Bondurant Hall, CB#7135

19198438792

dana_mccarty@med.unc.edu

Background and Purpose: Research has previously indicated that parents, especially mothers, of preterm infants, experience increased stress and anxiety as a result of their child's condition and that stress/anxiety is associated with worse infant neurobehavioral outcomes.1-3 Small pilot studies have shown that teaching mothers to perform infant massage on their preterm infants decreases stress, as reported by the mother, and improves parent-infant interaction.4-8 The aim of this study was to compare mother's salivary cortisol, a biomarker for stress, immediately before and after maternally-administered massage.

Materials and Methodology: This data was collected as part of the TEMPO (Therapist Education and Massage for Parent-Infant Outcomes) Study, which was a prospective single group, non-randomized study completed in the Neonatal Critical Care Center at UNC Children's Hospital funded by the National Center for Complementary and Integrative Health (NCCIH) (3KL2TR002490-02S1). Only infants who were born extremely preterm (<28 weeks gestation) were eligible for inclusion. Infants were excluded if they had a medical condition that made massage not feasible. All infants meeting the appropriate criteria were screened for inclusion when a PT referral was received, and families were approached by the principal investigator in the study for consent. Infant massage was one of the main interventions provided in this study and is the focus of this investigation.

All TEMPO interventions were provided in addition to therapy standard care, which does not currently include infant massage. Standard therapy includes 1-2 sessions of physical therapy per week and parent education if the parent is available during sessions. While the TEMPO study primarily focused on enrolling mothers, fathers were also invited to participate in the study. In the TEMPO intervention, education sessions were planned in advance with parents, and multiple modes of instruction were used (eg. demonstration, handouts). Based on our experience in this study, infants were generally able to tolerate infant massage at 33-34 weeks postmenstrual age and approximately 1500 grams, in addition to being able to regulate their temperature outside of an incubator during the massage. Bedside nurses and therapists leading the intervention monitored vitals throughout in order to ensure that the infant remained physiologically stable and appropriate for massage. While the therapist demonstrated how to perform massage on a doll and provided verbal cues, parents followed along and massaged their infants. The massage techniques consisted of moderately firm effleurage strokes to the extremities and gentle passive muscle elongation lasting 10-20 minutes in accordance with the White-Traut ATVV protocol.9 After 2 educational sessions, parents were encouraged to complete infant massage on their own when they visited their babies and were asked to record any massage they performed on a card at the bedside.

Salivary cortisol levels were collected by research personnel via buccal swab immediately before and after the second of two massage education sessions. For parents of twins, the first salivary cortisol sample was collected before massage with the first child, and the second salivary cortisol sample was collected after massage with both infants was completed.

Of the 32 parent-infant dyads enrolled, 6 were transferred to outside hospitals and 2 infants died prior to massage education intervention. One mother declined salivary cortisol testing and one mother could not be present for massage session. Within the remaining 21 mothers and 1 father, the average change of salivary cortisol from pre to post massage administration was 18.01 ng/dl. Results of a paired t-test revealed a significant difference in salivary cortisol levels from before and after massage administration (p=0.02).

Results: The average change in salivary cortisol levels was 18.01 ng/dL, although changes ranged from an increase of 55 ng/dL to a decrease of 108 ng/dL. Samples from mothers of twins were only counted once in all analyses. The test for salivary cortisol did not distinguish levels below 50 ng/dL, so some changes may not have been detected, potentially leading to an underestimation of the true change in salivary cortisol. T-test analyses demonstrated that there was a significant decrease in salivary cortisol levels after participating in infant massage (p = 0.02). Given these preliminary findings, results from studies examining salivary cortisol changes during skin-to-skin care,10 and studies demonstrating altered cortisol levels in parents of children with chronic health needs,11 we anticipate that regular maternally-administered massage will result in reduced salivary cortisol, which will, in turn, contribute to reduced maternal anxiety and depressive symptoms.

Conclusion: Infant massage is a feasible and safe parent education intervention in the NICU with established benefits for preterm infants.4 Emerging evidence suggests that when administered by the parent, that there may be additional benefits to the parent's mental health. Significant changes in salivary cortisol, a biomarker for stress, were observed pre and post massage in a small cohort of parents administering infant massage. Additional research is needed to establish a correlation between salivary cortisol level changes and clinical symptoms of stress in parents of preterm infants.

Learning Objectives:

Upon completion of this presentation:

1. Participants will be able to discuss the potential parent psychological benefits of implementing infant massage.
2. Participants will be able to describe a protocol for implementing infant massage in a NICU and educating parents on the technique.

Gravens2022-9

Abstract Title: Family resilience in the NICU: Preliminary evidence of a rapid metasummary

Authors: Geneviève Laporte, RN, Ph.D. (c), Christine Genest, RN, Ph.D., Marilyn Aita, RN, Ph.D.

Corresponding Author:

Miss Genevieve Laporte, RN, Ph.D.(c)

Faculty of Nursing, Université de Montréal

514-821-9686

genevieve.laporte.1@umontreal.ca

Background and Purpose: Every day, worldwide, more than 15 million infants are born preterm (WHO, 2018). In most cases, infants born before 37 completed weeks of gestation need neonatal intensive care (NICU) until their development and growth reach the anticipated level of maturity to be discharged home. This hospitalization can be highly stressful, as many as 2 out of 3 parents report symptoms of psychological distress during their time in the NICU (Greene and al., 2015). These symptoms of anxiety, depression and stress can influence parent-infant attachment and the preterm infant's neurodevelopment in the long term (Kingston and al., 2015). Some studies have found a significant relationship between family resilience and a decrease in psychological symptoms when facing an adverse situation (Kukihara et al., 2020). Family resilience can be defined as "the ability of families, as functional systems, to withstand and rebound from adversity" (Walsh, 2016). According to Walsh's Family Resilience Model, the concept can be observed through specific resilience-promoting processes, namely shared belief systems, communication, and organizational processes (Walsh, 2003). In neonatology, some qualitative studies indirectly report on these family resilience domains through the participants' discourse (Wilson and Cook, 2018). Therefore, this rapid metasummary aims to evaluate the presence family resilience in qualitative scientific literature to answer the following question: Of what nature are the family resilience domains depicted in the NICU setting?

Materials and Methodology: A rapid metasummary methodology was undertaken by our research team. A total of 5143 articles published between 2016 and 2022 were retrieved from four databases (CINAHL, PubMed, PsychInfo, PubPsych). All were imported into Covidence © for selection and extraction. To be included, articles had to be primary qualitative studies in which participants were exclusively parents of preterm infants who discussed their NICU hospitalization experience. Other types of papers, as well as quantitative or mixed-methods studies, were disregarded. Qualitative studies exploring healthcare provider viewpoints, parents' discharge experiences, at-home experiences, or bereavement experiences were also excluded. A total of 55 publications were selected for analysis. Selection and extraction were undertaken by one reviewer, whereas coding of findings will be completed by one reviewer and revised by a second reviewer. Based on Sandelowski and Barroso's suggested methodology, qualitative findings will be extracted from the retained articles. Directed coding will be completed using the family resilience domains identified in Walsh's Family Resilience model as the initial codebook. Other emerging themes will also be coded and further analyzed as needed to allow for conceptual advancement. As the coding process is finalized, intensity effect size and frequency effect size will be calculated, and results will be presented in a metasummary table.

Results: This analysis will shed new light on the most recent qualitative evidence of parents' experiences in the NICU by analyzing it through the lens of family resilience. This study is the first known to formally identify family resilience domains in NICU families. This will provide empirical evidence to guide future development of instruments and interventions to support family resilience within a family-centered care philosophy. At the clinical level, new insight on the resilience of families of preterm infants could help promote healthy coping in the NICU and reduce the negative effects of high psychological distress as reported by parents during their infant's hospitalization.

Conclusion: Family resilience can be found in qualitative studies reporting on families' experiences during their NICU stay. As it is an increasingly promising concept due to the predominance of the family-centered care philosophy in neonatal units, these findings can encourage researchers and clinicians to consider family resilience in further research and clinical inquiries.

Bibliography:

1. *Greene, M. M., Rossman, B., Patra, K., Kratovil, A. L., Janes, J. E. et Meier, P. P. (2015, Jun). Depression, anxiety, and perinatal-specific posttraumatic distress in mothers of very low birth weight infants in the neonatal intensive care unit. Journal of Developmental and Behavioral Pediatrics, 36(5), 362-370. https://doi.org/10.1097/DBP.0000000000000174*

2. *Kingston, D., McDonald, S., Austin, M. P. et Tough, S. (2015). Association between Prenatal and Postnatal Psychological Distress and Toddler Cognitive Development: A Systematic Review. PLoS One, 10(5), e0126929. https://doi.org/10.1371/journal.pone.0126929*

3. *Kukihara, H., Yamawaki, N., Ando, M., Nishio, M., Kimura, H. et Tamura, Y. (2020). The mediating effect of resilience between family functioning and mental well-being in hemodialysis patients in Japan: a cross-sectional design. Health and Quality of Life Outcomes, 18(1), 233. https://doi.org/10.1186/s12955-020-01486-x*

4. *Sandelowski, M. et Barroso, J. (2003). Toward a metasynthesis of qualitative findings on motherhood in HIV-positive women. Research in Nursing and Health, 26(2), 153-170. https://doi.org/10.1002/nur.10072*

5. *Walsh, F. (2003). Family Resilience: A Framework for Clinical Practice. Family Process, 42(1), 2-18. https://doi.org/10.1111/j.1545-5300.2003.00001.x*

6. *Walsh, F. (2016). Strengthening family resilience (Third edition.e éd.). The Guilford Press.*

7. *Wilson, C. et Cook, C. (2018). Ambiguous loss and post-traumatic growth: Experiences of mothers whose school-aged children were born extremely prematurely. Journal of Clinical Nursing, 27(7-8), e1627-e1639. https://doi.org/10.1111/jocn.14319*

8. *World Health Organization (2018). Preterm birth. Retrieved from https://www.who.int/news-room/fact-sheets/detail/preterm-birth on December 13th, 2021*

Learning Objectives:

1. Define the concept of family resilience
2. Understand the metasummary method as a novel strategy for analyzing qualitative studies
3. Recognize that family resilience is a central concept in neonatology

Gravens2022-10

Abstract Title: Improving communication in the NICU: a qualitative descriptive study of parent and NICU clinician perspectives

Authors: Maya Dahan, Leahora Rotteau, Jo- Ann Alfred, Shelly

Higazi, Ophelia Kwayke, Giselle WS Lai, Wendy Moulsdale, Kate Robson, Lisa Sampson, Jennifer Stannard, Paige Terrien Church, Karel O'Brien

Corresponding Author:

Maya Dahan, MDCM, FRCPC, FAAP

Neonatal-Perinatal Fellow

University of Toronto

42 Keewatin Main Unit, Toronto, Ontario

5149623666

maya.dahan@mail.mcgill.ca

Background and Purpose: Decision making in the Neonatal Intensive Care Unit (NICU) has oscillated between the extremes of paternalism and patient autonomy and now appears to have settled in-between, with a preference for individualized decision making1. The individualized decision-making process is based on clinicians better understanding of the specific context of families and provides them with the flexibility to individualize guidance2. Despite guidelines advocating this type of decision making, there is no literature guiding its practical application by a multi-disciplinary inter-professional team. Of the guidelines that exist for individual clinicians, the first step is eliciting families' context, hopes, fears and values3,4. However, the NICU environment is often frenetic and reactive, with limited time for this process to occur. Even when a few members of the team sit down with a family, the information learned from families in those meetings are at risk of being lost through the 'broken telephone' of handover and are often minimally documented in the chart. The purpose of this descriptive qualitative study is to explore the experience of families and NICU clinicians with information sharing around the families' context and values, and how that applies to decision making in the NICU. Understanding how this is currently happening in our NICU will inform the development of a quality improvement (QI) process aimed at improving communication between families and NICU clinicians.

Materials and Methodology: Using purposive sampling, families of varying cultural backgrounds and educational levels were recruited. We conducted semi-structured interviews with 11 parents from 8 families (3 couples chose to be interviewed together) and 13 NICU clinicians. All families had infants born at less than 27 weeks of gestation and birth weights less than 1000 grams. The NICU clinicians interviewed included social workers (n=1), nurse practitioners (n=3), nurses (n=3), respiratory therapist (n=1), and neonatologists (n=4). Most NICU clinicians had more than 15 years of experience (81%) and were predominantly Caucasian (64%). We performed a thematic analysis on the interviews. Two authors (MD+LR) read the transcripts of the first four interviews of each group and performed a preliminary analysis to develop a coding structure. This coding structure was then used by one author (MD) to code the remainder of the transcripts.

Results: Four interconnected themes were identified both in the staff and family interviews: 1) the experience of sharing information, 2) the 'broken telephone' noted between NICU clinicians, 3) a strong desire to control information and 4) the positive impact of information sharing on care provided and received.

The experience of sharing information captured when, how, with whom and why information was shared between families and staff. Families spoke about their experiences with different providers (nurses, physicians, and social workers) and the opportunities they had to share information. Staff spoke about how they engaged with families (informally at the bedside versus more formally in family meetings) and how certain enablers and barriers shaped that experience. Multiple families mentioned one of their reasons for sharing information about themselves was to forge relationships with those caring for their infants. Staff members spoke about wanting to better understand families to be better able to support them.

Both families and staff spoke about the 'broken telephone' of handover noted between care team members despite having many opportunities to share from antenatal consultation and throughout the admission. Father A spoke about the need for developing an "efficient narrative, otherwise, you're just exhausted" because of the constant turnover of staff and the lack of handover. Staff members repeatedly noted gaps in the collection and documentation of information around a family's context. Staff spoke about the inconsistency of understanding what values are most important to families especially in the context of goals of care discussions or for example not knowing a family's religious beliefs at the time of a baby's death. The third theme is the strong desire to control information. Parents express both the desire to create the narrative about their context and to have control over its evolution. Staff also described wanting to access that narrative to better understand families and to be able to contribute to it in their own way, independent of their professional role. This desire to understand the family context is heightened in medically fragile infants. Fourthly, both families and medical staff perceive strong benefit in sharing information, and no one reported any negative impacts of participating in the information sharing process. Reported benefits included building relationships and trust, improvement in care and personalization of support. Staff members spoke of the positive impacts on the inner dynamics of the medical team when the shared mental model extended from the medical condition of the neonate to include a shared mental model of family's context. One interesting difference elucidated in the interviews was that parents and staff placed different importance on certain decisions. Staff perceived important decisions as being those around goals of care, such as redirection of care decisions. Parents viewed decisions like planning the timing of extubation (parents C) or choosing their infant's first outfit once graduated to a crib (parents B) as decisions that they would like to be more involved in. This highlights opportunities for supporting parenting efficacy and building trust with families.

Conclusion: This descriptive qualitative study serves as a first step in a larger quality improvement initiative aimed at improving communication between clinicians and families. These findings provide us with a better understanding of the dynamics of information sharing around a family's context in our NICU and will help us target interventions to improve the experience for everyone involved. Improving this step will allow our NICU to engage in more family centered and individualized decision making.

Gravens2022-11

Abstract Title: Daily Graphing of %PO To Guide Feeding Management in the NICU

Authors: Katherine Gibson, MS, CCC-SLP, BCS-S; Pamela Do-

drill, PhD, CCC-SLP, BCS-S; Debra Marks, PNP; Carmina Erdei, MD

Corresponding Author:

Dr. Pamela Dodrill

Brigham and Women's Hospital

Brigham and Women's Hospital, NICU, 75 Francis St, Boston 02115

6174701790

pdodrill@bwh.harvard.edu

Background and Purpose: Variable PO (per os, by mouth) feeding management practices in the Newborn Intensive Care Unit (NICU) can affect patient safety, contribute to delays in achieving early feeding milestones, prolong length of stay, impact family experience, and potentially contribute to long-term feeding difficulties. Graphing an infant's %PO allows clinicians to observe trends in feeding progress over time (e.g. days, weeks) versus over a single feed or shift, as well as the impact of changes in a feeding plan (e.g. slower/ faster bottle nipple, number of PO feeds per day). We aimed to describe how daily plotting of an infant's %PO, and review of this information in medical rounds, helps guide timing of objective swallow evaluation (i.e. modified barium swallow, MBS) and/or the decision to discharge home with enteral tube feeds.

Materials and Methodology: A chart review was conducted for infants admitted to a large Level III NICU in 2020-2021. We reviewed charts for infants who received MBS (approx. 100 p.a.), as well as those who went home on enteral tube feeds (approx. 15-20p.a.). We looked at the rationale documented for feeding management decisions and determined the proportion of infants in whom failure to progress with %PO was listed as a primary or secondary factor for proceeding with imaging. Results of these MBS studies were reviewed. Furthermore, we examined the proportion of infants in whom slow advancement of %PO was listed as a factor for proceeding with discharge home with enteral tube feeds.

Results: For many infants, overt clinical signs and symptoms of aspiration (e.g. SpO2 desaturation, apnea, bradycardia) are listed as the reason for proceeding with MBS. However, in approximately 25% of infants who received MBS, failure to progress with %PO was listed as the primary factor for proceeding with imaging. In >50% of these cases, the infant was found to be aspirating on MBS. In a further 15% of cases, failure to progress with %PO was listed as a secondary factor for proceeding with imaging, and affected how soon the study was performed. In >90% of infants who discharged home on enteral tube feeds, slow advancement of %PO was listed as a factor for proceeding with this pathway. This initiative enhances the interdisciplinary care model. Group results will be discussed, and individual case examples will be used to demonstrate clinical utility of this information.

Conclusion: Daily graphing of an infant's %PO helps clinicians to identify when an infant's PO feeding is not advancing as anticipated and/or is getting worse, and helps guide management plans. In some cases, failure to progress with %PO is the main indicator of an underlying swallow impairment, versus adverse respiratory events (e.g. 'spells'), that are typically relied on to guide recommendations and timing of objective swallow evaluations.

Learning Objectives:

At the end of this talk, participants will be able to:

1. List 3 potential benefits of graphing an infant's %PO to guide PO management
2. List 3 potential reasons an infant may stall in %PO intake
3. List 3 ways to measure the success of feeding practices

Gravens2022-12

Abstract Title: Utilizing An Infant Feeding Scale to Track Feeding Progress in the NICU Population

Authors: Pamela Dodrill, PhD, CCC-SLP, BCS-S; Katherine Gibson, MS, CCC-SLP, BCS-S; Emily Adams, MS, CCC-SLP, CNT; Elizabeth Kling, MS, CCC-SLP; Joan Fitzgerald, MS, CCC-SLP; Carmina Erdei, MD

Corresponding Author:

Dr. Pamela Dodrill

Brigham and Women's Hospital

Brigham and Women's Hospital, NICU

75 Francis St, Boston 02115

6174701790

pdodrill@bwh.harvard.edu

Background and Purpose: Preterm and other high-risk infants often display difficulty establishing oral (per os, PO) feeding in the NICU. Most initially require enteral tube (per gavage, PG) feeds. Then, as they transition to PO feeds, many require the use of therapeutic compensations (e.g. special bottle nipples, positioning, strategies) to assist them to feed safely and efficiently. Some infants continue to require therapeutic compensations +/- PG feeds post-discharge from the NICU. These infants continue to require input and guidance from feeding therapy. The FOIS P is a 6 point feeding scale that allows an infant's feeding skills to be categorized across a functional continuum (1 = all PG feeds, no PO; 6 = all PO with no therapeutic compensations required). We aimed to track the corrected age when infants admitted to the NICU reach key feeding milestones, including age at start of PO feeds, full PO feeds, and PO feeds without requiring therapeutic compensations.

Materials and Methodology: We utilized the Functional Oral Intake Scale- Pediatric (FOIS-P) to track PO progress in infants during their NICU stay and across the first year at home. Within- and between- rater reliability were established. A retrospective chart review was performed for infants admitted to a large Level III NICU 2018-2021.

Results: Approximately 25% of our NICU population continue to display immature feeding skills at the time of discharge; 2% require PG feeding (FOIS 1-3); the remainder are fully PO fed, but require therapeutic compensations (FOIS 4-5). Age at attainment of age-appropriate feeding skills (i.e. not requiring therapeutic compensations – FOIS 6) is correlated with gestational age at birth and the presence of certain illnesses during the NICU stay.

Conclusion: Evidence-based reporting tools assist in monitoring of patient outcomes. Through implementation of the feeding scale, we are better able to guide staff and parent expectations regarding age at attainment of PO feeding milestones, and plan appropriate support services for infants continuing to need therapeutic compensations to feed safely.

Learning Objectives:

1. List 3 major PO feeding milestones for preterm and other

high-risk infants.

2. List 3 evidence-based therapeutic compensations used to assist preterm and other high-risk infants while establishing functional PO feeding.
3. List 3 potential benefits of using a formal PO feeding outcome tool

Gravens2022-13

Abstract Title: Improving the Patient Experience in the NICU by Enhancing Parent Education

Author: Heather Reimer, MSW, CPXP

Senior Director, NICU Initiatives

March of Dimes

1305 Merchants Tale Ln Austin, TX 78748

914-450-5761

hreimer@marchofdimes.org

Background and Purpose: This session addresses the vital importance of how we communicate and educate NICU parents in a meaningful way, while making a lasting, positive impression of their NICU experience. This session will highlight specific educational tools and tips that you can incorporate into your own practice.

Materials and Methodology: Materials: -Data on the efficiency and effectiveness of NICU parent education by establishing consistency, improving quality and identifying best practice. Collected from an 18 month study developed and implemented across 81 NICUs and nearly 10,000 parents and caregivers. Findings were published in the Feb 2020 issue of Advances in Neonatal Care.

-Background and data on health literacy. Collected from the CDC: https://www.cdc.gov/healthliteracy/learn/UnderstandingLiteracy.html ; retrieved 8/19/19 -Wolf, J. (2017). A report on the Beryl Institute benchmarking study, the state of patient experience 2017: A return to purpose. Retrieved from http://www.theberylinstitute.org/?page=PXBENCHMARKING2017

Methodology: This session will provide an overview of the impact providing parent education has on the patient experience. Focus will be given to understanding different learning styles, recognizing barriers to learning, an introduction to health literacy and an explanation on designing curriculum based on what was learned. Using data from nurses and NICU families via surveys and evaluations, we will help professionals recognize strategies to improve parent education towards the broader goal of improving the patient experience.

Results: Major accomplishment of program, i.e. qualitative or quantitative data; evidence-based results; impact on staff and/or families; Both qualitative and quantitative data from the evaluation and publication will be shared, along with lessons learned, in order to present the effectiveness of parent education on patient experience.

Conclusion: Effective parent education is a large component of a positive patient experience. The strategies presented will help to ensure that staff are making the most of each teaching opportunity to support parents throughout their NICU journey and leave them feeling satisfied with the care provided to both their baby and the family unit.

Learning Objectives:

At the end of this presentation the learner will be able to:

1. Identify ways in which parent education relates to patient experience
2. Describe effective education techniques that help empower families to care for their baby
3. Identify solutions to common barriers to learning.

Gravens2022-14

Abstract Title: Body Wrap Devices and Their Effects on Skin-to-Skin Care in the Neonatal Population: A Pilot Study

Authors: Allison Freccero, OTR/L, BPC; Melissa Scala, M.D; and Annette Nasr, Ph.D., RN, MPA, NE-BC

Corresponding Author:

Allison Freccero

OTR/L

Lucile Packard Children's Hospital Stanford

725 Welch Road, Palo Alto, CA 94305

(650) 304-7861

afreccero@stanfordchildrens.org

Background and Purpose: Skin-to-skin care (SSC) has been shown to improve infant cardiorespiratory stability, promote growth, reduce infections and positively impact parental mental health among others. Barriers to skin to SSC include concerns about infant safety as well as, caregiver and staff discomfort. Body wraps have been developed in an effort to overcome perceived barriers related to SSC, but limited evidence exists on their overall impact. The purpose of this safety and feasibility pilot study was to discover whether the use of a body wrap used to support SSC in the Neonatal Intensive Care Unit (NICU) would increase duration of SSC, decrease caregiver stress during SSC, and minimize adverse events. The authors hypothesized that when a body wrap was appropriately used to support SSC for preterm infants, the caregiver's level of stress would decrease and the duration of SSC would increase, and adverse events would decrease when compared to SSC without using the body wrap.

Materials and Methodology: Materials: Donated Zaky Zak body wraps were available for the intervention group.

Methods: This pilot study was conducted at a level four NICU in a tertiary-level pediatric hospital. Eligible participants included preterm infants at less than 34 weeks postmenstrual age (PMA) and who qualified for SSC per the unit's holding algorithm. The first 15 participants to meet inclusion criteria were enrolled into the standard of care (SOC) group which did not include the use of a body wrap during SSC. The remaining 14 participants were enrolled into the intervention group, performing SSC with the body wrap. Both groups received the same education on the benefits of SSC by the research team. Caregivers in the intervention group were

measured for proper fit for the body wrap by the research study team members and instructed to utilize the wrap during two SSC holds. Each infant/caregiver dyad performed two separate SSC holds, completed the Parent Stressor Scale and Parent Feedback form after each SSC hold, and completed a demographics questionnaire. Adverse events were documented by the research team with assistance from the nurse, parent, and retrospective chart review of the electronic medical record. Descriptive statistics were applied for analysis of the data.

Results: A total of 29 participants were enrolled in this pilot study. The mean gestational age (GA) at birth for enrolled participants was 29.0 weeks (std = 3.0). The mean PMA for participants at time of enrollment was 32.1 weeks (std = 2.4). Participants in the intervention group were on average younger (PMA during first SSC hold of 31.0 weeks vs. 33.1 weeks; d=-0.93), their caregivers were less experienced at performing SSC (57.2% had done 3 or fewer holds vs. 26.7% in the SOC group), and they were less likely to be on room air (28.6% vs. 66.7%; d=0.80). Despite this difference in the two cohorts, no significant differences between the two groups in terms of primary outcomes were observed. Total SSC time was not statistically significant between the two groups (p = 0.33), neither was the number of adverse events (p=0.31 for major events; p=0.38 for minor), the average parental stress (p=0.22) and confidence levels (p=0.18).

Conclusion: This was a small feasibility study to assess the impact a body wrap can have on infants and their caregivers while performing SSC in the NICU. The small sample size (n=29) was a significant limitation of this study, as it meant we were only powered to detect very large effects. The data did demonstrate that the body wrap group was more immature, on more ventilatory support and had less experience with SSC, yet did not experience any significant differences in adverse events or parental confidence. Given these findings, data from this feasibility study can be used to inform future research with larger sample sizes to evaluate the safety, efficacy, and cost-effectiveness of using body wraps during SSC for infants in the NICU.

Learning Objectives:

1. List at least two benefits of SSC for the preterm infant and/or their caregiver
2. Recall at least one perceived barrier to SSC holding with preterm infants in the NICU.
3. Accurately explain the findings from this pilot study conducted on the use of body wraps during SSC with preterm infants and the implications for future research.

Gravens2022-15

Abstract Title: Single family rooms in the NICU: parents in the lead!

Authors: M.M. Peters-Geven, MD, NICU Isala Zwolle, The Netherlands. M.A.C. Hemels, Doctor of pediatrics and neonatology, NICU Isala Zwolle, The Netherlands. S.M. Mulder-de Tollenaer, Doctor of pediatrics and neonatology, NICU Isala Zwolle, The Netherlands

Corresponding Author:

M.M. Peters-Geven, MD

Drs. Isala Zwolle

NICU Isala Zwolle. Dokter van Heesweg 2, 8025 AB Zwolle, The Netherlands.

+31640394925

m.m.geven@isala.nl

Background and Purpose: In the last decade there is increasing attention for Family Centered Care in the neonatal intensive care unit (NICU). In order to facilitate the presence of parents, more and more NICUs replace open bay units (OBUs) by single family rooms (SFRs). A similar trend is seen in the Netherlands. Multiple studies have shown the benefits of SFRs in the NICU. Neonates show less physiological stress, less pain and are less likely to develop sepsis[1]. Due to better regulation of light and sound, SFRs have a positive influence on their neurological development[2]. Furthermore, the amount of skin-to-skin contact rises significantly when parents have the opportunity to stay overnight, which has positive effects on breastfeeding, neonatal growth, neonatal development and parental stress[3]. On the other hand, the absence of parents in SFRs might negatively influence neurodevelopment and speech development in particular[4]. Several studies indicate parents are more isolated from other parents and medical staff and experience more hospital-related stress[1,5]. Therefore, Erdei et all proposes that the choice for OBU or SFR should be determined per child, parents and phase of the disease[6]. In order to be able to offer this in a NICU, both an OBU and SFRs must be available. A flexible architecture of the NICU, as suggested by Robson, can help to adapt to these shifting needs[7]. In this study, we examined the parents' views on the NICU design. What are the needs and wishes and what would the NICU look like if parents were in the lead?

Materials and Methodology: Explorative, quantitative research through online questionnaires. All parents with a child admitted to the NICU in Isala Zwolle in 2020 were invited by letter, except the parents from deceased children (278 invitations send). Currently the questionnaire was fully completed by 132 parents on which this research is based. Most important outcome measurements were: 1) number of parents who want to stay in SFRs (and if so, during the whole stay or at specific moments); 2) expectation of privacy and tranquility in an SFR (rating from 1 to 5); 3) Current and expecting levels of parental stress in SFRs compared to OBUs (rating from 1 to 5); 4) Current and expected visiting time in both and 5) the influence of SFRs on the use of the Ronald McDonald (RMD) house. Descriptive statistics were used. To compare these numeric (non-continous) and categorical outcomes, the Wilcoxon Signed Rank Test was used.

Results: Almost all parents (92%, 122/132) want to make use of SFRs at some point of hospital admission. However only 52% (68/132) want to make use of an SFR during the whole stay. Parents prefer SFRs when their child is stable (36%, 47/132) or when their child is critically ill (16%, 21/132). Only 8% (10/132) of the parents do not want to make use of SFRs at all (Figure 1). Benefits of SFRs mentioned by parents are more privacy (69%) and tranquility for themselves (63%). Objections are less contact with other parents and less visibility of their child to the care providers when they are not in the SFR themselves. Parents can relax better if they are present in the hospital using an SFR (mean SFR=3,70, mean OBU=3,54, Z=-2,180, p=0,029) but leave their child with less confidence when going home then when using an OBU (mean SFR=4,05, mean OBU=4,34, Z=-3,291, p=0,001) (Table 1). Parents expect to be 447 minutes a day longer on an SFR then on an OBU. In addition to an SFR, 15% of parents want to continue the use of the RMD house for their own tranquility and to be able to distance themselves from the hospital. In the current situation with an OBU 25% (33/132) of parents make use of the RMD house.

Conclusion: Most of the parents, but not all, favor an SFR at

some point of the hospital admission in the NICU, especially when their child is stable or critically ill. SFRs provides more privacy and tranquility for parents. The presence of parents is expected to be much longer in SFRs than in OBUs. However, parents do need opportunities for relaxation and tranquility outside the hospital. Therefore, parents think that during the NICU period a combination of OBUs and SFRs in tune with the condition of their child and the wishes and opportunities of the parents would be preferable than offering SFRs alone

Bibliography:

1. *Domanico R, Davis D, Coleman F, Davis B. Documenting the NICU design dilemma: comparative patient progress in open-ward and single family room units. J Perinatol. 2011;31(4):281–8.*
2. *Lester B, Hawes K, Abar B et al. Single-family room care and neurobehavioural and medical outcomes in preterm infants. Pediatrics. 2014;134:754–60.*
3. *Veenendaal van N, Kempen van A, Frank et al. Hospitalising preterm infants in single family rooms versus open bay units: a systematic review and meta-analysis of impact on parents. Eclinical Med. 2020;23:1–8.*
4. *Pineda R, Neil J, Dierker D et al. Alterations in Brain Structure and Neurodevelopmental Outcome in Preterm Infants Hospitalized in Different Neonatal Intensive Care Unit Environments. J Pediatr. 2014;164(1):52–60.*
5. *Pineda R, Stransky K, Rogers C et al. The single patient room in the NICU: maternal and family effects. J Perinatol. 2012;32(7):545–51.*
6. *Erdei C, Inder TE, Dodrill P et al. The growth and development unit. A proposed approach for enhancing infant neurodevelopment and family-centered care in the neonatal intensive care unit. J. Perinatol. 2019;39:1684-1687.*
7. *Robson K, Smith J, Dunn MS. Towards an architecture of flexibility. J. Perinatol. 2020;40:22-28.*

Learning Objectives:

1. SFRs have great advantages but are not in every situation superior to OBUs in the NICU.
2. Flexible NICU design is needed to provide optimal clinical and family-centered care.
3. Based on parents opinion, a hybrid model of SFRs and OBU should be offered during the NICU period to meet the needs of parents and child.

Gravens2022-16

Abstract Title: Development of a Multidisciplinary Parent Mental Health Program during NICU Hospitalization

Authors: Cindy H. Liu, Carmina Erdei, Leena Mittal, Julie Cadogan, Lorna Campbell, Emily Hildrey, Andrea Johnson, Gregory Kane, Alicia Katz, John McGillivray, Abigail Takesian, Kyra Schwartzman, & Terrie Inder

Corresponding Author:

Cindy H. Liu, PhD

Assistant Professor

Brigham and Women's Hospital, Harvard Medical School

221 Longwood Ave Boston, MA 02446

510-415-6932

chliu@bwh.harvard.edu

Background and Purpose: Up to 40-50% of parents of very preterm infants have been shown to experience elevated depressive and anxiety symptoms. While efforts have been made to assess parents' mental health and to refer them to services, an ongoing challenge is ensuring that the delivery of services and appropriate referrals take place during the infants' hospitalization.

Materials and Methodology: This is a descriptive analysis of the development and implementation of the Parent Mental Health (PMH) Program at Brigham and Women's Hospital, a 66-bed level III NICU. Composed of a multidisciplinary collaboration involving social work, psychology, psychiatry, and newborn medicine, the program was developed to provide timely and consistent mental health services for parents and caregivers during their infants' hospitalization in the NICU through services embedded in the milieu itself. Program elements include: universal screening and surveillance of parent mental health, the provision of individual and group therapy, and psychopharmacological treatment during the infants' NICU hospitalization.

Results: The NICU PMH Program was conceived in 2020 and developed throughout 2021. The hiring of a full time social worker in fall of 2021 was subsequently followed by the first phase of the program rollout which focused on screening and services for a subset of the NICU families. These included mental health screening for registered parents and caregivers of NICU infants under <32 weeks, and referrals for individual therapy and psychopharmacological treatment among those screened through the Edinburgh Postnatal Depression Scale (EPDS) with scores >10, or otherwise through their history. Individual and group interventions encompasses modalities including cognitive behavioral therapy (CBT), acceptance-based therapy (ABT), and includes skill-based development (e.g., mindfulness-based strategies) to reduce parent distress tolerance and increase emotion regulation during the NICU hospitalization. The service is intended to promote caregiver self-efficacy and readiness at discharge, during which referrals to outside mental health providers are made as needed. We expect the number of mental health screenings to gradually increase over the next several months and subsequently reach case-load capacity for the full-time therapist. Challenges to the development and implementation largely center on the multidisciplinary nature of the endeavor. These range from administrative concerns such as involving billing and documentation, determining role expectations and establishing norms for referrals and communication between the NICU team and the PMH team, in addition to the supervisors and leadership for the program.

Conclusion: The program provides relief and assurance not just to families, but to NICU providers who have long been engaged in efforts in supporting the emotional needs of distressed and grieving parents. Our efforts to develop and implement a NICU parent mental health program can serve as an example and an encouragement for other hospitals interested in providing treatment for families during the NICU hospitalization.

Learning Objectives:

1. To identify sources of stress and protective factors that contribute to parent mental health in the NICU.
2. To understand approaches to implementing parenting mental health screening and treatment within the NICU milieu.

Gravens2022-17

Abstract Title: Feasibility and Acceptability of a Motivational Interviewing Intervention to Increase Maternal Presence in a Level IV Neonatal Intensive Care Unit

Authors: Dailyn Acosta PhD, Vedanta Dariya MD, Rashmin Savani MD, Melissa Faith PhD

Corresponding Author:

Dailyn Acosta, PhD, IMH-E®

NICU psychologist

Children's Health / Children's Medical Center

1935 Medical District Dr, Dallas, TX 75235

972-741-0926

dailyn.acosta@childrens.com

Background and Purpose: Maternal presence is critical to health and development of neonates, particularly among those in a neonatal intensive care unit (NICU). However, the literature suggests that maternal presence at bedside is highly variable. The aim of this study was to assess feasibility and acceptability of a motivational interviewing intervention (MI) to increase maternal presence in a Level IV NICU. We also evaluated study design feasibility to inform a future, larger randomized controlled trial (RCT). This study was conducted in two phases: pre-COVID-19 and during the COVID-19 pandemic. Preliminary phase 1 acceptability data demonstrated that the MI intervention and study randomization were acceptable.

Materials and Methodology: Budget and Resources: The study was supported by a grant from the Jerry M. Lewis, M.D. Mental Health Research Foundation (grant number GA-2017-013). Methodology: All patients admitted to the Level IV NICU were screened for the following inclusion criteria: 1) infant in legal custody of biological mother, 2) infant in the care of the biological mother, 3) the mother speaks English or Spanish, 4) no maternal cognitive impairment, and 5) the infant was expected to stay in the NICU for at least 2 weeks. Participants were randomly assigned to one of two study groups, the motivational interviewing (MI) group, or the treatment-as-usual (TAU) group. Each participant completed up to 6 study visits in addition to a discharge visit. During the baseline and final visits, participants were administered an assessment battery that included questionnaires on parenting stress (PSS:NICU), depressive symptoms (EPDS), bonding (MIBS), COVID-19 related concerns (in phase two of the study), and motivation to visit. All study MI visits assessed for mother's motivation to visit and MI satisfaction. Maternal presence data were collected from visitation data in the patient's EPIC flowsheets documented by bedside nurses and verified through the check-in processes for visitors when mothers entered the hospital.

Results: This study recently completed data collection. Here, we present preliminary findings (time 1 measures, feasibility data) and full data analyses (N=96) will be presented at the meeting. A total of 343 infants were identified for the study, and 123 infants were eligible for inclusion in the study. Of those who were eligible and approached (n=123), 78% (n=96) enrolled in the study. An equal number of participants were randomized into the MI group (intervention: one weekly MI session for up to six sessions) and to the TAU group (control: supportive sessions as needed), with a total of 48 participants in each study arm. We present the relevant central tendency estimate (e.g., Mean, Median) based on variable distribution and outliers. At baseline, the average gestational age of infants enrolled in the study was 33 weeks (SD=5.32) gestational age (GA). Median length of stay was 38 days (Q1=17, Q2=38, Q3=85; Range=3-328). Our study sample is representative of the larger ethnically and racially diverse NICU population we serve: 16.7% (n=16) Black, 46.9% (n=45) non-White, and 57.3% (n=55) Latinx. Indeed, 17.7% (n=17) mothers identified Spanish as their primary language. Additionally, 38.5% (n=37) of mothers in the study reported marital status as single, and 50% (n=48) reported formal education as greater than a high school education. Mothers reported a wide range of visitation barriers: 24.2% (n=22) care for patient's sibling(s); 8.8% (n=8) distance; 8.8% (n=8) transportation; and 5.5% (n=5) work or school. 23% (n=21) of mothers reported a prior mental health history. At baseline, mothers reported elevated parenting stress (M(SD)=4.4(1.16)) and elevated depressive symptoms (M(SD)=18.8(6.9)). In a subsequent measure of mother-infant bonding (n=78), mothers reported clinically significant bonding challenges (M(SD)=2.87(.19)).

Preliminary findings from Phase 1 of the study demonstrated that the MI intervention was acceptable. We assessed MI acceptability by the rate of enrollment, willingness to participate in more than one MI session, and MI satisfaction ratings. In the first phase of the study, 78% of participants approached for the study agreed to participate, and all the mothers who participated in at least one MI session reported being willing to participate in a subsequent session. Of those who completed study visit one, 91% found the intervention as supportive, 86% found it helpful in managing their problems, and 94% found it motivating to visit their infant in the hospital.

Phase 1 analysis of the group showed a significant negative correlation between number of days mothers were present at the bedside and length of NICU stay. This finding is consistent with the broader literature that suggests that parental presence tends to decrease with longer NICU days hospitalized. In our presentation, we will analyze the MI and TAU groups separately to determine whether the MI intervention mitigated NICU presence decline over time. We will also evaluate whether maternal depressive symptoms decreased for the MI intervention group compared to the TAU group. Mediators for any group differences will be worthy of investigation, as maternal depressive symptoms are associated with a wide range of negative infant outcomes.

Conclusion: The goal of this study was to assess feasibility and acceptability of a motivational interviewing intervention (MI) to increase maternal presence in a Level IV NICU. The study was supported by a grant, and data collection was recently completed. Preliminary phase 1 acceptability data demonstrated that the MI intervention and study randomization were acceptable, and full data analyses will be presented at meeting; preliminary findings are included in this abstract. We also evaluated study design feasibility to inform a future, larger randomized controlled trial (RCT).

Learning Objectives:

1. Evaluate and describe feasibility of a motivational interviewing intervention in a Level IV NICU.
2. Evaluate and describe acceptability of a motivational interviewing intervention in a Level IV NICU

Gravens2022-18

Abstract Title: Barriers to long durations of kangaroo care in neonatal units in the United States

Authors: Ashley Weber, PhD, RN 1 Qutaibah Oudat, BSN, RN, MPH 1 Emma Close 2 Hannah Dion 1 Yamile Jackson, PhD, PE, PMP 3

Corresponding Author:

Ashley Weber, PhD, RN

Assistant Professor

University of Cincinnati

23785 Hedgewood Ave Westlake, OH 44145

440-476-4232

ashley.weber@uc.edu

Background and Purpose: Over forty years of research has revealed numerous benefits of prolonged skin-to-skin contact (SSC), also known as Kangaroo Care (KC), for neonates. However, safety concerns and other barriers to KC have hindered its implementation.1–3 This study aims to assess the common barriers to long durations of KC and evaluate the use of assistive KC devices in neonatal units in the United States.

Materials and Methodology: This secondary data analysis was part of a larger, national survey of neonatal clinicians' opinions and practices of KC. The Institutional Review Board considered this study "exempt," as the survey responses were anonymous, meant to describe existing practice, and did not collect any identifiable information.

A cross-sectional descriptive study was conducted with an electronic survey distributed to neonatal clinicians across the United States. Registered nurses, physicians, respiratory therapists, occupational/physical therapists, and other neonatal care providers completed an online survey made available through online neonatal community groups and organization websites. We also posted the survey on professional organizations' social media pages; this along with encouraging the survey respondents to share the post with other eligible participants led to snowball recruitment. To be eligible, the participant must have clinically cared for newborns in the United States or had a significant role in newborn care. Inclusion criteria questions were asked in the survey to identify and exclude ineligible participants. The survey was originally developed by Author YJ in partnership with key stakeholders, including parents, ergonomists, experts in the field of neonatology, and neonatal clinicians from a variety of disciplines. The survey included questions regarding demographic information, such as age, gender, and work environment. Questions regarding Kangaroo Care policies in hospitals were also asked; these questions determined which settings Kangaroo Care is used, including in the delivery room, when transporting mother and newborn to the postpartum unit, and in the NICU. Hospital policies regarding breastfeeding and sleeping during Kangaroo Care were also evaluated using the survey. Finally, questions were asked pertaining to barriers surrounding the implementation of long durations of Kangaroo Care. The survey contained multiple choice, select all that apply, and free text response. For the multiple choice and select all that apply, frequencies and percentages were calculated for each survey question. Fisher's exact tests were used to analyze relationships between categorical variables when the number of respondents in a cell was less than five. Independent t-tests and One-way Analysis of Variance (ANOVA) were used to analyze dependent continuous variables. Descriptive and summary statistics, including frequencies, percentages, means, and standard deviations, were used to quantify the data.

Results: The majority of respondents (N=148) were nurses (n=78, 52.7%) working full-time (n=111, 75.0%) in a level II, III, or IV NICU (n=109, 79.73%). Respondents overwhelmingly reported familiarity with KC, with 58.1% (n=86) considering themselves experts in this practice. Respondents generally described KC as either "standard practice" or "consistently practiced" in several circumstances: at birth for vaginal deliveries (n=116, 78.3%), at birth for c-sections (n=76, 51.3%), in post-partum (n=100, 67.5%), and in the NICU (n=111, 75.0%). A majority reported that parents were not allowed to sleep (n=106, 71.6%), or breastfeed/pump (n=87, 60.4%) while engaging in KC. Respondents reported the greatest barriers to KC as parents' willingness (M=0.53, SD=0.5), risk of dislodging medical devices (M=0.50, SD=0.5), and the units threshold of stability for KC (M=0.45, SD=0.5) When asked about standardized use of KC assistive devices, 44.7% (n=67) stated that their hospital had no specific policy or protocol in place, while an additional 11.3% (n=17) were unsure of their hospital's policy. However, a majority of respondents said that a hospital-provided ergonomic KC device would be either very beneficial (n=89, 60.1%) or somewhat beneficial (n=38, 25.7%).
Among respondents who were familiar with at least one of the KC devices assessed in this study, a majority either agreed or strongly agreed that the device increased the safety of the infant (n=27, 84.4%). In addition, they endorsed that the use of KC devices increased the duration (n=23, 71.9%), and frequency (n=23, 71.9%). They reported increased satisfaction of mothers (n=23, 71.9%), fathers (n=20, 62.5%), and clinicians (n=21, 65.6%) who engaged in KC with a device. Furthermore, respondents stated that these devices decreased unplanned dislodging of medical equipment (n=19, 59.4%) and that they could be used to keep infants warm in skin-to-skin in the case of a warmer/incubator malfunction (n=23, 71.9%).

Conclusion: Our results are important because we found several new barriers to long durations of KC, such policies that do not allow parents to sleep or pump/breastfeed during KC. Our results highlight that, despite recommendations from the Developmental Care Standards for Infants in Intensive Care to use assistive KC devices,4,5 many NICUs in the United States do not have specific protocols for the use of devices to increase the comfort and safety of Kangaroo Care. Clinicians who did use KC devices in our study suggest a subjective increase in both the duration and frequency of KC sessions with the use of KC devices, as well as added protection against falls and dislodging of equipment. Our results suggest that the use of assistive KC devices can serve a dual purpose of increasing comfort and convenience for parents and increasing safety for infants, to better allow all infants to reap the benefits of Kangaroo Care.

Bibliography:

1. *Weber A, Jackson Y. A Survey of Neonatal Clinicians' Use, Needs, and Preferences for Kangaroo Care Devices. Adv Neonatal Care Off J Natl Assoc*

Neonatal Nurses. 2021;21(3):232-241. doi:10.1097/ANC.0000000000000790

2. *Weber A, Elder M, Voos KC, Lambert JW, Kaplan HC, Jackson YC. Clinician Opinions and Approaches to Manage Risk Related to Safe Sleep During Skin-to-Skin Care. J Obstet Gynecol Neonatal Nurs JOGNN. 2020;49(5):464-474. doi:10.1016/j.jogn.2020.07.001*

3. *Lewis TP, Andrews KG, Shenberger E, et al. Caregiving can be costly: A qualitative study of barriers and facilitators to conducting kangaroo mother care in a US tertiary hospital neonatal intensive care unit. BMC Pregnancy Childbirth. 2019;19(1):227. doi:10.1186/s12884-019-2363-y*

4. *Browne JV, Jaeger CB, Kenner C, Gravens Consensus Committee on Infant and Family Centered Developmental Care. Executive summary: standards, competencies, and recommended best practices for infant- and family-centered developmental care in the intensive care unit. J Perinatol Off J Calif Perinat Assoc. 2020;40(Suppl 1):5-10. doi:10.1038/s41372-020-0767-1*

5. *Browne JV, Jaeger CB, Arvedson JC, et al. Developmental Care Standards for Infants in Intensive Care.; 2020:1-139. Accessed March 17, 2020. https://nicudesign.nd.edu/nicu-care-standards/*

Learning Objectives:

1. Previously documented barriers to KC include parent willingness, risk of dislodging devices, infant instability, and lack of clear hospital policy.
2. Assistive KC devices may increase the practice of KC by improving parent comfort and infant safety.

Gravens2022-19

Abstract Title: Maternal self-report of the impact of COVID-19 restrictions on their presence at bedside in a Level IV NICU

Authors: Dailyn Acosta PhD, Vedanta Dariya MD, Rashmin Savani MD, Melissa Faith PhD

Corresponding Author:

Dailyn Acosta, PhD, IMH-E®

NICU psychologist

Children's Health / Children's Medical Center

1935 Medical District Dr, Dallas, TX 75235

972-741-0926

dailyn.acosta@childrens.com

Background and Purpose: Maternal neonatal intensive care unit (NICU) presence is critical for infants' medical recovery and overall neurodevelopmental trajectory (Reynolds et al., 2013). Studies conducted in the United States suggest that caregivers' NICU presence vary significantly (Greene et al., 2015). Since March 2020, many NICUs have enacted policies that restrict caregiver presence because of COVID-19, and ease of restrictions have varied over time. This study evaluated mothers' perceptions of COVID-19 impact on their NICU presence.

Budget and Resources: The study was supported by a grant from the Jerry M. Lewis, M.D. Mental Health Research Foundation (grant number GA-2017-013).

Materials and Methodology: Data were collected as part of a larger, funded study evaluating a motivational interviewing intervention to increase maternal NICU presence. Phase two of the study began during the COVID-19 pandemic, during which time we enrolled a diverse and representative sample of 62 NICU mothers (age M(SD)=28(7.6), 46% Hispanic, 20% Spanish-speaking, 80% government subsidized insurance). From this sample, 10% of mothers reported testing COVID-19 positive during pregnancy and 8% of mothers reported testing COVID-19 positive at the time of infant's NICU admission. All patients admitted to the Level IV NICU were screened for the following inclusion criteria: 1) infant in legal custody of biological mother, 2) infant in the care of the biological mother, 3) the mother speak English or Spanish, 4) no maternal cognitive impairment, and 5) the infant was expected to stay in the NICU for at least 2 weeks. Participants were randomized into the motivational interviewing intervention (MI) group (N = 29) or a treatment-as-usual control (TAU) group (N = 33). In this phase of the study, prior to randomization, participants completed an assessment battery that included whether they tested COVID-19 positive during or after pregnancy. At the time of their infant's NICU discharge, participants completed the COVID-19 NICU Visitation Impact Scale, a 20-item self-report measure developed in English and Spanish for this study. Themes included understanding visitation restrictions and guidelines, availability and engagement at bedside, perceived distress, and socioeconomic resources. Participants reported the impact of COVID-19 visitation restrictions on a 4-point Likert-type scale (1=Not true at all, 4=Very true), with higher scores indicating greater impact. We determined maternal visitation rate using concierge electronic visitation data as well as electronic medical record flowsheets where nursing staff document visitation information.

Results: For participants who completed discharge measures (N=56), the most commonly endorsed barrier to NICU presence was having other children in the home. A subset of mothers reported that COVID-19-related stressors caused them to visit the NICU more than they may have otherwise – citing a desire to protect their baby from COVID-19 and noting that being present with their baby in the NICU made them feel less stressed about COVID-19. Conversely, the least common COVID-related barrier included being unsure about the hospital's COVID-19 policies. In summary, these findings suggest greater maternal concern around COVID-19 infection and the desire to protect their baby from infection, while issues related to understanding of COVID-19 related visitation policies and worries about breaking hospital's COVID-19 policies did not appear to influence maternal presence at bedside as much

Conclusion: To our knowledge, this is one of the first studies to develop a self-report measure to assess maternally reported COVID-19 impact on NICU presence at bedside. Preliminary findings suggest mothers may continue to benefit from additional resources during the COVID-19 pandemic, especially related to mitigating COVID-19 related stress in the context of a NICU stay.

Learning Objectives:

1. Describe COVID-19 NICU Visitation Impact Scale, a 20-item self-report measure developed in English and Spanish for this study.
2. Discuss findings related to self-reported COVID-19 impact on maternal presence in the NICU.

Gravens2022-20

Abstract Title: Nurses' implementation of skin-to-skin contact in the NICU is related to their perceptions of family-centered care

Authors: Marilyn Aita, Gwenaëlle De Clifford-Faugère, Geneviève Laporte, Sébastien Colson, & Nancy Feeley

Corresponding Author:

Marilyn Aita

Associate Professor

Université de Montréal

C.P. 6128 Succ. centre-ville, Montréal, Québec, Canada

514-343-6111, ext.: 51473

marilyn.aita@umontreal.ca

Background and Purpose: Skin to skin contact (SSC) is a common developmental care (DC) practice in neonatal nursing care with established benefits for preterm infants and their parents. SSC is rooted in the philosophy of family-centered care (FCC)1 since it can promote parental presence and involvement at the bedside from the earliest hours of the preterm infants' life2. FCC is also documented as a DC intervention improving health outcomes of preterm infants as well as psychological well-being of the parent3,4. Driven by the philosophy of DC, nurses should provide opportunities for collaboration and involvement for parents in the NICU to encourage both FCC and SSC. As an optimal implementation of FCC and SSC may depend on the nurses' perceptions of developmental care practices, the goal of these secondary analysis was to explore the relationship between NICU nurses' perceptions of FCC as well as SSC.

Materials and Methodology: Secondary analysis was conducted from a larger comparative international study5 where 202 nurses working in level III universities affiliated neonatal units in Canada and France completed questionnaires on their perceptions about FCC and SSC. The FCC questionnaire had 20 items including 3 subscales (support, collaboration and respect) where higher scores indicated more favorable perceptions of FCC6. The SSC questionnaire contained 20 items separated in four distinct subscales (knowledge, beliefs and attitudes, education and training implementation)7. Higher scores were also indicative of favorable perception towards SSC.

Results: The nurses' FFC total score was significantly but weakly correlated with all SSC subscales scores, ranging from 0.17 to 0.30. More precisely, SSC education and training (subscale 3) and implementation of SSC (subscale 4) were correlated with nearly all FCC subscales (respect, collaboration, and support). These results may suggest that the nurses' perceptions of their care being family-centered would be higher with greater SCC training and education and implementation of SSC in the NICU.

Conclusion: Our results suggest that the FFC is associated to the implementation of SSC in the NICU. These results shed a light on the association of these practices and might highlight a theoretical and practical perspective to better understand developmental care as an integrated concept. Thus, considering these findings, it seems possible that encouraging the practice of SSC among nurses, through the adoption of practice guidelines, training and education, and adequate implementation on the unit, would lead to a better perception of FCC, which translates into positive outcomes for preterm infants and their parents.

Learning Objectives:

1. Comprehend how SCC and FCC as DC practices may be related.
2. Recognize that the adoption of SCC practice guidelines, training and education, and adequate implementation in the NICU lead to better perceptions of FCC by nurses.

Gravens2022-21

Abstract Title: Health Equity Beyond the NICU: Perspectives from Family, Staff, and National Experts on Improving Accessibility and Experience in NICU Follow-Up Clinic

Authors: Nisha Dalvie, Brandon McBay, Jonathan Litt, Lindsay Rosenfeld

Corresponding Author:

Nisha Dalvie, MD

Resident Physician

Boston Children's Hospital and Boston Medical CEnter

19 E Albion Street, Somerville, MA 02145

9254870142

nisha.dalvie@childrens.harvard.edu

Background and Purpose: Racial and socioeconomic inequities have well-known impacts on healthcare outcomes, especially for families with preterm or medically-complex infants.1,2 These include impacts on long-term neurodevelopment, access to specialty services, and family experience.3,4,5 Such inequities persist throughout childhood and therefore have important, long-term implications for public health and health equity.3 As such, the goal of this study was to understand barriers to health equity in our own NICU follow-up clinic, and consider how other programs can do the same.

Materials and Methodology: Our study setting was an urban quaternary-care medical center with a specialized follow-up clinic for NICU graduates. Our study population included three key groups: 1. primary caregivers of patients currently enrolled or recently enrolled in our NICU follow-up program (n=6), 2. current staff members working in the clinic across various disciplines, including neonatology, psychology, nursing, social work, and physical therapy (n=9), and 3. national experts in the field of public health and healthy equity (n=4). We conducted semi-structured interviews to explore best practices, barriers, facilitators, clinic purpose, and other areas of patient experience. A grounded theory approach was used to guide thematic analysis. Coding was performed by trained research assistants with multiple reliability checks using a third coder to ensure inter-rater reliability. Themes are reported if a majority (50% of more) of the group highlighted the theme. Analyses were facilitated by Dedoose, Version 9.0.17.

Results: Strengths: Among primary caregivers, the most recurring strengths identified via thematic analysis were the continuity of care with staff members, both in the transition from NICU to follow-up as well as within follow-up clinic. Thematic analysis of staff interviews identified empathy of providers as the most common strength. National experts did not comment on clinic-specific strengths as they were not familiar with our follow-up program or hospital system. Common strengths across all groups included

the general expertise of follow-up clinic staff in treating medically and developmentally-complex infants and the opportunity for subspecialty referrals within the same hospital network.

Improvement Needs: Each group identified unique areas for clinic improvement. Among primary caregivers, thematic analysis revealed a desire for increased social-emotional support for parents and improved care coordination between specialists outside of the clinic. Thematic analysis of staff interviews identified weaknesses surrounding social work resources, and the importance of setting clear limitations regarding what follow-up clinics can and should provide. National expert interviews highlighted the importance of employing systems-level public health frameworks to ensure equitable outcomes. All groups noted a lack of clarity in how the purpose of follow-up is communicated to families, especially regarding Early Intervention.

Conclusion: Taken together, key themes for focusing systems-level improvement work include augmenting strengths, considering new communication strategies and ideas, and using health equity frameworks to guide improvement cycles. A clinic taskforce (staff, families, and other relevant experts) is reflecting together as it drives this work, which explicitly uses systems change frameworks.

Learning Objectives:

1. Identify the relationship between racial and socioeconomic inequities and health outcomes, particularly for preterm or medically-complex infants.
2. Explain common themes about strengths and weakness of infant follow-up between families, staff, and national experts.
3. Explore how these themes might be used to create interventions for reducing health inequities using an equity-informed quality improvement approach.

Gravens2022-22

Abstract Title: Multidisciplinary Approach to the Creation of Developmental Neuroprotective Care Guidelines in a Level IV NICU

Authors: Acosta, D., Bordier, E., Murray, A.

Corresponding Author:

Dailyn Acosta, PhD

NICU Psychologist

Children's Health/ Children's Medical Center

1935 Medical District Dr., Dallas, TX 75235

972-741-0926

dailyn.acosta@childrens.com

Background and Purpose:

For consideration as oral presentation

Over the years, our Level IV NICU has been relying on individual policies and guidelines developed independently to guide clinical practice in the unit. However, recently, there was an opportunity to develop and utilize a unified theoretical framework of interventions tailored specifically for a high-risk, medically complex Level IV unit. The goal of this oral presentation is to describe the development of a comprehensive and evidence-based document outlining a set of neuroprotective guidelines that will serve as the foundational and educational guide to developmental care in our unit. The professions represented by the three authors of the document include: speech-language pathologist, occupational therapist, and psychologist.

Materials and Methodology: For the purposes of creating the NICU developmental care guidelines, content was organized following the seven broad core measures outlined by Altimier & Phillips (2016). The seven core measures are as follows:

1) Healing Environment

2) Partnering with Families

3) Positioning and Handling

4) Safeguarding Sleep

5) Minimizing pain and stress

6) Protecting Skin

7) Optimizing Nutrition

This model allowed for integration of all relevant areas of developmental neuroprotective care in a medical center. It was also deemed a good model to follow for our specific NICU as it mapped nicely onto various committees and workgroups already established within our unit, several of which were subsumed under the Developmental Care Steering Committee. The endeavor was highly structured and collaborative, with many checks and balances, and elicited consultation, educational resources, and input from content experts and NICU leadership to guide the process.

Results: For the purposes of our NICU's guidelines, each core measure included: standards of care, goals, background, and evidence-based interventions specifically tailored for our Level IV unit based on up-to-date literature and research. References for each section were included at the end of section for easy review. The full, comprehensive document is 95 pages, including references. It has been reviewed by NICU content experts.

Conclusion: Moving forward, the goal is to continue refining the developmental care guidelines, educating and disseminating relevant materials and information, and developing and prioritizing unit initiatives that will support evaluation and reflection of current NICU practices in order to advance their alignment with evidence-based practices outlined in the NICU Developmental Neuroprotective Care Guidelines.

Learning Objectives:

1. Describe multidisciplinary approach and process for creating developmental care guidelines within a care team and within our unit structure and culture.
2. Describe content of the new document developed: NICU Developmental Neuroprotective Care Guidelines.
3. Discuss opportunities, challenges, and benefits of cre-

ating comprehensive developmental care guidelines for a Level IV unit; emphasis on importance of multidisciplinary collaboration.

Gravens2022-23

Abstract Title: Mothers' of Preterm Infants Subjective Experiences of a Newborn Behavioral Observations (NBO) Parenting Support Intervention

Authors: Esther Sokoloff-Rubin, Tufts University; Jessica Dym Bartlett, MSW, PhD, Thriving Together, LLC; Katherine Paschall, PhD, Child Trends; Allison Hebert, MA, Child Trends; Lianne Woodward, PhD, University of Canterbury; J. Kevin Nugent, PhD, Boston Children's Hospital; Sylva Yeghiayan, PhD, Brigham and Women's Hospital; Rachel Suttin, BA, Brigham and Women's Hospital; Lise C. Johnson, MD, Brigham and Women's Hospital

Corresponding Author:

Lise C. Johnson, MD

Newborn hospitalist

Brigham and Women's Hospital

Department of Pediatric Newborn Medicine CWN4;

Brigham and Women's Hospital;

75 Francis St; Boston, MA 02115t

6174484026

ljohnson11@bwh.harvard.edu

Background and Purpose: Mothers of preterm infants have heightened risk of postpartum mental health problems compared to mothers of full-term infants. Preterm newborns present additional challenges due to their neurobehavioral and physiological immaturity and the stress of prolonged hospitalization after birth. Previous research has shown that parents of preterm infants report higher rates of anxiety and depression and lower levels of parenting confidence than parents of healthy, full-term newborns (Frello Roque et al., 2017). A Newborn Behavioral Observations (NBO)-based parenting support intervention has been shown to improve maternal confidence and to decrease symptoms of depression and anxiety in new mothers (McManus et al., 2020; Nugent et al., 2014). The NBO is an infant-focused, family centered, relationship-based intervention, designed to sensitize parents to their baby's competencies and individuality, to foster positive parent-infant interactions, and to contribute to the development of a positive parent-infant relationship from the start. The NBO consists of 18 neurobehavioral observations, which together capture the infant's unique capacities and challenges in self-regulation in four key domains: autonomic, motor, and state regulation, and responsiveness to social and non-social stimuli (Nugent et al., 2007). The Baby AMOR Study is a randomized controlled trial of the NBO intervention for moderate and late preterm (gestational age 32 to 36 6/7 weeks) infants and their mothers aimed at improving maternal mental health outcomes and supporting sensitive early parenting and optimal healthcare behaviors. We hypothesize that this intervention will improve postpartum maternal mental health and mother-infant relationships and that mothers will find the NBO to be an acceptable and useful intervention.

Materials and Methodology: One hundred ninety-nine mother-baby dyads have been randomized either to the NBO-based parenting support intervention delivered in three sessions during the first 6 weeks post discharge from birth hospitalization, or to a control group. Data addressing demographic information, mental health measures, parenting confidence, and infant feeding and health care practices are being gathered at three time points: baseline (Time 1), 6 weeks post hospital discharge (Time 2), and a follow-up interview at infant's four months corrected gestational age (Time 3). A mother-infant play session is videotaped at Time 3 for scoring using the Emotional Availability Scales. After Time 3 data collection is complete, intervention group mothers participate in a brief end-of-study interview addressing their perceptions of the value and impact of the NBO sessions. This preliminary analysis reports on findings from 57 final study interviews (Time 3) conducted to date.

Results: A total of 91.23% of mothers reported that the NBO intervention was helpful; 92.86% of mothers reported a positive impact of the NBO on their confidence as parents; 91.23% of mothers reported a positive impact of the NBO on their understanding of "who their baby is as a person;" 91.23% of mothers reported a positive impact of the NBO on their parenting; 87.72% of mothers reported a positive impact of the NBO on their relationship with their baby; and 87.72% of mothers reported a positive impact of the NBO on their emotional well-being. Coding of open-ended responses corroborate these dominant themes. Mothers reported that the NBO sessions were educational and informative, helping them to notice and interpret their baby's behaviors and cues so that they could respond accordingly. Mothers' comments indicated that the three NBO sessions provided reassurance, helping them to negotiate the challenges of prematurity, to manage expectations, and to be more confident during their infants' first weeks of life at home after hospital discharge.

Conclusion: This interim analysis offers evidence that the NBO intervention is subjectively helpful to mothers in supporting their early parenting of preterm infants. We expect analysis of complete study data to further elucidate these findings, including results of standardized measures on maternal mental health and confidence, maternal health practices with their infants, and moderating and mediating factors that help explain the underlying the impacts of the NBO and study outcomes.

Bibliography:

1. *Frello Roque, A. T., Lasiuk, G.C., Radunz, V, Hegadoren, K. (2017). Scoping Review of the Mental Health of Parents of Infants in the NICU. J Obstet Gynecol Neonatal Nurs 46(4):576-587*
2. *McManus, B. M., Yvette Blanchard, Y., Natalie J. Murphy, N. J., & Nugent, J. K. (2020). The effects of the Newborn Behavioral Observations (NBO) system in early intervention: A multi-site randomized controlled trial. Infant Mental Health Journal, 41(6), 757-769.*
3. *Nugent, J. K., Bartlett, J. D., & Valim, C. (2014). Effects of an infant-focused relationship-based hospital and home visiting intervention on reducing symptoms of postpartum maternal depression: A pilot study. Infants & Young Children, 27(4), 292–304.*
4. *Nugent, J. K., Keefer, C. H., Minear, S., Johnson, L. C., & Blanchard, Y. (2007). Understanding newborn behavior and early relationships: The Newborn Behavioral Observations (NBO) system handbook. Baltimore, MD: Paul H Brookes.*

Gravens2022-24

Abstract Title: Adaptation and Integration of the Family Centered Care team in NICU decision making processes during a pandemic and transformational changes in the NICU.

Authors: Sangeeta Mallik, Priya Jegatheesan, Patty Mier, Jennifer Godfrey, Erin Saucedo, Laura Berritto

Corresponding Author:

Sangeeta Malik, Ph.D.

Director, Family Centered Care Program

Santa Clara Valley Medical Center NICU

20661 5th St, Unit 4, Saratoga CA 95070

650-245-6517

sangy9@gmail.com

Background and Purpose: Family Centered Care (FCC) prepares family members for decision-making and caregiving roles, with the goal of reducing family members' stress during and after neonatal intensive care unit (NICU) hospitalization of an infant. FCC has been associated with numerous benefits including decreased length of stay, improved well-being of pre-term infants, and greater family satisfaction. Physical or social distancing used to reduce infection transmission during COVID-19 pandemic has a profound impact on the delivery of family-centered inpatient care in NICU due to visitation restriction policies. How do we adapt such a program to maintain the core of the family centered care concept in the service of families? This presentation describes the various ways in which the FCC program in a level IV NICU was adapted to continue to serve our families during the pandemic and the ways in which that adaptation and integration of the team into NICU decision-making led to certain transformational changes in NICU family centered care practices.

Budget and Resources: The Family Centered Care Program consisted of staff funded by First 5 Santa Clara County. Family support specialists (paid staff) consisted of 3 ex-NICU mothers that helped other NICU parents by proving peer support through their journey in NICU. The Director of the FCC program helped oversee and grow the program. A Family Education Specialist was responsible for family CPR and discharge preparedness education in addition to bedside staff teaching.

Materials and Methodology: This is a retrospective, observational single-center study conducted at a public safety-net hospital in California with a regional level IV NICU. This study included infants born and admitted to our NICU between July 2019 and October 2020. We compared the demographics and FCC program measures during the "pre-pandemic phase" (July 2019 - February 2020, N=192), and "pandemic phase" (March 2020 -October 2020, N=227). In addition, we qualitatively describe FCC team processes that were existent pre-pandemic in the NICU and further highlight how those were modified and expanded during the pandemic after the team was fully integrated in NICU decision making leading to transformational change in certain family centered practices in the NICU.

Results: There was no difference in the demographics between the "pre-pandemic" and "pandemic" groups. Overall, the median birth weight and gestational age were 2753 grams and 37 weeks; 58 percent were males, 65 percent of Hispanic origin and 21 percent of caregivers had substance use disorders. There were several modifications of the FCC program during the pandemic that were transformational to NICU family centered care practices.

Conclusions: In the pre-pandemic phase, the FCC team: 1) connected with families in person at bedside 1-2 times a week, 2) provided language support in person, 3) held onsite parent education classes twice a week and scrapbooking once a week.

During the pandemic, they : 1) connected with families mostly via phone 1-2 times per week, 2) communicated changes in visitor policy to families actively, 3) provided phone language support, 4) gave family related feedback to the NICU team during weekly multidisciplinary meetings and in real time to charge nurses, 5) provided onsite parent education in small groups twice a week with social distancing rules, 6) added a parent educator for CPR and special discharge teaching, 7) suggested the idea of initiating psychosocial rounds with NICU staff to review any psychosocial issues NICU families could encounter on a weekly basis which then got implemented by NICU leadership 8) suggested to NICU staff to strengthen language translation services in the NICU due to which a translator was hired and 7) initiated discharge preparedness quality improvement efforts.

Following the pandemic, while the FCC team onsite hours decreased, virtual (e.g. phone calls) support activities increased significantly. NICU families continued to receive FCC care regularly on a weekly basis. Proactive virtual adaptation of the FCC program in a timely fashion in response to the dynamic changes of pandemic polices allowed the FCC team to maintain their connectivity with the NICU families. Despite working remotely, daily phone calls and information exchange between the FCC team and NICU staff enabled them to advocate for the families effectively. Furthermore, the FCC team was able to expand their responsibilities during the pandemic by suggesting and helping implement psychosocial rounds as well as suggesting strengthening language translation services in the NICU with the help of leadership. All these activities in unison helped NICU FCC program adapt effectively to continue serving the needs of our NICU families despite the constraints imposed by the COVID-19 pandemic.

Learning Objectives:

1. To understand how a family centered care program adapted itself during the pandemic to continue to serve NICU families.
2. To understand how the FCC team was able to effectively advocate on behalf of families and help add additional family centered processes in NICU decision making to help NICU staff better support families.
3. To see if there were any differences in the demographics of NICU babies pre pandemic and during the pandemic.

Gravens2022-25

Abstract Title: Nutrition Care Team Experience of Novel Human

Milk Fortifier in US Neonatal Intensive Care Units

Authors: Gates A, Evans H, Gatto A, Le Vin J, Thornton J, Langley K, Valentine C.

Corresponding Author:

Amy Gates PhD, RDN, CSP, LD

Associate Professor

Augusta University

112 Deer Springs Rd., Clarks Hill, SC 29821

17067999598

amy.gates@rb.com

Background and Purpose: Human milk fortification for the high-risk infant is crucial for growth and development, but the process is not uniform. Historically, human milk fortifier (HMF) was only available in premeasured, volume-restricted amounts. Fortification with small volume packaging required multiple steps, additional staff time, lacked flexibility, and led to inaccuracies. In 2020, a novel sterile bottle containing 5.5 oz of HMF was designed by neonatal practitioners to ensure accurate and safe fortification. Staff can aseptically remove the exact amount of fortifier needed for volume and caloric density. Nutrition Care Team (NCT) awareness of a safer and more efficient strategy is needed. This study aimed to cross-sectionally examine the experience of Nutrition Care Team members using the novel sterile bottle of HMF.

Materials and Methodology: Clinicians at United States (US) hospitals that evaluated the HMF from June 1, 2020, through April 30, 2021 (n=108), were sent an email containing an anonymous survey link to share with the NCT. Investigators were blinded to whom completed the survey, and no identifying information was collected. After obtaining consent, survey respondents were asked 29 questions about the preparation of human milk, growth, feeding tolerance, and nutritional status in their Neonatal Intensive Care Unit (NICU). The protocol was IRB approved.

Results: The response rate to the survey was 36% (n=124). Of those that responded, 99.2% (n=123) consented to participate. Of those that consented, 84.2% (n=113) responded that they had used the HMF for at least one patient. Most of the respondents were registered dietitians (RD) (32.4%), nurses with direct patient care responsibilities (26.1%), and formula room technicians (17.1%) (Table 1). Most respondents (76.6%, n=82) indicated that human milk was prepared in a milk preparation room, followed by 18.7% (n=20) at a designated space in the NICU. Respondents responsible for the preparation of human milk reported the novel sterile bottle of HMF was better than their previous practice for reduction in time to prepare (71.7%, n=33), accuracy of fortified human milk (69.6%, n=32), aseptic preparation (52.2%, n=24), reducing waste of human milk (58.7%, n=27), and ease of use (65.2%, n=30). Of those that were responsible for evaluation of nutritional status, feeding tolerance was better (38.5%, n=27) or the same (58.6%, n=45) with the novel HMF when compared to their previous practice. The majority of respondents indicated that growth parameters were the same as previous practice for weight (67.1%, n=47), head circumference (81.2%, n=56), and length (76.8%, n=53) with use of the novel HMF (Table 2).

Conclusions: A novel sterile bottle of human milk fortifier was perceived favorably by NICU Nutrition Care Teams. The HMF bottle may reduce preparation time and waste of human milk while maintaining growth and tolerance.

Profession	n	%
Formula or Milk Room Technician	19	17.1%
Lactation Consultant	0	0.0%
Neonatal Nurse Practitioner, Advanced Practice Nurse, or Physician Assistant	6	5.4%
Nurse Manager or Assistant Nurse Manager	7	6.3%
Nurse with direct patient care responsibilities	29	26.1%
Nurse without direct patient care responsibilities	0	0.0%
Patient Care Technician or Nursing Assistant with direct patient care responsibilities	0	0.0%
Physician	16	14.4%
Registered Dietitian	36	32.4%
Total	**111**	**100.0%**

Table 1 Participants by Profession

Values are number (%)

	Better Than		The Same		Worse Than		Total
	n	%	n	%	n	%	n
Breastmilk Preparation							
Easy to use	30	65.2%	15	32.6%	1	2.2%	46
Ensures aseptic preparation	24	52.2%	15	32.6%	7	15.2%	46
Reduces time to fortify breastmilk	33	71.7%	13	28.3%	0	0.0%	46
Reduces breastmilk waste	27	58.7%	17	37.0%	2	4.4%	46
Reduces the number of steps needed to prepare fortified breastmilk	25	54.4%	18	39.1%	3	6.5%	46
Ensures accuracy of fortified breastmilk	32	69.6%	12	26.1%	2	4.4%	46
Feeding Outcomes							
Feeding tolerance	27	38.5%	41	58.6%	2	2.9%	70
Weight gain	20	28.6%	47	67.1%	3	4.3%	70
Head growth	12	17.4%	56	81.2%	1	1.5%	69
Length growth	15	21.7%	53	76.8%	1	1.5%	69

Table 2 Compared to the human milk fortifier(s) you have used before, how does the new HMF compare?

Values are number (%)

Learning Objectives:

1. Learner will explore potential impacts of human milk fortifier selection on nutrition order preparation practices in the NICU.
2. Learner will be able to compare their experiences to a nationwide sample of NICU Nutrition Care Team experiences in regards to patient nutrition outcomes.

Gravens2022-26

Abstract Title: COVID-19 Pandemic Experiences and Maternal Stress in Neonatal Intensive Care Units

Authors: Carmina Erdei, MD, Natalie Feldman, MD, Amanda Koire, MD, PhD, Leena Mittal, MD, & Cindy H. Liu, PhD

Corresponding Author:

Carmina Erdei, MD

Neonatologist

Brigham and Women's Hospital

Harvard Medical School

75 Francis St

6174620202

cerdei@bwh.harvard.edu

Background and Purpose: The Coronavirus Disease 2019 (COVID-19) pandemic has been a major disruption for individuals across the world, with elevated rates of mental health symptoms observed since March of 2020 when the U.S. outbreak first occurred. These increased mental health concerns have been observed in the general population, as well as in high-risk populations such as perinatal women. Parents of infants hospitalized in the Neonatal Intensive Care Unit (NICU) are a particularly vulnerable population, and they experience increased rates of psychological distress and mental health problems in the perinatal period.

Materials and Methodology: We conducted a cross-sectional analysis based on nationwide online survey responses to understand the relationship between the COVID-19-related experiences and the stress experienced by mothers of infants admitted to US NICUs (n=108) during the pandemic. The sample of NICU mothers used for this analysis were drawn from the Perinatal Experiences and COVID-19 Effects (PEACE) Study where online survey data was collected among postpartum women across the U.S. from May 21, 2020 and June 23, 2021. Participants were recruited from email listservs, social media, word of mouth, and Facebook support groups. Predictors included: COVID-19 pandemic related health worries using the Coronavirus Health Impact Survey, COVID-19 worries about resources, and COVID-19 related grief. To assess parenting stress experience within the NICU, we administered the Parental Stressor Scale: Neonatal Intensive Care Unit (PSS:NICU). We examined all covariates listed above in relation to the three subscales of the PSS:NICU (parental role, infant appearance and behavior, and sights and sounds). We utilized infant gestational age, pre-existing maternal anxiety, and whether the infant was admitted in the NICU at the time of the survey as covariates in the hierarchical multiple regression models.

Results: The majority (61.9%) of surveyed mothers reported experiencing high levels of stress in our study, with a total mean score of 3.2 on the PSS:NICU. (Table 1) COVID-19-related grief was significantly associated with higher levels of maternal stress as it related to seeing the baby's appearance and behavior in the NICU, and exposure to sights and sounds within the NICU environment. (Table 2) No significant associations were noted between parental stress and COVID-related health worries or worries about resources.

Key Variables	Means (SD, range)
COVID-19 related experiences	
Health worries	12.9 (3.6, 4.0-20.0)
Worries about resources	13.6 (4.7, 6.0-25.0)
Grief	19.2 (3.7, 6.0-27.0)
PSS: NICU	
Total	3.2 (0.8, 1.5-5.0)
Parental role alteration	3.9 (0.6, 1.2-3.9)
Infant appearance and behavior	2.7 (0.9, 1.1-5.0)
Sights and sounds	3.0 (1.0, 1.0-5.0)

N = 97-107

Table 1. Maternal mental health and other psychosocial experiences from Wave I of the PEACE Study, data collected between May 21, 2020 to June 23, 2021.

	Parental role alteration			Infant appearance and behavior			Sights and sounds		
Blocks of variables entered in three steps	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
1. Covariates		.062	.062		.104	.104*		.042	.042
Gestational age	-.165			-.204†			-.015		
Currently in NICU (ref=no)	-.228†			-.077			-.071		
Maternal pre-pregnancy GAD	.095			.197†			.179		
2. COVID-19 related experiences		.101	.040		.178	.075†		.125	.083*
Health worries	.042			.095			.129		
Resource worries	.048			-.064			-.210†		
Grief	.156			.254*			.260*		

N = 95-99, †*p*<0.1, **p*<.05

Table 2. Multiple regression predicting parent stress in the NICU in three domains based on COVID-19 related experiences.

Conclusion: Hospitals should consider parental COVID-19-related experiences when weighing the risks and benefits of family presence and involvement in the NICU. Enhanced psychosocial support is necessary to mitigate the long-term consequences of heightened stress during and after the COVID-19 pandemic for NICU families.

Learning Objectives:

1. Describe the rates of NICU-related parent stress levels during the COVID-19 pandemic.

2. Determine how COVID-19-related experiences, inclusive of health worries, worries about resources, and grief of lost experiences might relate with high levels of stress experienced by mothers of infants hospitalized in the Neonatal Intensive Care Unit (NICU).

Gravens2022-27

Abstract Title: A Music-Based Intervention to Reduce Stress in the Hospitalized Preterm Infant

Authors: Erdei, Carmina MD; Forde, Madison; Sunwoo, John; El-Dib, Mohmed MD; Inder, Terrie MD

Corresponding Author:

Dr. Carmina Erdei, MD

Brigham and Women's Hospital

75 Francis Street, CWN , Boston, MA 02115

cerdei@bwh.harvard.edu

Background and Purpose: Preterm infants experience stress while hospitalized in the sensory-atypical environment of the Neonatal Intensive care Unit (NICU). (1) Such stress can perturb infant physiological state, contributing to later developmental impairments. (1,2) Music-based interventions may reduce stress, enriching the auditory environment in the NICU to improve infant neurodevelopment. (3-5) Little is known about which music conditions and stimulus characteristics correlate with improvement of physiologic measures of stress in preterm infants. (3) This study investigated the relationships between different three different types of musical segments and physiologic and behavioral responses in hospitalized preterm infants.

Materials and Methodology: Three 15-minute original pieces of music, composed by Bose Corporation Company, were employed. 13 preterm infants, with postmenstrual ages between 30 weeks and 35 weeks, 6 days participated in the study (Table 1). Each participant was exposed to 12 interventions in a randomized order (three exposures for each music condition and silence); study staff remained blinded to the music condition. Outcomes included continuous recordings of heart rate, respiratory rate, oxygen saturation, infant behavioral state organization, and regional cerebral oxygen saturation (rSO2). A repeated measures ANOVA (Linear Mixed Model) was used to analyze vital sign evolution after each music exposure compared with silence (Condition 4).

Results: No statistically significant changes were observed in vital sign patterns after each type of exposure (music or silence) when compared with baseline vital signs patterns pre-exposure (Table 1). Respiratory rates tended to decrease after each music condition (Condition 1, 2, or 3) when compared with silence (Figure 1), however differences were small and did not reach statistical significance. Further, when analyzing the respiratory rate pattern during and 5 minutes after each Condition, we observed a significant reduction with Condition 2 compared with silence (Tukey Post-Hoc p= 0.056*). Infant behavioral state regulation ratings trended in the desired (lower) direction one hour after all Conditions (1, 2, 3, and 4), and remained most stable at the lowest (desired) rating after exposure to Condition 2. This Condition consists of a low, repetitive, and rhythmically consistent entrainment stimulus. Further statistical analyses inclusive of modeling and multivariate regressions will be conducted on a larger sample in further stages to inform more conclusive results.

Conclusion: This study provides insight into the characteristics of music associated with reduced stress. This will permit NICU professionals to tailor music experiences in the NICU to achieve optimal therapeutic effects.

Learning Objectives:

1. Meaningful auditory exposure is important for the brain development of premature infants. Excessive noise can overstimulate the brain, while not enough high-quality auditory exposure and silence can also hinder progress. Achieving the right balance is important to support optimal brain development.

2. This study seeks to understand how to use composed music most effectively to help babies soothe and better regulate their physiologic functions after stressful instances.

3. Preliminary results suggest that there were no statistically significant changes observed 5 to 15 minutes before and up to after 60 minutes after the exposure. Respiratory rate tended to decrease after all music conditions (Conditions 1, 2, and 3) when compared to silence.

Variables (Average response of 45-75minutes)	Total (N=156 sessions)	Music 1 (39)	Music 2 (39)	Music 3 (39)	Music 4 (39)	P-Value*
Heart Rate (BPM)						0.423
Missing	0	0	0	0	0	
Mean±SD	158.5 ± 11.6	160.9 ± 10.7	157.6 ± 11.4	160.3 ± 12.6	155.3 ± 11.3	
Min–Max	130.0 - 184.0	134.5 - 179.8	131.5 - 179.3	135.0 - 184.0	130.0 - 175.5	
Median (IQR)	159.5 (16.4)	160.0 (14.8)	159.0 (19.3)	160.3 (19.8)	156.3 (14.0)	
Respiratory Rate (BPM)						0.559
Missing	0	0	0	0	0	
Mean±SD	54.0 ± 13.0	53.2 ± 12.1	52.2 ± 12.2	56.9 ± 15.4	53.8 ± 11.7	
Min–Max	15.5 - 92.3	23.5 - 80.8	15.5 - 73.8	27.8 - 92.3	32.8 - 83.3	
Median (IQR)	52.6 (18.1)	52.0 (13.3)	52.5 (14.0)	56.5 (26.8)	52.3 (16.8)	
Delta Regional Cerebral Oxygen Saturation (%)						
Missing	2	0	1	0	1	0.875
Mean±SD	72.7 ± 10.3	73.0 ± 10.0	71.9 ± 9.7	71.5 ± 10.9	74.4 ± 10.7	
Min–Max	46.5 - 92.0	55.0 - 88.0	53.0 - 92.0	46.5 - 91.5	50.3 - 92.0	
Median (IQR)	74.8 (15.0)	75.8 (17.5)	72.0 (14.6)	73.5 (16.0)	76.4 (15.1)	
Delta Oxygen Saturation (%)						0.960
Missing	1	1	0	0	0	
Mean±SD	96.3 ± 2.0	96.2 ± 2.2	96.4 ± 1.6	96.2 ± 2.1	96.4 ± 2.1	
Min–Max	89.3 - 100.0	89.3 - 100.0	93.5 - 100.0	90.3 - 100.0	93.0 - 100.0	
Median (IQR)	96.0 (2.8)	96.0 (2.9)	96.3 (2.8)	96.0 (1.8)	97.0 (3.3)	

Table 1. Variables during the studies among N=156

sessions (13 infants x 12 exposures); Linear mixed model was used to account for repeated exposures of each music in each baby; No other covariates were included.

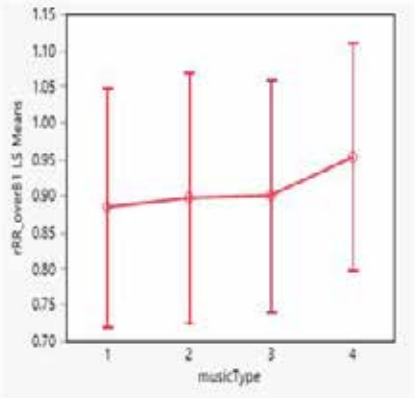


Figure 1: Least Squares Means Plot of Respiratory Response Rate over Baseline

Gravens2022-28

Abstract Title: "My Brigham Baby" App: Using Technology to Advance Parent Engagement and Promote Resilience in the Neonatal Intensive Care Unit

Authors: Forde, Madison; Sara Cherkerzian, ScD; Susan Berliner, LICSW; Maria Conley; Cindy H Liu, PhD; and Terrie Inder, MBChB, MD, and Carmina Erdei, MD

Corresponding Author:

Madison Forde

Pediatric Newborn Medicine,

Brigham and Women's Hospital, Boston, MA, United States

75 Francis Street, CWN 4, Boston, MA 02115

mforde1@bwh.harvard.edu

Background and Purpose: Parents of infants who require hospitalization in the Neonatal Intensive Care Unit (NICU) often experience psychosocial distress which can impact infant and family outcomes. Technology-based interventions may enhance parent experience and discharge readiness and promote family-centered developmental care in the NICU. An interdisciplinary clinical team has partnered with a developing team to create a smartphone application (App) called "My Brigham Baby", to better support parents of infants admitted to a level III NICU. The objective of this study was to describe the family psychosocial experience in the NICU and assess how it evolved after rollout of an educational smartphone application (App).

Materials and Methodology: Responses to questionnaires regarding parental NICU experience were obtained from parents (25 pre- and 25 post-App rollout). Post-App data collection occurred during the COVID-19 pandemic (Pre-app: Spring/Summer 2020, Post-App: Summer-Winter 2020/Spring 2021). Data included self-reported:

1. Discharge readiness. Using a 7-Point Likert Scale, parents were deemed not ready for discharge if they reported a score of 1-4, somewhat ready for discharge if they reported a 5, and very ready for discharge if they reported 6-7.

2. Symptoms of stress. To assess stress, the Parental Stressor Scale: NICU was implemented. Total scores between 0-28 indicated no stress symptoms, 29-84 suggested moderate stress symptoms, and 85-140 indicated very high stress symptoms.

3. Anxiety. Parenting anxiety was measured using the Generalized Anxiety Disorder Scale-7. A score of 1-4 indicated minimal anxiety, 5-9 implied mild anxiety, and above 10 correlated to moderate-severe anxiety symptoms experienced.

4. Parenting skill confidence. Parenting self-efficacy was measured using the Parenting Sense of Competence Scale. Parents were not confident in their skills if their reported scores were between 45-60, moderately confident if between 61-70, and very confident if between 70-102.

Descriptive statistics of the demographic and clinical characteristics of the sample were evaluated by pre-App/post-App rollout group status. Data were organized by family- (n = 40), parent- (n = 50 [n = 40 mothers and n = 10 fathers]), and infant- (n = 45) level, as appropriate. Parents (n = 50) participating in the study completed study surveys and their data was evaluated overall and by pre- and post-App rollout status and parent sex. Differences in demographic and clinical characteristics by rollout status were assessed using chi square or Wilcoxon rank sum tests.

Results: The demographics (parent) and clinical (infant) characteristics for the pre- and post-App rollout groups indicated that there were no significant differences between groups, suggesting that the pre- and post-App cohorts were comparable in terms of medical and family-social characteristics. Of the measured outcomes, frequency of "very ready" discharge readiness responses significantly increased in the post-App rollout group (56% v. 20%, p =0.02*) (Table 1). There were no statistically significant differences between continuous scores of parent stress, anxiety symptoms, and parenting skills between the pre- and post-App cohorts (Table 1). When scores for each outcome were categorized by severity, pre-App rollout parent experience data suggested that many of surveyed parents felt ill-prepared for discharge (36%), reported symptoms of stress (28%) and anxiety (40%) in the severe range, and were not confident in their parenting skills (8%). Post-App rollout survey results indicated that a higher proportion of parents reported experiences in the optimal categories discharge readiness (56%), anxiety symptoms (44%), and parenting skills (25%) (Figure 1 and Table 1). There was a moderate correlation between anxiety, stress, and parenting competence, and a weak correlation between discharge readiness and parenting competence. No correlations were observed between discharge readiness and symptoms of stress or anxiety reported by NICU parents in this study.

Conclusion: In conclusion, the pilot project presented here suggests that technology applications can increase parent discharge readiness, and have the potential to modify NICU parent psychosocial experiences in the context of external stressors.

Learning Objectives:

1. Parent discharge readiness, stress and anxiety, and parenting skills confidence were assessed before and after the rollout of an educational smartphone application.
2. Results indicated that parents in the post-App rollout group reported significantly higher discharge readiness scores, parenting confidence shifted towards improvement, and feelings of stress and anxiety remained stable.
3. Technology applications have the potential to positively impact NICU parental experiences despite external stressors.

Variables	*Total (N=50)*	*Pre-Intervention (N=25)*	*Post-Intervention (N=25)*	*P - Value*
GAD7 Total Scores				0.4472
Mean±SD	8.0±5.6	8.6±5.7	7.4±5.6	
Min-Max	0.0–21.0	0.0–21.0	0.0–19.0	
Median (IQR)	7.0 (4.0–12.0)	7.0 (4.0–14.0)	7.0 (4.0–9.0)	
GAD7 Category				0.2823
Minimal (0–4)	17 (34.0)	6 (24.0)	11 (44.0)	
Mild (5–9)	17 (34.0)	9 (36.0)	8 (32.0)	
Moderate-Severe (10 ≥)	16 (32.0)	10 (40.0)	6 (24.0)	
PSCS Total Scores				0.4232
Mean±SD	74.0±10.6	73.5±9.1	74.6±12.1	
Min-Max	37.0–94.0	56.0–94.0	37.0–91.0	
Median (IQR)	75.0 (68.0–82.0)	75.0 (68.0–79.0)	76.5 (66.5–84.5)	
PSCS Category				0.8617
Missing	1 (2.0)		1 (4.0)	
Not confident (45–60)	4 (8.2)	2 (8.0)	2 (8.3)	
Moderately confident (61–70)	14 (28.6)	8 (32.0)	6 (25.0)	
Very confident (70–102)	31 (63.3)	15 (60.0)	16 (66.7)	
PSS: NICU Total Scores				0.3985
Mean±SD	63.7±26.7	60.4±29.0	66.9±24.4	
Min-Max	7.0–119.0	13.0–111.0	7.0–119.0	
Median (IQR)	68.5 (42.0–85.0)	65.0 (34.0–85.0)	70.0 (57.0–80.0)	
PSS: NICU Category				0.9469
Not stressed (0–28)	6 (12.0)	3 (12.0)	3 (12.0)	
Moderate stressed (29–84)	31 (62.0)	15 (60.0)	16 (64.0)	
Very stressed (85–140)	13 (26.0)	7 (28.0)	6 (24.0)	
PSS: NICU Scaled Scores				0.51965
Parental Role Alteration	2.8	2.1	2.4	
Infant Appearance and Behavior	2.7	2.3	2.2	
Sights and Sounds	2.9	1.9	2.6	
DC Readiness Total Scores				0.1705
Mean±SD	5.0±1.4	4.8±1.4	5.2±1.5	
Min-Max	1.0–7.0	1.0–7.0	2.0–7.0	
Median (IQR)	5.0 (4.0–6.0)	5.0 (4.0–5.0)	6.0 (4.0–6.0)	
Discharge Readiness Category				0.0204
Not Ready (1–4)	16 (32.0)	9 (36.0)	7 (28.0)	
Somewhat Ready (5)	15 (30.0)	11 (44.0)	4 (16.0)	
Very Ready (6–7)	19 (38.0)	5 (20.0)	14 (56.0)	

Table 1. Self-Reported Responses to Standardized Questionnaires Based on Group Status

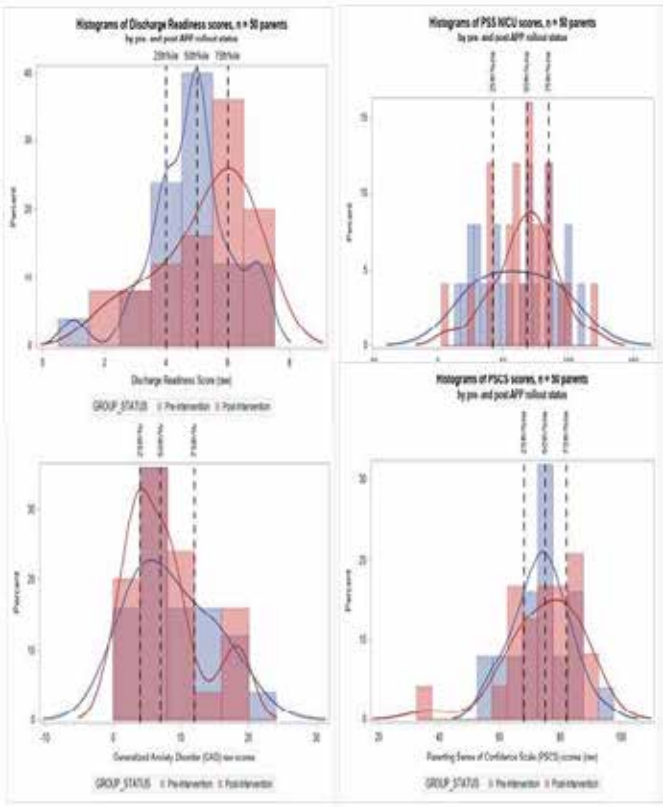


Figure 1: Distribution of Survey Scores Among n = 50 parents by pre- and post- App rollout status

Gravens2022-29

Abstract Title: "There's No Place Like Home" -- Improving NICU Discharge Education and Preparation

Authors: Kari McCallie, MD and Malathi Balasundaram, MD

Corresponding Author:

Malathi Balasundaram

Clinical Associate Professor

Stanford University School of Medicine/El Camino Hospital

1870 Limetree Ln,Mountain View,CA 94040

6506055787

malathib@stanford.edu

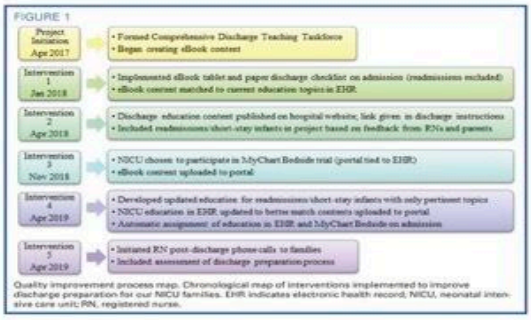
Background and Purpose: Often, families feel that they are not adequately prepared to "click their heels" and bring their high-risk infant home from the Neonatal Intensive Care Unit (NICU). We will describe the design and implementation of an education program for NICU families, making specific use of digital technologies, in order to create a process that is more effective and efficient, increases parent satisfaction, and saves nursing time.

Materials and Methodology: Aim: Improve "prepared for discharge" top-box responses (responses that reflect the highest possible rating) on post-discharge patient satisfaction surveys from only 47% in 2017

How: Using technology to improve the consistency of discharge teaching

When: Starting on admission rather than waiting until the last few days of hospitalization Setting: Our 20-bed, community level 3 NICU is located on the Mountain View campus of the El Camino Health system in Santa Clara County, California. The hospital has approximately 4200 newborn deliveries and 450 NICU admissions per year. Our NICU provides care to infants less than 1000 g at birth, less than 28 weeks of gestational age (GA), and/or those with severe or complex illnesses. The unit is staffed by board-certified neonatologists from the Division of Neonatal & Developmental Medicine at Stanford University and does not utilize advanced practice providers or pediatric trainees. We will share the process we implemented for developing our NICU Discharge Education Program (Figure 1). Neonatal intensive care unit staff and former NICU parents developed a task force to create technology-based discharge education content. The content was originally uploaded to an e-book and later transferred to the electronic health record (EHR) inpatient portal (MyChart Bedside) during Intervention 3. Families were able to view discharge teaching content at their own convenience and pace and review topics as needed with the NICU staff. After reading the education, parents could indicate "I Understand" or "I Have Questions" in the tablet-based MyChart Bedside app, and these responses automatically flowed into the EHR for staff to visualize what parents needed to review (Figure 2). With automatic documentation of parents' understanding, nurses were able to tailor education to family needs, making it more effective and efficient, and saving nursing time. As a part of Intervention 5, post-discharge follow-up phone calls were initiated and provided insight into parental reaction to the new education format.

Figure 1



Quality improvement process map. Chronological map of interventions implemented to improve discharge preparation for our NICU families. EHR indicates electronic health record; NICU, neonatal intensive care unit; RN, registered nurse.

Figure 2

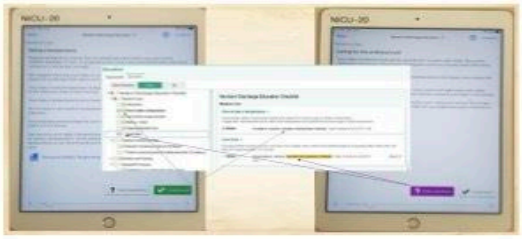
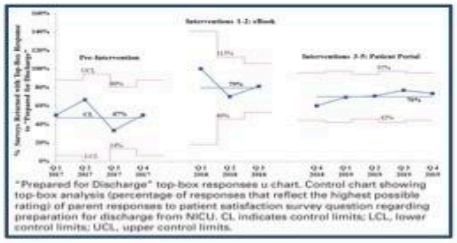


Figure 3



"Prepared for Discharge" top-box responses u chart. Control chart showing top-box analysis (percentage of responses that reflect the highest possible rating) of parent responses to patient satisfaction survey question regarding preparation for discharge from NICU. CL indicates control limits; LCL, lower control limits; UCL, upper control limits.

Figure 1, Figure 2, Figure 3

Figure 4

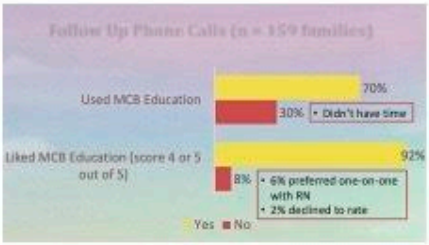


Figure 5

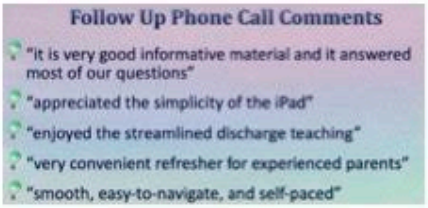


Figure 6

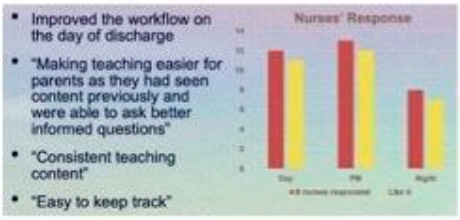


Figure 7

Figure 4, Figure 5, Figure 6, Figure 7

Results: Parent satisfaction top-box scores, reflecting the highest rating in the "Prepared for Discharge" category of the patient satisfaction survey, improved from a baseline of 47% in 2017 to 70% in 2019 (Figure 3) after implementation of the discharge education program. Overwhelmingly, 92% of families (Figure 4) highly rated the tablet-based discharge teaching during post-discharge phone calls. Some of the parents' qualitative comments about the tablet-based education are listed in Figure 5.

Greater than 90% of nurses surveyed liked the new tablet-based discharge education (Figure 6) and commented on its consistency, ease of use, and improvement in workflow. We were able to achieve sustainability in parent completion of the tablet-based discharge education in part due to our unit clerks becoming champions for activating the tablets and demonstrating their use to the NICU families. After two years, over 80% of the education topics assigned are read by families on the tablets, and over 90% of those topics read have a parent response (> 90% "I Understand") (Figure 7).

Limitations: A benefit of using the mailed post-discharge patient satisfaction surveys as the main outcome measure was that they provided anonymous answers to sensitive questions. Low response rate to our parent satisfaction surveys was one of the limitations of our results. To encourage responses, we started adding information about the surveys in our hospital discharge instructions. The discharging physician also reminded families during their face-to-face meeting, and the RNs again encouraged parents to complete the survey during their follow-up phone call after discharge. Another limitation to our QI project was the lack of ability to track readmissions or emergency department (ED) visits because there are multiple healthcare systems in our local area and not all infants return to us. However, anecdotally, during the follow-up phone calls with the 159 families we reached, no readmissions or ED visits were reported.

Conclusion: A comprehensive, consistent, and early discharge program using technology can lead to more effective and efficient NICU discharge education and improved parent satisfaction.

Acknowledgments: Discharge Taskforce team members, Stanford El Camino Health (ECH) Neonatologists, NICU Clinical Nurse Specialist, ECH NICU staff, nursing manager and leadership team, unit administrative support, Patient Experience, Marketing, IT Department, Family Advisory Board members, Follow-up phone call team members.

References:

1. *Balasundaram et al. "Increasing Parent Satisfaction with Discharge Planning: An Improvement Project Using Technology in a Level 3 NICU." Adv Neonatal Care. 2021 Feb 4.*
2. *American Academy of Pediatrics Committee on Fetus and Newborn. "Hospital discharge of the high-risk neonate." Pediatrics. 2008 Nov;122(5):1119-1126*
3. *Smith VC, Hwang SS, Dukhovny D, Young S, Pursley DM. "Neonatal intensive care unit discharge preparation, family readiness and infant outcomes: connecting the dots." J Perinatol. 2013;33(6):415-421.*
4. *Kelly MM, Hoonakker PL, Dean SM. "Using an inpatient portal to engage families in pediatric hospital care." J Am Med Inform Assoc. 2017;24(1):153-161.*

Learning Objectives:

Learners will walk along the "yellow brick road" of the steps to success in NICU discharge education, including:

1. Understanding the importance of discharge preparation for NICU families
2. Selecting and/or creating education materials
3. Using technology to support discharge education
4. Measuring the success of the education program.

Gravens2022-30

Abstract Title: Identifying Barriers to Quality Mother-Infant Inter-

actions in the NICU through Naturalistic Systematic Observations

Authors: Christine Neugebauer, MS, MT-BC, LPC; Miranda Cox, BS; Melissa Deckert, BA, BSN, RN; Ann M. Mastergeorge, PhD

Corresponding Author:

Christine Neugebauer, MS, MT-BC, LPC

Clinical Instructor

Texas Tech University Health Sciences Center

4607 103rd St

409-770-3088

christine.neugebauer@ttuhsc.edu

Background and Purpose: Relationship development between mothers and their premature infants in the NICU are influenced by the frequency and duration of dyadic interactions as well as factors that may facilitate or hinder interaction quality. This study aims to identify patterns of maternal proximity in the NICU and identify contexts that facilitate, deter, or disrupt focused dyadic engagement during context-specific activities (e.g., routine cares, feeding, nurturing).

Materials and Methodology: Trained field observers conducted systematic observations in a Level-IV open bay NICU over a period of four months recording maternal presence, proximity to infant, unfocused versus focused engagement and the dyadic social contexts within which they occurred, utilizing a coding scheme grounded in theory and specified to the aims of this study. Observations occurred at different times of the day and days of the week for approximately 1-hour intervals to minimize observer fatigue. Coding included frequency counts of maternal presence as well as recording onset and offset times of maternal presence, focus versus unfocused engagement, and duration of interaction and non-interaction for each engagement context. In addition, observers documented qualitative description upon observing occurrences of maternal non-engagement or unfocused engagement, such as talking to a nurse, using a personal mobile device, or other alternate activity. Likewise, observers documented what mothers were doing when they were engaged with their infant (e.g., holding the infant) but not focusing on their infant due to attention to an alternate activity. Analyses included both quantitative and qualitative strategies. Quantitative analysis included calculating frequency and mean duration for each of the timed-event codes to determine differences in how long mothers were engaged with their infants in each interaction context and compare them to the time mothers were not engaged or not focused on their infants. Qualitative analysis included summarizing and synthesizing the descriptive notes on maternal alternate activities and applying an iterative approach to identify thematic categories. Interpretive analysis including linking thematic categories with information obtained from the extant literature.

Results: Over a period four months (52 hours of observation), most infants (N=353) did not have a caregiver present, and an additional cluster (N=64) had obstructed view (e.g., privacy curtain was pulled) during the time when the observer was present in the NICU. Results include observational data coded for 88 mother-infant dyads with 83% (N=73) observed during periods of maternal proximity without engagement, 97% (N=85) observed during periods of maternal focused engagement, and 65% (N=57) observed during periods of maternal unfocused engagement. Mothers were observed spending most time in focused engagement with their infants during nurturing contexts (M=9.48 minutes; N=83) followed by feeding (M=3.56 minutes; N=25), and routine cares (M=2.98 minutes; N=51). Unfocused engagement occurrences were most frequently observed during nurturing contexts (M=6.50 minutes; N=48) and ranged between 1-38 cumulative minutes. Table 1 displays the summary statistics for when mothers were in proximity to their infants but not engaging with their infants. Mothers were most frequently observed using a personal mobile device followed by talking to a member of the healthcare staff. Table 2 displays the summary statistics for when mothers displayed unfocused engagement with their infants due to their attention diverted to another activity. Again, mothers were most frequently observed using a personal mobile device followed by talking to healthcare staff. Interestingly, occurrences of unfocused engagement due to mothers using a personal mobile device occurred primarily during nurturing contexts (N=27) and ranged from 1 to 32 cumulative minutes (M=3.5 minutes). Of those mothers, 44% (N=12) immersed their attention for ten minutes or longer to their mobile devices versus to their infant.

Table 1. Summary Statistics on Alternate Activities for Proximity without Engagement

Alternate Activity	N	Relative Proportion	Frequency Observed	Relative Frequency	Cumulative Minutes	Mean Minutes	Range Minutes
Using cell phone	36	.49	70	.33	634	8.7	0-59
Talking with healthcare staff	33	.45	48	.22	184	2.5	0-29
Prepping/Organizing	21	.29	22	.10	75	1.1	0-19
Sitting quietly	12	.16	17	.08	71	1.0	0-14
Engaging with twin	8	.11	22	.10	156	2.1	0-35
Talking to another parent	8	.11	11	.05	38	0.5	0-9
Doing crafts	6	.08	6	.03	71	1.0	0-34
Observing nurse/partner	5	.07	5	.02	50	0.7	0-23
Other	13	.18	13	.06	25	0.4	0-9

Figure 1

Note: 73/88 dyads observed in proximity without engagement; Relative proportion is relative to the number of mothers observed in proximity without engagement; Frequency is the number of distinct occurrences observed; Relative frequency is the ratio of frequency to the total number of proximity without engagement occurrences; Cumulative minutes is the total time dyads were observed in proximity without engagement; Mean minutes is the average duration mothers were engaged in that alternate activity; Range is the minimum to maximum cumulative minutes a mother was observed engaging in that alternate activity

Table 2. Summary Statistics on Alternate Activities during Unfocused Engagement

Alternate Activity	N	Relative Proportion	Frequency Observed	Relative Frequency	Cumulative Minutes	Mean Minutes	Range Minutes
Using cell phone	27	.47	71	.30	307	3.50	0-32
Talking with healthcare staff	38	.67	90	.38	202	2.30	0-28
Talking to partner	21	.37	46	.19	108	1.23	0-13
Sitting quietly	7	.12	15	.06	32	.40	0-10
Talking to another parent	5	.09	5	.02	20	.23	0-13
Observing other activity on unit	3	.05	13	.05	12	1.40	0-10

Figure 2

Note: 57/88 dyads observed in unfocused engagement; Relative proportion is relative to the number of mothers observed in unfocused engagement; Frequency is the number of distinct occurrences observed; Relative frequency is the ratio of frequency to the total number of unfocused engagement occurrences; Cumulative minutes is the total time dyads were observed in proximity without engagement; Mean minutes is the average duration mothers were engaged in that alternate activity; Range is the minimum to maximum cumulative minutes a mother was observed engaging in that alternate activity

Conclusion: While it is expected that interruptions to mother-infant interaction in the NICU will occasionally happen, the frequency and duration that some mothers spent on their personal mobile devices is concerning. This phenomenon, termed "technoference" in the emerging empirical literature, poses risks to both facilitating and maintaining quality interactions due to limits on intentional engagement where mothers may miss critical communicative signals from their infants. More research in this area is necessary to determine the underlying rationale for prolonged cell phone use by mothers in the NICU as well as the short- and long-term impact this behavior may have on the early development on maternal sensitivity and contingent responsiveness during the NICU hospitalization and beyond discharge.

Bibliography:

1. *Braune-Krickau, K., Schneebeli, L., Pehlke-Milde, J., Gemperle, M., Koch, R., & von Wyl, A. (2021). Smartphones in the nursery: Parental smartphone use and parental sensitivity and responsiveness within parent–child interaction in early childhood (0–5 years): A scoping review. Infant Mental Health Journal, 42(2), 161-175.*

2. *Lavallée, A., De Clifford-Faugère, G., Ballard, A., & Aita, M. (2021). Parent–Infant Interventions to Promote Parental Sensitivity During NICU Hospitalization: Systematic Review and Meta-Analysis. Journal of Early Intervention, 1053815121991928.*

3. *Shimon-Raz, O., Salomon, R., Bloch, M., Romano, G. A., Yeshurun, Y., Yaniv, A. U., ... & Feldman, R. (2021). Mother brain is wired for social moments. Elife, 10, e59436.*

Learning Objectives:

1. Participants will identify barriers and facilitators to quality mother-infant interactions in the NICU and develop potential mitigation strategies to address these barriers.

2. Participants will learn how using systematic observational methods can be used to understand familial interaction processes in the NICU.

Gravens2022-31

Abstract Title: You've Got Milk: A NICU Lactation Journey

Authors: Cristina Canete, RN-BSN, RNC-NIC, IBCLC, Rachel Land, MD, Dharshi Sivakumar, MD, Malathi Balasundaram, MD

Corresponding Author:

Malathi Balasundaram MD

Clinical Associate Professor

El Camino Health/Stanford University

1870 Limetree Ln, Mountain View,CA 94040

6506055787

malathib@stanford.edu

Background and Purpose: The benefits of human milk feedings have been well established, particularly in preterm infants. However, establishing optimal milk supply for mothers of infants admitted to the NICU comes with unique challenges. Evidence suggests that many mothers of preterm infants have health problems and/or birth complications that impact lactation outcomes such as milk supply and early involution.1,2 These mothers have specific barriers to the initiation and maintenance of lactation 1,2 and may benefit from the specialized skills of a certified lactation consultant (LC). Dedicated NICU LCs have the potential to improve parent satisfaction and maternal well-being.3,4 Historically, despite having access to lactation services via the postpartum unit, our NICU did not have a specialized, dedicated NICU LC. We received direct feedback regarding the lack of lactation support from our Family Advisory Board (former NICU parents). Thus, our Family Centered Care Program initiated a quality improvement project to improve lactation support and the initial lactation consultant visit.

Materials and Methodology: Our 20-bed, community level 3 NICU is located on the Mountain View campus of the El Camino Health system in Santa Clara County, California. The hospital has approximately 4200 newborn deliveries and 450 NICU admissions per year. Our NICU provides care to infants less than 1000g at birth, less than 28 weeks gestational age (GA), and/or those with severe or complex illnesses. The unit is staffed by board-certified neonatologists and does not regularly utilize advanced practice providers. Aim: Our primary aim was to improve the proportion of NICU Mothers being seen by a Lactation Consultant within 24 hours after delivery by 20% from the baseline average of 26% in one year. The secondary aim was for all NICU mothers to be seen by an LC within 48 hours of delivery. Methodology: We recruited a NICU LC with the aim of creating a lactation program. Special emphasis was placed on the timeliness and quality of the initial visit to better support establishment of the mothers' milk supply. Standardized education focused on use of a hospital grade pump to establish optimal milk supply and return demonstration of hand

expression technique to initiate colostrum expression. Follow up visits were then arranged on average twice weekly while the neonate was inpatient. LC reviewed target volumes, infant driven feeding cues, and building skills on latching during this visit. The final visit involved lactation-specific discharge teaching and provision of breastfeeding community resources, including outpatient lactation services. Documentation in the electronic health record (EHR) was completed for each baby. There was an emphasis on team communication in EHR. Data was generated from reports in the EHR, with the timing of "Initial Visit" documentation.

Results: Barriers: Partners of NICU mothers requesting a delay in initial LC consult due to NICU mothers' medical status, inconsistent LC coverage when NICU LC is unavailable, as well as NICU staff and MBU staff adjusting to the new role and new system.

Results: Since the start of this program in June 2021, we have noted an increase in the proportion of NICU mothers being seen within 24 hours of delivery from 26% to 43% (Figure 1) Lactation Consultants were able to see 87-96% of the moms within 48 hours of delivery in the past four months (Figure 2). Mothers were not seen by an LC within 48 hours of delivery due to the barriers listed above. Parents have provided positive verbal feedback about the impact of this project in post discharge follow up phone calls.

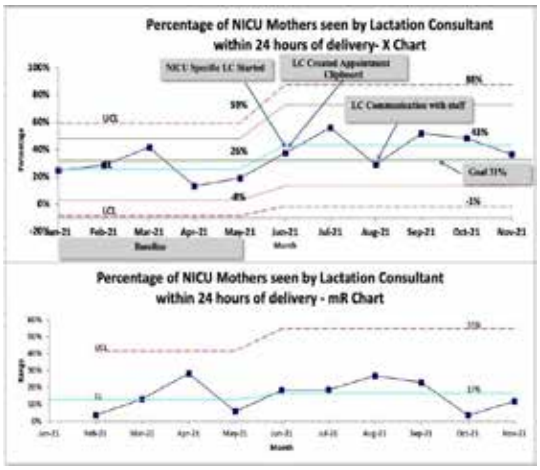


Figure 1

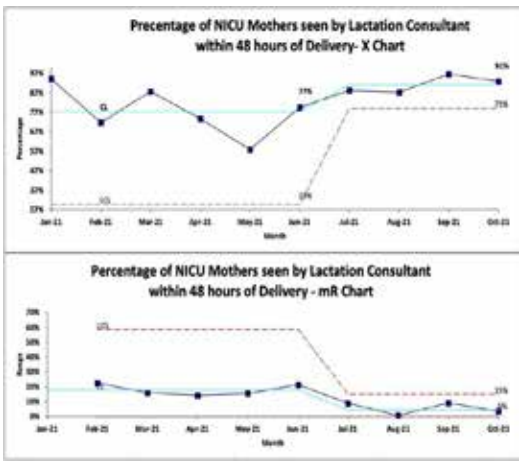


Figure 2

Conclusion: In the first 6 months of establishing a dedicated NICU lactation program we have exceeded our aim of increasing lactation support by a certified LC within the first 24 hours of delivery. Evidence suggests that by improving lactation support during that initial 24 hours and providing consistent follow up during baby's inpatient stay we can optimize parent satisfaction, self-reported maternal well-being, increase milk volumes, and increase the percentage of neonates breastfeeding upon discharge.4,5

Next steps: We have observed a need for staff and family education while initiating this project. Next steps would be to assess their self-reported educational needs regarding lactation services, potentially via survey. Another opportunity for improvement would be to facilitate coordination of El Camino Outpatient Lactation services for all NICU mothers within 7-10 days of their baby's discharge.

Special Acknowledgements: El Camino Health Stanford Neonatology team, NICU Nursing staff, Lactation Services Department, NICU Clinical Nurse Specialist, NICU Nursing Manager, NICU administrative support, Maternal Child Health Director, Family Advisory Board Members, Family Centered Care Committee Members, Gopal Vedartham (EPIC Reporter).

References:

1. *Meier, P. P., Johnson, T. J., Patel, A. L., & Rossman, B. (2017). Evidence-based methods that promote human milk feeding of preterm infants: an expert review. Clinical Perinatology, 44(1):1-22.*
2. *Mercado, K., Vittner, D., & McGrath, J. (2019). What is the impact of NICU-dedicated lactation consultants? Advances in Neonatal Care, 19(5).*
3. *Holdren, S., Fair, C., & Lehtonen, L. (2019). A qualitative cross-cultural analysis of NICU care culture and infant feeding in Finland and the U.S. BMC Pregnancy and Childbirth, 19(345), 1–12.*
4. *International lactation consultant association. (2013). Core Curriculum for Lactation Consultant Practice. (R. J. Mannel, P. J. Martens, & M. J. Walker, Eds.) (3rd ed.). Burlington, MA: Jones & Bartlett Learning.*
5. *Spatz, D. L. Ten Steps for Promoting and Protecting Breastfeeding for Vulnerable Infants. The Journal of Perinatal & Neonatal Nursing, 2004. 18(4), 385-396.*

Learning Objectives:

1. To recognize the importance of providing early lactation support for NICU mothers
2. To learn how to create a NICU-specific lactation program and its benefits

Gravens2022-32

Abstract Title: Quality Improvement Project to Achieve Early Full Enteral Feeds in Preterm Infants at a Level IV Neonatal Intensive Care Unit

Authors: Prasad U, DO, MPH; Johnson K, MD; McGuire S, APRN; Haines K, RD; Spizzoucco A, RD; Lainwala S, MBBS, PhD.

Corresponding Author:

Usha Prasad, DO, MPH

Neonatal Perinatal Fellow

Connecticut Childrens;

University of Connecticut Medical School

282 Washington Street, Hartford CT 06106

uprasad01@connecticutchildrens.org

Background and Purpose: In preterm infants early introduction of enteral nutrition has been shown to promote gastrointestinal growth. In the past, early initiation and advancement of enteral feeds was thought to be associated with an increased risk of necrotizing enterocolitis (NEC). However, recent studies support early achievement of full enteral feeds to be safe and associated with reduction in central line and total parental nutrition (TPN) days. The aim of this quality improvement (QI) project was to achieve full enteral feeds 20% sooner (from average 13.3 days to 10.6 days) in preterm infants at Connecticut Children's Medical Center Level IV Neonatal Intensive Care Unit (NICU) by December 2021.

Materials and Methodology: A multidisciplinary team identified key drivers to improve time to full enteral feeds. The primary drivers were (1) obtaining early donor human milk (DHM) consent, within 9 hours of life (HOL); (2) initiating early trophic feeds within 12 HOL; and (3) modifying enteral feeding guideline by reducing trophic feeds duration and faster advancement to full enteral feeds.

Prior to initiation of this QI project, in our unit preterm infants' enteral feeds were initiated within 24-48 HOL with a conservative feeding advancement guideline. In our NICU, DHM usage criteria include BW<1.8 kg and/or gestational age <32 weeks. The inclusion criteria for our project were inborn infants with BW<1.8 kg. The exclusion criteria were infants with congenital anomalies, transferred out prior to achievement of full enteral feeds or expired prior to initiation of enteral feeds.

The primary outcome measure was time to achievement of full enteral feeds and secondary outcome measures were total central line and TPN days. The process measures were time in hours to obtain DHM consent and initiation of trophic feed within 12 HOL. The balancing measures included DHM not used in infants where consent was obtained; incidence of feeding intolerance determined by feeds switched from bolus to continuous gastric feeds and the number of abdominal x-rays obtained within the first 30 days; and incidence of NEC (>stage 2).

Baseline data were collected retrospectively for 6 months prior to initiation of our QI project, from 5/1/2020 to 11/23/2020. Prospective data were collected from 11/24/2020 to 10/31/2021.

Results: There was a total of 175 infants. 159 infants data were analyzed; 58 infants in baseline group; and 101 in post-intervention group. 16 infants were excluded. Special cause variation (SCV) was detected for DHM consent time and time to full enteral feeds (Figures 1 and 2). There was a 23% improvement in achievement of full enteral feeds from baseline 13.3 days to 10.3 days post-intervention and DHM consent time improved from 7 hours prior to birth (HPB) to 35 HPB post-intervention. Although SCV was not detected, a 21% improvement in central line days from 16.3 days to 12.9 days post-intervention and a 44% improvement in trophic feeds initiation from 32 HOL to 18 HOL was noted. There was no improvement in TPN days. For our balancing measures, DHM consents obtained but not used decreased from 19% (11/58) to 4% (4/101) and continuous gastric feeds slightly increased from 34% (20/58) to 39% (39/101) post-intervention. There was an increase in number of abdominal x-rays obtained from 3 to 3.3 and incidence of NEC from 3 (5.2%) to 8 (8.9%) post-intervention.

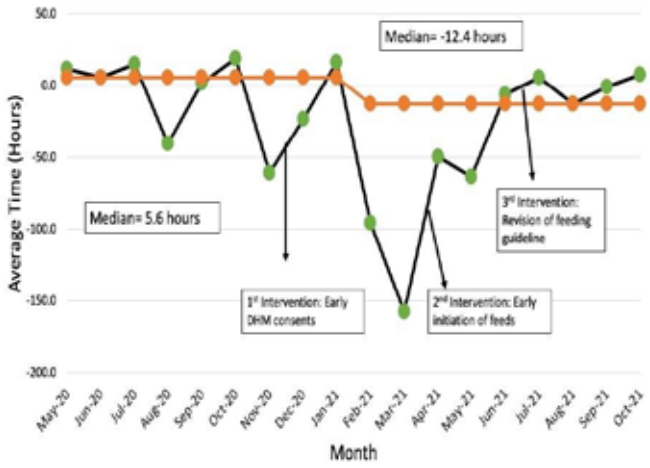


Figure 1. Time to Donor Human Milk Consent in Preterm Infants

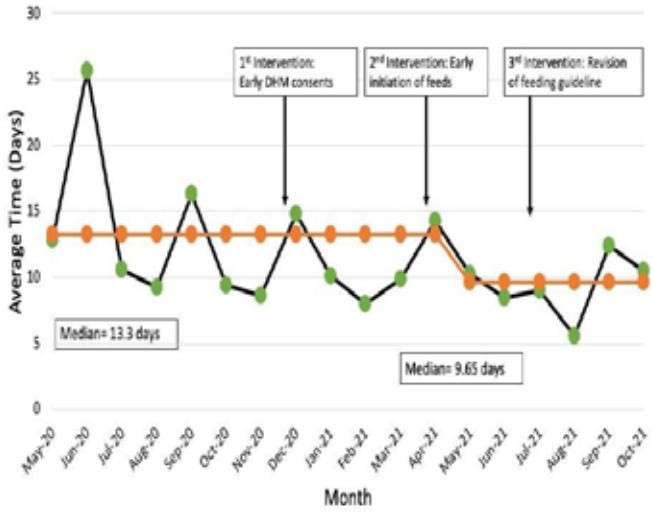


Figure 2. Days to Full Enteral Feeds

Conclusion: Our QI project in preterm infants at the level IV NICU showed that optimization of DHM consents, early trophic feeds initiation and modification of our feeding guideline led to earlier

achievement of full enteral feeds. Our next interventions will focus on improvement in TPN days while monitoring our balancing measures.

Learning Objectives:

1. To achieve early full enteral feeds (150 ml/k/day) in preterm infants born with birth weight (BW) less than 1.8 kg in our NICU.
2. To reduce central line and total parental nutrition (TPN) days in preterm infants born with BW<1.8 kg.

Gravens2022-33

Abstract Title: Skin Integrity: Reducing Diaper Dermatitis in the NICU

Authors: Amber Coston, MPAS, PA-C; Kasey Kauffman, BSN, RN; Breanna Bellows, BSN, RN; Andrea Molitoriz Hester, DNP, APRN, NNP-C; Rachel Owens, BSN, CWON; Christine Aune, MD

Corresponding Author:

Amber Dawn Coston, MPAS, PA-C

Physician Assistant

San Antonio Pediatric Developmental Services,

Pediatrix Medical Group

5430 Fredericksburg Rd, Suite 508 San Antonio, TX 78229

210-614-5539

amber_coston@mednax.com

Background and Purpose: Although it is difficult to determine the exact prevalence of diaper dermatitis, it is a common occurrence during infancy with published prevalence ranging from 7 percent to 65 percent of infants1,2 and 17 to fifty percent of infants requiring medical intervention3. Diaper dermatitis exists on a continuum with most infants (58%) having a slight rash, 34% having a moderate rash and 8% having a severe rash2. It is found equally among genders and in all ethic groups. Maintaining skin integrity is a vital aspect of neonatal care and remains a common concern in the Neonatal Intensive Care Unit (NICU) at St. Luke's Baptist Hospital with 30% of patients experiencing severe diaper dermatitis during their hospital course. Historically, this NICU has not had specific guidelines to assess severity and treatment and there has been no tracking system used in the unit other than a basic, objective section in the EMR. Each case of diaper dermatitis has been managed by the nurse taking care of the infant. The NICU would have Sensi-Care diaper ointment stocked to use at the nurse's discretion. However, once actual breakdown occurs, the provider would decide the course of action and whether or not to consult wound care. Overall, these practices have led to inconsistent identification and management of diaper dermatitis throughout the unit and subsequently, this has had a negative impact on parent satisfaction regarding the quality of care they perceive their infant to be receiving.

AIM #1: To create a diaper dermatitis algorithm based on evidence-based skin care guidelines and best practices and ensure 100% of the NICU nursing staff is educated and trained on the guidelines and scales being utilized in the algorithm.

AIM #2: To reduce the incidence and severity of diaper dermatitis by utilizing the diaper dermatitis algorithm.

Materials and Methodology: Baseline data revealed that 30% of patients in the NICU at St. Luke's Baptist Hospital experience severe diaper dermatitis during their hospital course. In an effort to reduce the incidence and severity of diaper dermatitis, a multidisciplinary team is currently collaborating to standardize the identification and management of diaper dermatitis. A visual tool illustrating rashes from mild to severe was created by wound care staff and an algorithm based on evidence-based skin care guidelines was created to standardize the management of each stage of diaper dermatitis (FIGURE 1). Further efforts to determine factors contributing to skin breakdown and to develop intervention strategies to treat/prevent diaper rashes are currently underway. After initial implementation of the algorithm, there was confusion regarding how each stage of rash was to be treated. In addition, shortly after implementing the algorithm, there was a supply shortage of a few of the treatment modalities being utilized (including Desitin). It was quickly determined that the team must be proactive with ordering supplies in order to ensure ample supply of topical agents is available due to ongoing warehouse shortages during COVID-19. The algorithm had to be revised to clarify treatment protocols and account for supply shortages. Also, an unexpected obstacle encountered during the project has been an increase number of float nurses staffing the unit due to increase in census. It has proven to be especially difficult to implement a new protocol and collect data without consistent staff.

Baseline: "Assessment of Current Practices, Development of Skin Assessment Tool, and Baseline Data Collection" (April 2021)

• Visual tool created by wound care staff illustrating rashes from mild to severe

Inclusion: • Infants admitted to NICU with stay of >48 hours

Exclusion: • Dermatological conditions or major malformation

PDSA Cycle 1: "Development & Implementation of Algorithm" (April 2021 - August 2021)

• Development of algorithm describing each stage of rash and providing corresponding treatment options

• Provide simple education to all nursing and therapy staff for categorizing skin rashes & using algorithm

• Placement of visual aids on all rolling computers used by nursing staff

PDSA Cycle 2: "Algorithm Revision & Accounting for Supply Shortages" (August 2021 – Current)

• Revision of algorithm based on feedback from nursing and therapy staff and to account for supply shortages of certain treatment modalities

• Creation of back up treatment plans for staff to follow when specific topical agents are backordered

FUTURE: "Ensuring Compliance and Trialing Other Products"

• Ensure algorithm is being utilized from admission until discharge by conducting chart audits to determine how well nursing staff is complying with new protocol

• Assess potential benefits of trialing different brands of diapers and wipes

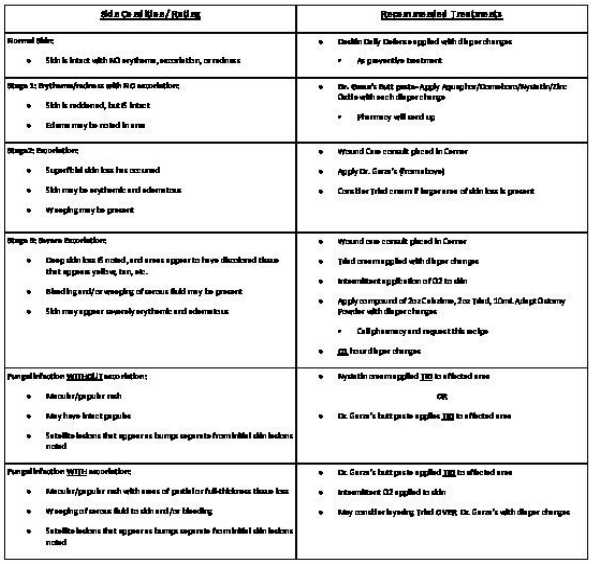


FIGURE 1: Algorithm for Management for Diaper Dermatitis

FIGURE 1: Algorithm for Management of Diaper Dermatitis

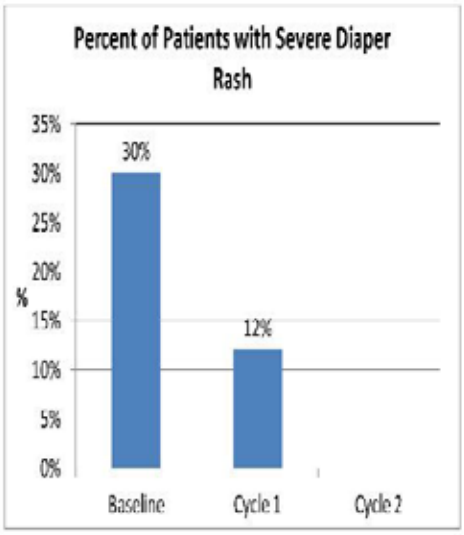


FIGURE 2: Percent of Patients with Severe Diaper Rash

FIGURE 2: Percent of Patients with Severe Diaper Rash

Results: Overall, since implementing the algorithm, the process of evaluating and treating diaper dermatitis has become more streamlined and consistent. In addition, after PDSA cycle 1, the incidence of severe diaper rash has decreased from 30% to 12% (FIGURE 2).

IMPACT: The project unified our unit and showed strengths in our teamwork by using a multidisciplinary approach to implement the algorithm. Obtaining staff feedback during the revision process also facilitated ongoing dialogue between providers and staff members. The project has also revealed that visual tools are more successful at educating nursing staff than verbal education which is information we will be able to take into account during future projects. Ideally, this project will continue to encourage standardized management of diaper dermatitis which will lead to reduced incidence and severity of skin breakdown, improved outcomes, and decreased treatment times.

References:

1. *Merrill, L. (2015). Prevention, treatment and parent education for diaper dermatitis. Nursing for Women's Health, 19 (4), 324-337. doi:10.1111/1751-486X.12218*
2. *Blume-Peytavi, U., & Kanti, V. (2018). Prevention and treatment of diaper dermatitis. Pediatric Dermatology, 35:s19-23. http://doi.org/10.1111pde.13495*
3. *Esser, M.S & Johnson, T. S. (2019). An integrative review of clinical characteristics of infants with diaper dermatitis. Advances in Neonatal Care. 00 (0). 1-10. Doi: 10.1097/ANC.0000000000000682*

Learning Objectives:

1. Be able to differentiate between the three stages of diaper dermatitis.
2. Identify one topical agent used to treat or prevent diaper dermatitis.

Gravens2022-34

Abstract Title: Thermoregulation: A Developmentally Focused, Infant-Driven Transition from Isolette to Open Crib

Authors: Amber Coston, MPAS, PA-C; Leonora Newell, MS OTR/L, NTMTC; Andriana Tellez, RN, BSN; Cynthia Pizana, RN, ADN; Susan Mercier, APRN, NNP-BC; Christine Aune, MD

Corresponding Author:

Amber Dawn Coston, MPAS, PA-C

Physician Assistant

San Antonio Pediatric Developmental Services,

Pediatrix Medical Group

5430 Fredericksburg Rd, Suite 508 San Antonio, TX 78229

210-614-5539

amber_coston@mednax.com

Background and Purpose: The timing of weaning from the incubator is important; weaning too early leads to cold stress and increased energy expenditure, whereas a delay in weaning may prolong hospital stay1. In addition, it has been shown that brain

maturity is the primary criteria to predict a successful transfer from the isolette to an open crib rather than weight or postmenstrual age (PMA)2. Historically, in the Neonatal Intensive Care Unit (NICU) at St. Luke's Baptist Hospital, there has been no standardized process for weaning infants from isolette to open crib. Nurses would typically wait for a provider to initiate the wean which led to large variability of transition time depending on provider preference. This caused infants to be weaned too early, lose weight, not maintain temperature, and/or demonstrate a regression in oral feeding cues likely due to sensory overload. At times, variable weaning also led to confusion and frustration amongst families/caregivers as they tend to view transitioning to an open crib as a step towards discharge.

AIM #1: To create a standardized, infant-driven protocol of transition from isolette to open crib that includes thermoregulation, developmental readiness, and weight gain.

AIM #2: To establish a standardized process for thermoregulation practice in the unit that includes a guideline for use of sensory/developmental support systems (positioning devices and grading sensory exposures) for infants during the transition from isolette to open crib.

Materials and Methodology: Based on the initial survey of unit nurses, it was determined that nurses were weaning their patients to open cribs in a variety of ways and most were under the assumption that a provider had to initiate the process. In an effort to ensure a more successful transition from isolette to open crib, a multidisciplinary team of healthcare providers and support staff created an infant-guided transition protocol that considers thermoregulation, developmental readiness, and weight gain.

The project revealed that thermoregulation and feeding readiness did not always occur simultaneously. Many patients were ready to thermoregulate prior to showing consistent signs of feeding readiness and the transition protocol had to be revised to account for this. Also, an unexpected obstacle encountered during the project has been an increase number of float nurses staffing the unit due to increase in census. It has proven to be especially difficult to implement a new protocol and collect data without consistent staff.

In addition, feeding readiness scoring is one of the developmental markers the project is utilizing, but the scoring process is very new and subjective and more staff education may be necessary for it to be a reliable indication of developmental maturity.

Baseline: "Assessment of Current Practices & Baseline Data Collection" (September 2020 – February 2021)

• Assessment of current practices of transition

• Surveyed nurses to assess knowledge regarding current transition practices

PDSA Cycle 1: "Development & Implementation of Transition Protocol" (March 2021 – June 2021)

• Creation of an infant driven transition guideline to establish unit wide change in practices, including:

- Grading of sensory exposures (light and sound)

- Consistent use of new positioning support systems during transition

- Feeding readiness cues as a measure for neurodevelopmental readiness for transition

• Placement of laminated flow charts and data collection sheets at each bedside

• Identification of areas that need adjustment in protocol:

- Infants becoming too hot before meeting feeding readiness criteria

• Established a requirement for providers to place an order for infants to be weaned in order to account for special populations/outliers

PDSA Cycle 2: "Protocol Revision & Implementation of 2- step Protocol" (August 2021 – Current)

• Development of a Two-Step protocol of transition to include thermoregulation readiness followed by developmental readiness prior to transition to open crib (FIGURE 1)

Future: • Reassessment of nursing knowledge (follow up survey)

• Improve bedside signage to guide individualized transition of isolette cover (for graded light/sound) of outliers that don't follow the general protocol

• Develop guidelines to address sensory/developmental needs for special populations requiring longer stay in isolette (IUGR, multiple gestation, BPD, etc)

• Develop criteria for which infants are placed in an isolette on admission

• Determine whether or not average PMA at discharge is affected by transition protocol

Results: Overall, since implementing the protocol, the process of transition has become more streamlined and consistent. Infants are demonstrating greater improvement in oral feeding readiness scores after transitioning to open crib (FIGURE 2). In addition, weight gain after transition remained unchanged after PDSA cycle 1, but may have decreased during cycle 2, which is currently under analysis (FIGURE 3). Lastly, average PMA at time of transition has gradually increased by 2-3 days per cycle (FIGURE 4), but it is unclear if the PMA at time of discharge has been affected.

IMPACT: The project is unifying our unit and showing strengths in our teamwork by using a multidisciplinary approach to implement the transition protocol. Obtaining staff feedback during the revision process is also allowing for ongoing dialogue between providers and staff members. In addition, the project is facilitating family involvement in the unit as the protocol provides nurses with objective criteria to discuss with caregivers when questions regarding weaning arise. Overall, the project is teaching us that an infant's ability to transition to an open crib is a developmental

milestone and should be evaluated as such.

FIGURE 1: Two-Step Transition Protocol

FIGURE 1: Two-Step Transition Protocol

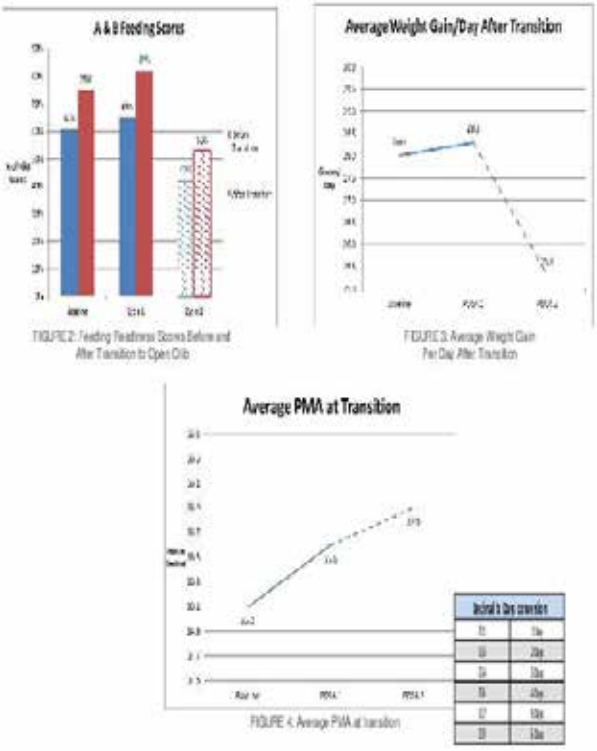


FIGURE 2: Feeding Readiness Scores Before and After Transition to Open Crib FIGURE 3: Average Weight Gain Per Day After Transition FIGURE 4: Average PMA at Transition

References:

1. *Shankaran, Seetha et al. "Weaning of Moderately Preterm Infants from the Incubator to the Crib: A Randomized Clinical Trial." The Journal of pediatrics vol. 204 (2019): 96-102.e4. doi:10.1016/j.jpeds.2018.08.079*

2. *Jacoba, Ani & Casatelli, Joanne. "Developing a guideline for transferring premature infants from an incubator to an open crib." Journal of Neonatal Nursing vol. 26, issue 3 (June 2020): 162-166.*

Learning Objectives:

1. Identify a potential consequence of weaning an infant from an isolette to an open crib too early.

2. Identify a potential consequence of delaying the weaning process.

Gravens2022-35

Abstract Title: Incubator-based noise control system: quantifying size of attenuation zone

Author:

George Hutchinson, PhD

CEO

Invictus Medical

16601 Blanco Road, San Antonio, TX 78230

210 951 0283

ghutchinson@invictusmed.com

Background and Purpose: The aural stimulation of the hospitalized infant in the neonatal intensive care unit (NICU) from alarms, ventilators, phones, conversations, and air handling system is linked to negative effects on sleep hygiene, weight gain, sensitivity to pain, and vital signs in the short term and in the long term with neural development. Quieter environments have shown improvement in the ratio of quiet to active sleep and weight gain, even over a short study period.

Materials and Methodology: In a realistic NICU environment, this study evaluated performance metrics of a novel incubator-based active noise control (ANC) system. Three measures of the attenuation performance of a non-contact ANC device (Neoasis, Invictus Medical) were conducted. (1) The amount of attenuation produced by the ANC device was compared to the attenuation achieved by adhesive-affixed earmuffs (MiniMuffs, Natus Medical) in response to 11 alarm and voice sound sequences (Table 1). (2) The sound attenuation zone size of the ANC device was measured in response to these 11 sound sequences. (3) Sound attenuation of the ANC device was evaluated in three different NICU room configurations with the 11 sound sequences to determine the flexibility of the device to work in different conditions. Attenuation measurements were reported for the louder of the two ears under all test conditions.

Testing was conducted in a NICU simulator training room at the Children's Hospital of San Antonio. The ANC device was deployed in a Giraffe Omnibed incubator (GE Healthcare) and the 11 sound sequences were generated by a recorded male and female voice, a patient monitor (Philips Healthcare), a ventilator (Maquet Medical Systems), and a syringe pump (Medfusion), either singularly or in combinations. A worst case sound sequence was defined in which a high priority alarm from all three devices occurred simultaneously. To ensure testing represented appropriate frequencies, bedside device alarms were selected to represent the expected spectral range of a NICU environment. The preponderance of NICU sound energy is found in the 500 and 1k Hz octave bands. In addition to the alarm and voice signals, all sound sequences included sound from the hospital air handling systems, highway noise through the windows of the NICU room simulator, and occasional voice noise from an adjacent hallway.

A mannequin was placed inside the incubator, the mannequin being equipped with two general purpose array microphones (Model 40PP, GRAS Sound and Vibration A/S) embedded in its head such that the sensing element of each microphone is positioned at the opening of the mannequin's molded ear. The microphones were interfaced to a computer equipped with LabVIEW Development System with the Sound and Vibration Toolkit via a CompactDAQ Chassis containing a Sound and Vibration Input Module (National Instruments).

Using the 11 sound sequences, a comparison was made between the performance of the earmuffs and the ANC device. Sound pressure level (SPL) measurements were made under four test conditions including (1) no attenuation (control), (2) ANC device, (3) earmuffs, and (4) earmuffs positioned on hair. A-weighted SPLs for seven octave bands were calculated for each sound sequence.

To evaluate the sensitivity of the ANC device to positioning or movement of the infant in an incubator, measurements were made with the test mannequin place in six positions within a 24cm by 8cm region.

The attenuation performance of the ANC device was evaluated with the incubator and bedside devices arrayed in three different room configurations for all 11 sound sequences.

Results: For seven of the 10 alarm-based sound scenarios, the ANC device had better attenuation than the earmuffs (Table 2). For the remaining three alarm-based sound scenarios, neither earmuffs or the ANC device provided attenuation greater than a just noticeable difference. These three sound scenarios consisted of a primary frequency in either the high end of the 1kHz octave band or the 2kHz octave band. These tones are passively attenuated by the walls of the incubator, resulting in less needed active attenuation. The earmuffs provided 4.7dB attenuation for voice signals, greater than that provided by the ANC device.

Of the 11 sound sequences, alarm sounds with a primary frequency below 500 Hz were well attenuated throughout the 24cm by 8cm measurement region (6.5dB to 10.6dB). For border frequencies (500Hz to 1kHz), the two measurement locations nearest the ANC device provided better attenuation than measurement points further away (average of 5.4dB vs 1.0dB). For frequencies above 2kHz, the ANC device provides no further attenuation; however, the SPL inside the incubator for these sound sequences is consistently below 39dBA, perhaps due to the passive attenuation of the incubator wall.

For all three room configurations, frequency alarm components 1kHz and below were consistently better attenuated than components of 2kHz and above. For all room configurations, any octave bands whose unattenuated SPLs were 35dBA or lower were not meaningfully further attenuated by the Neoasis. For instance, focusing on the worst case sound scenario (simultaneous high priority alarms from a patient monitor, ventilator, and syringe pump) attenuation of 6dB, 8dB, and 8dB was achieved for room configurations 1, 2, and 3, respectively for octave bands of 1kHz and below while for octave bands of 2kHz and above, no further attenuation was provided.

	Device	Brand	Alarm Priority
1	Patient Monitor	Philips	Medium
2	Patient Monitor	Philips	High
3	Ventilator	Maquet	Medium
4	Ventilator	Maquet	High
5	Syringe Pump	Medfusion	Low
6	Syringe Pump	Medfusion	High
7	(1) Syringe Pump (2) Ventilator	Medfusion Maquet	High High
8	(1) Syringe Pump (2) Ventilator	Medfusion Maquet	Low High
9	(1) Syringe Pump (2) Patient Monitor	Medfusion Philips	High Medium
10	(1) Syringe Pump (2) Ventilator (3) Patient Monitor	Medfusion Maquet Philips	High High High
11	Male and Female Voices	N/A	N/A

Table 1. Sound sequences used in performance testing

	Attenuation (dB)	
Sound Sequence	ANC Device	Earmuffs
2	11.7	3.5
3	9.4	7.4
4	8.6	2.6
7	7.0	4.4
10	6.5	5.0
8	5.1	0.2
9	3.3	2.7

Table 2. Highest attenuation of the worst ear for ANC device and earmuffs

Conclusion: A non-contact ANC system provides sound attenuation at least as good as earmuffs and therefore may provide similar clinical benefits as achieved by earmuffs.

Learning Objectives:

1. Potential utility of a non-contact active noise controlA non-contact ANC system provides sound attenuation at least as good as earmuffs and therefore may provide similar clinical benefits as achieved by earmuffs system in a NICU incubator.
2. Clinical benefits of quieter environment within a NICU incubator.

Gravens2022-36

Abstract Title: Characteristics and Outcomes of Neonatal Opioid Withdrawal Syndrome in Preterm Infants: A Retrospective Cohort Study in the Current Era

Authors: Alicia Heyward D.O. UH Rainbow Babies & Children's Hospital. Nori Minich Data Analyst UH Rainbow Babies & Children's Hospital. Anna Maria Hibbs M.D. UH Rainbow Babies & Children's Hospital. Lulu Zhao M.D. UH Rainbow Babies & Children's Hospital. Adriana Hoffman M.D. UH Rainbow Babies & Children's Hospital. Moira Crowley M.D. UH Rainbow Babies & Children's Hospital

Corresponding Author:

Alicia Marie Heyward D.O.

Neonatal-Perinatal Medicine Fellow PGY6

University Hospitals Rainbow Babies and Children's Hospital

9495 Metcalf Rd Willoughby Oh 44094

434-249-0179

alicia.heyward@uhhospitals.org

Background and Purpose: Opioid use in pregnancy has increased exponentially since the early 2000's, resulting in rising rates of Neonatal Opioid Withdrawal Syndrome (NOWS) and NICU admissions. Characteristics of opioid withdrawal has been well described for term infants, however, data is lacking for preterm infants affected by in-utero opioid exposure. The few existing studies reflect neonates born before 2010, the early phase of this current opioid epidemic, and likely do not reflect current prenatal exposures including increasing fentanyl and polydrug use.

The objective of this study is to describe symptomatology, presentation and treatment of NOWS in preterm (PT) and late preterm (LPT) infants compared to term infants. We hypothesized preterm and late preterm infants will express a different spectrum of withdrawal symptoms, different timing and peak of symptoms, and lower rates of pharmacologic treatment compared to term infants.

Understanding the timing and presentation of NOWS in the late preterm population is important not only for practitioners in NICU's but in newborn nurseries as well since neonates born as early as 34-35 weeks gestational age can remain with mom and be discharged home shortly after birth. Our hope is to provide more information that will help guide physicians and practitioners caring for preterm and late preterm neonates with in-utero opioid exposure.

Materials and Methodology: This was a retrospective chart review of 340 mother-infant diads' admitted to a single tertiary care center between January 2014 and December 2019, with IRB approval. Infants were categorized by gestational age: term (>37 weeks), LPT (34 and 0/7 weeks to 36 and 6/7 weeks) and PT (< 34 weeks). Inclusion criteria: admission within the first 7 days of life with a history of maternal opioid use during pregnancy and/or positive maternal or infant toxicology screen. Exclusion criteria: received opioids prior to transfer or for any treatment other than NOWS, Grade 3-4 intraventricular hemorrhage, neonatal encephalopathy, and any congenital anomalies affecting the central nervous system (CNS). Modified Finnegan Scores were used to assess withdrawal symptoms and were obtained on admission per protocol. Only scores obtained from our NICU or step-down unit beginning with admission were included in the analysis. The single highest total Modified Finnegan score was used for analysis, if treatment was initiated the highest score prior to treatment was used. Our primary outcome was to describe the symptomatology and timing of NOWS in preterm and late preterm infants compared to term infants. Our secondary outcomes were to describe timing of peak symptoms and rate of pharmacologic treatment in preterm and late preterm infants compared to term infants. A limitation encountered was ensuring the identification of all in-utero opioid exposed infants. To increase the identification of infants both a unit database of infants with opioid exposure and medical record searches using International Classification of Diseases, Ninth Revision (ICD-9) and International Classification of Diseases, Tenth Revision (ICD-10) codes were utilized. Another limitation was the small number of preterm infants in our study, due to a large number of preterm infants being excluded as they were not monitored for NOWS.

Results: There were 263 infants who met criteria: 13 preterm, 72 late preterm, and 178 term infants, with 77 infants excluded based on the defined criteria. A similar onset of NOWS (46 vs 51.2 hours, p=0.20) and peak symptoms (52.4 vs 67.1 hours, p=0.11) was observed in late preterm infants compared to term. Highest total Finnegan scores were lower in late preterm infants compared to term infants, (9 vs 12 p<0.001), with LPT infants scoring less frequently for increased muscle tone (85.5 vs 96.6%, p=0.006), excoriations (18.8 vs 34.5%, p=0.02), fever (63.8 vs 91.2%, p<0.001) and sucking (65.2 vs 77.7%, p=0.05). PT and LPT infants received less pharmacologic treatment when compared to term (23.1 and 45.7 vs 70.1%, p=0.003 and p<0.001, respectively). Duration of treatment, adjunctive medication use, and maximum morphine dose were similar in LPT and term infants.

Conclusion: Understanding the timing and presentation of NOWS in LPT infants is important as discharge can occur in the first few days of life. The onset of NOWS in LPT infants was similar to term, allowing for the same duration of monitoring for withdrawal. PT and LPT infants received less pharmacologic treatment and exhibited lower CNS, ANS and overall Finnegan scores compared to term. We believe this is related to the infants' physiologic im-

maturity which has been suggested by previous investigators, but also brings to question the ability of current opioid withdrawal tools' to accurately assess withdrawal in preterm infants.

	Preterm (n=13) N (%)	Late Preterm (n=72) N (%)	Term (n=178) N (%)	PT vs T p-value	LPT vs T p-value
Infant Demographics					
Gestational Age (weeks) (median, min/max)	33.00 (25.14-33.86)	35.64 (34.00-36.86)	39.00 (37.00-42.00)	-	-
Sex					
Male	9 (69.2)	40 (55.6)	88 (49.4)	0.18	0.38
Female	4 (30.8)	32 (44.4)	90 (50.6)		
Birthweight (grams) (median, IQR)	1790 (1675-2038)	2443 (2180-2735)	3080 (2730-3360)	<0.001	<0.001
Length (cms) (median, IQR)	42.0 (39.0-45.0)	46.0 (44.0-48.0)	49.0 (47.5-51.0)	<0.001	<0.001
Head Circumference (cms) (median, IQR)	29.5 (27.3-30.5)	32.0 (30.5-33.4)	33.5 (32.5-35.0)	<0.001	<0.001
Out born Infants	5 (38.5)	39 (54.2)	142 (79.8)	0.002	<0.001
Infant Diagnoses					
RDS, TTN, Pneumonia	11 (84.6)	35 (48.6)	32 (18.0)	<0.001	<0.001
PPHN	0 (0.0)	1 (1.4)	3 (1.7)	-	0.87
Sepsis	3 (23.1)	5 (6.9)	7 (3.9)	0.009	0.32
Hyperbilirubinemia	10 (76.9)	33 (45.8)	31 (17.4)	<0.001	<0.001
Feeding Intolerance	12 (92.3)	39 (54.2)	31 (17.4)	<0.001	<0.001
NOWS Outcomes					
Required Pharmacologic Rx					
Morphine	3 (23.1)	32 (44.4)	118 (66.3)	0.005	0.002
Morphine + Phenobarbital	0 (0.0)	6/32 (18.8)	19/118 (16.1)	-	0.72
Highest morphine dose (mg/kg/day) (median, IQR)	0.40 (0.40-0.40)	0.40 (0.40-0.80)	0.40 (0.40 - 0.64)	0.61	0.59
Onset of NOWS (hours) (median, IQR)	77.7 (62.3-86.1)	46.0 (24.7- 67.6)	51.2 (31.1-78.2)	0.24	0.20
Peak Symptoms (hours) (median, IQR)	77.7 (62.3-127.4)	52.4 (35.3 - 86.3)	67.1 (43.5-100.6)	0.42	0.11
Length Morphine Rx (days) (median, IQR)	6.4 (6.0-10.8)	13.1 (9.6-22.2)	12.1 (8.8-18.4)	0.02	0.17
Length Phenobarbital Rx (days) (median, IQR)	-	14.7 (7.1-31.1)	13.3 (5.4-29.6)	-	0.64
Length of Stay (days) (median, IQR)	22.7 (15.0-50.4)	13.5 (7.1-19.1)	15.0 (7.5-20.3)	0.001	0.002

Table 1. Infant Demographics and NOWS Outcomes To compare group differences in continuous measures, Kruskal-Wallis tests were performed and, when significant, followed up by Dunn post-hoc tests, when not significant, followed by Mann-Whitney U tests (between pairs of groups). Logistic regression was used to determine group differences in the presence/absence of dichotomous measures. Key: PT= Preterm, LPT= Late Preterm, T=Term, IQR= Interquartile Range 25-75, RDS = Respiratory Distress Syndrome, TTN= Transient Tachypnea of Newborn, PPHN= Persistent Pulmonary, Hypertension, Rx= Treatment

	Preterm (n=13)	Late Preterm (n=69)	Term (n=148)	PT vs T P-value	LPT vs T P-value
Highest Total Finnegan Score (median, IQR)	9.0 (6.5-10.5)	9.0 (7.0-12.0)	12.0 (10.0-15.0)	0.001	<0.001
Highest Total CNS Score (median, IQR)	7.0 (3.5-8.5)	6.0 (4.0-8.0)	7.0 (6.0-10.0)	0.19	0.003
Highest Total ANS Score (median, IQR)	2.0 (2.0-3.0)	3.0 (2.0-4.0)	3.0 (3.0-4.0)	0.02	0.002
Highest Total GI Score (median, IQR)	2.0 (1.0-2.5)	2.0 (1.0-4.0)	3.0 (2.0-3.0)	0.03	0.20
CNS Disturbances					
Crying	30.8%	36.2%	47.3%	0.26	0.13
Sleeping	84.6%	85.5%	85.1%	0.96	0.94
Moro Reflex	61.5%	46.4%	40.5%	0.15	0.42
Disturbed Tremors	92.3%	91.3%	93.2%	0.90	0.61
Undisturbed Tremors	69.2%	56.5%	48.6%	0.17	0.28
Muscle Tone	84.6%	85.5%	96.6%	0.06	0.006
Excoriation	23.1%	18.8%	34.5%	0.41	0.02
Myoclonic Jerk	15.4%	4.3%	4.7%	0.13	0.90
Sweating	0.0%	8.7%	14.2%	-	0.26
ANS Disturbances					
Fever	84.6%	63.8%	91.2%	0.44	<0.001
Yawning	15.4%	20.3%	17.6%	0.84	0.63
Mottling	53.8%	60.9%	59.5%	0.69	0.84
Nasal Stuffiness	30.8%	44.9%	37.8%	0.61	0.32
Sneezing	76.9%	73.9%	65.5%	0.41	0.22
Nasal Flaring	7.7%	8.7%	13.5%	0.56	0.31
Respiratory rate	92.3%	84.1%	87.8%	0.64	0.45
GI Disturbances					
Sucking	69.2%	65.2%	77.7%	0.49	0.05
Poor Feeding	23.1%	44.9%	36.5%	0.34	0.24
Regurgitation/Vomiting	38.5%	33.3%	25.7%	0.32	0.24
Stools	30.8%	52.2%	55.4%	0.10	0.66

Table 2. Comparison of Modified Finnegan Scores Kruskal-Wallis tests were used to compare groups on Finnegan scores. Logistic regression was used to determine group differences in the presence/absence of individual items. Key: PT= Preterm, T= Term, LPT= Late Preterm, CNS= Central Nervous System, ANS= Autonomic Nervous System, GI= Gastrointestinal

Learning Objectives:

1. Compare the symptomatology of NOWS in preterm and late preterm infants to term infants.
2. Compare the timing of presentation in preterm and late preterm infants to term infants.
3. Compare the need and length of treatment in preterm and late preterm infants to term infants.

Gravens2022-37

Abstract Title: Empowering Parents, Expediting Discharge, and Promoting Long-Term Feeding Success with Cue-Based Feeding and Telehealth Home NG Follow-Up Clinic

Authors: Melissa Andersen, PhD, Natalie Morris, PhD, BCBA, Kim Monroe, MD, MS, Catherine Joppich, RDN, CLC, Megan Schmuckel, MA, CCC-SLP, CLC, Christine Ndagije, MA, CCC-SLP, CLC; C.S. Mott Children's Hospital, Ann Arbor, MI

Corresponding Author:

Melissa Andersen, PhD

Pediatric Psychologist, Assistant Professor of Pediatrics

C.S. Mott Children's Hospital, Ann Arbor, MI

1500 E Medical Center Dr., MPB D2216, Ann Arbor, MI 48109

734-718-9012

melandrs@med.umich.edu

Background and Purpose: Infants born prematurely and with medical illness experience disruptions and delays to oral feeding skill acquisition resulting in prolonged hospitalization, increased parental stress, and risk of iatrogenic infection. When this occurs, providers and parents feel pressure to speed up the oral feeding acquisition process by using volume-driven feeding strategies that ultimately lead to unsafe and uncomfortable feeding experiences and often result in feeding problems that persist and worsen after discharge.

Materials and Methodology: Our institution established an inpatient and outpatient Cue-Based Feeding program that expanded infant cue-based feeding hospital-wide and established an outpatient telehealth Home NG Follow Up clinic. The outpatient clinic is a multidisciplinary clinic staffed by infant feeding and development experts (pediatric psychologist, speech and language pathologist, registered dietitian, and lactation consultant). It is designed to 1) improve transition of care from inpatient to outpatient, 2) expedite discharge as early as 30% PO, once infants are medically ready,

3) support parents to use evidence-based feeding practices within the comfort of their home to promote safe, efficient, and successful oral feeding skill acquisition and tube weaning, and 4) increase access to specialized feeding support statewide through telehealth services. An inpatient Cue-Based Feeding Team was also established, consisting of pediatric psychologists, a pediatric hospitalist, inpatient speech-language pathologists, infant cue-based feeding technicians, and a registered dietitian. A speech-language pathologist and inpatient cue-based feeding technicians monitor and support parents and staff to implement cue-based feeding practices. The inpatient and outpatient teams coordinate closely to identify infants who meet criteria for expedited discharge to the outpatient Home NG Follow Up Clinic. As soon as these infants are medically ready for discharge and reach 30-40% PO, they are discharged home with weekly telehealth follow-up appointments until they are weaned from the tube. Parent-collected data are reviewed during each appointment including daily oral intake and tube feeding volumes, adverse feeding events and medical/feeding issues that lead to conditioned aversion, and feeding strategies used. Growth is monitored with weekly weights obtained by home nursing, parent scales, or data obtained from PCP visits. Parents are provided with education to continue evidence-based oral feeding techniques and a cue-based approach, redefining success as quality of oral feeding experiences over quantity to advance oral feeding skills and prevent feeding problems. There is a strong emphasis on setting appropriate expectations to minimize feeding-related stress and pressure. Parents are provided breastfeeding support if desired, and they are provided guidance throughout the transition from NG tube feeds to 100% oral feeds. Feeding plans are adjusted to maintain appropriate growth and advance oral intake as needed. To date, we have had 31 infants and families discharged to our clinic. Outcome data are collected via chart review and parent satisfaction surveys administered at discharge. The main outcomes gathered for the clinic include number of bed days saved (decreased length of stay), number of tubes weaned, weight, g-tube placement, feeding-related readmissions, and parent satisfaction.

Results: As shown in Table 1, 31 patients have been discharged to the outpatient Home NG Follow-Up clinic, resulting in 393 total bed days saved (average of 7 bed days per patient when outliers are excluded). Average weight gain was 30.6 grams/day, and all have had tubes weaned, or are on track to be weaned at the time of this submission. One hundred percent (5/5) g-tubes have been prevented for those who were at risk. Twenty-three percent of the patients lived over 50 miles from the institution. All families who responded to the satisfaction survey reported high levels of satisfaction. The following reasons were endorsed by families as the highest contributors to their satisfaction: 1) early discharge from the hospital, 2) more time at home with family and bonding better with their baby, 3) increased confidence with feeding their baby, and 4) reduced stress due to increased support from feeding team.

Conclusion: This model of care provides increased access to specialized multidisciplinary care that facilitates decreased length of stay and promotes efficient, successful tube weaning, prevention of conditioned aversion, high levels of parent satisfaction, and long term feeding success after discharge for families who otherwise would not have access to such services.

Table 1. Home NG Program Outcomes

Total number of patients discharged to clinic to date	31
Total bed days saved`	393
Avg bed days saved (minus outliers)	7
Avg weight change	+30.6 g/day
Total number of tubes weaned	25*
Percentage of g-tubes prevented (of those at risk)	100%
Average length of time followed in clinic (minus outliers)	19 days
Number of feeding-related readmissions	0
Distance from clinic	
0-25 miles	10 (32%)
26-50 miles	14 (45%)
51+ miles	7 (23%)

* those that are not weaned yet are on track to be weaned from tube

Table 1. Home NG Program Outcomes

Table 2. Home NG Follow Up Clinic Satisfaction Survey Results

	Total "Yes" (%)
Are you satisfied with the help you received in the NG Follow-Up Clinic?	6 (100%)
Would you recommend the NG Follow Up Clinic to other families?	6 (100%)
Factors endorsed that contributed to parent satisfaction	
Discharged sooner from hospital	5 (83%)
Able to spend more time caring for my baby	3 (50%)
Able to spend more time at home with other family members	4 (67%)
Able to breast feed more/more easily	2 (33%)
Less financial strain (less gas, lodging, hospital cost, etc)	1 (17%)
Able to bond better with my baby than in the hospital	4 (67%)
More confident feeding my baby	4 (67%)
Less stress because I had a team helping us feed my baby	5 (83%)

Additional comments about the clinic:

"It was great! It was wonderful being able to take my baby home early and give him 100% of his feeds at home. I was able to heal faster, and I think he was able to wean from his tube faster because he was with his parents getting consistent feedings"

Table 2. Home NG Follow Up Clinic Satisfaction Survey Results

Learning Objectives:

1. Understand how long-term feeding problems develop with premature and medically ill infants during and after discharge from the hospital.
2. Describe an inpatient and outpatient cue-based feeding model that promotes safe, efficient oral feeding skill acquisition, decreases length of stay, and prevents long-term feeding disorders and tube dependency.

Gravens2022-38

Abstract Title: An Educational Approach to Increase the Use of Kangaroo Care in the Neonatal Intensive Care Unit

Authors: Samantha Moran, Robyn Stamm, Linda Lacina

Corresponding Author:

Samantha Moran, DNP

Registered Nurse

University of Cincinnati

303 Sycamore Lane Apt. 181 South Lebanon, Ohio, 45065

2108961883

samanthamoran78@gmail.com

Background and Purpose: Kangaroo care (KC) is associated with better quality outcomes during hospitalization.1 This project examined prevalence of KC in the neonatal intensive care unit (NICU) of Cincinnati Children's Hospital Medical Center (CCHMC). A needs assessment determined that the unit goal was to have 20% of patients receive KC at least once during their stay and the rate was only 6.4%. PURPOSE: The purpose of this project was to asynchronously educate nurses on KC practice and monitor for an observable change in the prevalence of KC following the education.

Materials and Methodology: A quality improvement (QI) project was conducted at CCHMC. The target population were NICU nurses who were hired to staff the private room pods. The intervention was an educational video portraying proper KC for eligible NICU patients. Quantitative and qualitative data were collected.

Results: Twenty-four nurses from the NICU participated. The rate of eligible patients who received KC increased by 5.9%. The total number of occurrences of KC increased by 56.2%. Nurses who offered KC 1 to 3 times per week increased by 13%.

Conclusion: IMPLICATIONS FOR PRACTICE AND RESEARCH: Providing asynchronous video learning increased KC in the setting of this project. The results support the use of continuing education. Results are not generalizable to other institutions and therefore further effort is needed to determine if continuing education will yield similar outcomes in other NICUs.

Figure 1.

Learning Objective:

Of the objectives of this project, perhaps the main ones were to educate nurses regarding best practice when teaching parents about kangaroo care as well as to give nurses the tools they need to assist families with kangaroo care based on the hospital guideline. Through this education, the goal was to increase the number of nurse-documented occurrences of kangaroo care. The documentation of kangaroo care is key to knowing if the intervention is being utilized within the NICU.

Gravens2022-39

Abstract Title: Understanding the Couplet Care Environment and its effect on bonding between the mother and infant dyad

Authors: Sabah Mohammed, B. Arch, (M.S. candidate) Cornell University, Dr. Mardelle McCuskey Shepley, B.A., M.Arch., M.A., D.Arch, Cornell University

Corresponding Author:

Sabah Mohammed, B. Arch

M.S. Candidate

Cornell University

231 12th Street NE, Atlanta GA 30309

+12094078942

sm2773@cornell.edu

Background and Purpose: The evolution of neonatology began with small rooms carved out from newborn nurseries, then evolved into bright, noisy, crowded, and sometimes windowless units. More recently, hospitals are providing single-family rooms (SFR) where the parents can reside with their babies, with evidence that SFRs are associated with increased family-centered care, breastfeeding, and parent visitation (Lester et al., 2014). There is an emerging model of care for the mother-baby dyad called 'couplet care' that lays even further along the spectrum of family integration. Instead of separating the mother and baby, the guiding principle is to keep the mother and baby together after delivery. It is a novel approach that aims to deliver intensive care to relatively low needs newborns and their postpartum mothers in a shared room (White, 2016).

Couplet care has been introduced in a few healthcare facilities in the United States and there is ongoing research on the outcomes. Two such facilities are Yale-New Haven Hospital in Connecticut and Memorial Hospital in South Bend, Indiana, the latter of which will serve as the site for data collection and tool validation in this study. Providing a mother with postpartum care in the same room where her infant receives NICU care provides physical proximity that increases opportunities for skin-to-skin time, breastfeeding, and bonding, three interrelated activities that enhance short- and long-term physical and emotional well-being for mother and infant. Recent literature suggests that SFR design is associated with more skin-to-skin time as well as longer duration of breastfeeding compared to an open bay layout (Tandberg et al., 2018; Domanico et al., 2011). In addition, skin-to-skin contact is associated with improved maternal-infant attachment (Cho et al., 2016), a greater maternal sense of confidence and competence in caring for her infant (Jaafar, Ho & Lee, 2016), higher levels of breastfeeding after hospital discharge which is associated with decreased rates of postpartum depression in mothers (Kuhnly, 2018). Increased parental stress in the Neonatal ICU has been associated with sever-

al undesirable outcomes in infants such as delayed lactogenesis and decreased rates of breastfeeding (Dimitraki et al., 2016; Catala, Peñacoba, Carmona, & Marin, 2018), delayed mother-infant bonding (Feldman et al., 1999; Bystrova et al., 2009), decreased parental confidence (Ong et al., 2019) and comfort with parenting roles (Al Maghaireh et al., 2016)

Purpose: The overall aim of the study is to identify the outcomes associated with the Neonatal Intensive Care Unit (NICU) and the Couplet Care Experience (CCE). The primary aim of this study is to validate the tool developed at Yale New Haven Hospital (YNHH) that measures the effect of exposure to CCE on maternal-infant bonding during hospitalization. Secondary aims are to determine associations between elements of the CCE (degree of infant holding, kangaroo care or skin-to-skin contact, and breastfeeding), maternal stress, and hospital stay satisfaction.

Materials and Methodology: Hypothesis: The primary hypothesis is that the CCE at Memorial Hospital will be comparable to the NICU at YNHH in terms of a positive association with maternal-infant bonding, hospital stay satisfaction, and lower maternal stress while in-hospital. The secondary hypothesis is that certain elements of the couplet care experience such as noise, lighting, proximity, and equipment will have stronger positive associations with maternal infant-bonding, hospital stay satisfaction, and a negative association with maternal stress.

Research question: What is the effect of the couplet care environment on bonding between mother and child as compared to bonding in other NICU models?

Independent variables: Physical proximity between mother and baby, acoustics, lighting, illness of mother and baby

Dependent variables: Skin-to-skin contact, length of stay, hospital stay satisfaction

Methodology: This is a prospective, cohort study involving a mixed methods approach to collecting qualitative and quantitative data. Eligible mothers will be screened upon their infants' admission to the NICU at Memorial Hospital, South Bend and will be presented the study poster by nursing staff as a means of recruitment. Targeted enrollment is 30 participants for the survey and 10 participants for the follow-up interview. Primary outcomes of interest will include scores on a neonatal experience survey and a qualitative interview. These outcomes will be compared between mothers who are exposed to couplet care and those who are not, controlling for baseline characteristics. Surveys will be administered during birth hospitalization. Interested participants will be invited to participate in a follow-up interview where they will be asked to describe their experience with the CCE model in detail.

Results: Outcome measurements: Primary outcomes of interest included scores on several self-report surveys as well as time spent engaged in kangaroo care, parent satisfaction with their hospital experience, as well as amount of education received from nursing. These outcomes were compared between mothers who are exposed to couplet care and those who are not, controlling for baseline characteristics. Surveys were administered during birth hospitalization and interested participants were invited to participate in a follow-up interview where they were asked to describe their CCE experience in detail.

Impact: Although there have been several studies on associated stressors in a traditional NICU, it has not been studied in mother-infant dyads who receive co-care. NICU couplet care is a novel approach that is seeing an increase in adoption rates in numerous hospitals across the United States. To our knowledge, very few studies exist that examine the outcomes associated with this type of NICU design.

Barriers to implementation: Due to the COVID-19 pandemic, data collection was primarily conducted remotely in coordinating with the care team at Memorial Hospital, South Bend.

Conclusion: This study identifies the strength and weaknesses of NICU models. The results from this study will provide an evidence-base case for medical planners to develop facility guidelines as well as for clinicians to perform clinical practice improvements in their NICUs.

Figure 1. Understanding the physical NICU environment: the relationship between constructs and variables.

Bibliography:

1. *Al Maghaireh, D. A. F., Abdullah, K. L., Chan, C. M., Piaw, C. Y., & Al Kawafha, M. M. (2016). Systematic review of qualitative studies exploring parental experiences in the Neonatal Intensive Care Unit. Journal of clinical nursing, 25(19-20), 2745-2756.*
2. *Bystrova, K., Ivanova, V., Edhborg, M., Matthiesen, A. S., Ransjö-Arvidson, A. B., Mukhamedrakhimov, R., ... & Widström, A. M. (2009). Early contact versus separation: effects on mother–infant interaction one year later. Birth, 36(2), 97-109.*
3. *White, R. D. (2016). The next big ideas in NICU design. Journal of Perinatology, 36(4), 259-262.*

Learning Objectives:

1. Understanding the need for future iterations in NICU design
2. Understanding the CCE from the perspective of the patient and extended family through qualitative interviews
3. Validating an existing tool and understanding the process of conducting design research

Gravens2022-40

Abstract Title: Organizational Health Literacy: Information and Environmental Assessments of a NICU Follow-Up Clinic

Authors: Lindsay Rosenfeld, Nisha Dalvie, Kelly McCullagh, Micaela Torres, Carolyn King, Jonathan Litt

Corresponding Author:

Nisha Dalvie, MD

Resident Physician

Boston Children's Hospital and Boston Medical CEnter

19 E Albion Street, Somerville, MA 02145

9254870142

nisha.dalvie@childrens.harvard.edu

Background and Purpose: Organizational health literacy is defined by Healthy People 2030 as the degree to which organizations equitably enable individuals to find, understand, and use information and services in informing health-related decisions and actions for themselves and others.1 Growing attention has been given to the role of literacy in health and health care, and the related responsibility of health organizations to improve organizational health literacy, given that the average U.S. adult has 7th grade reading skills.2,3 This is particularly salient in medically and developmentally complex populations, such as NICU graduates, due to the significant additional burden placed on families to navigate multiple levels and types of health services.4 However, little research has been published on the gaps in organizational health literacy for medically and developmentally complex children.

Materials and Methodology: We performed an organizational health literacy assessment in the setting of a follow-up clinic at an urban, quaternary children's hospital that provides medical and developmental evaluation and support post-NICU stay. We completed information (a) and environmental (b) assessments. Trained research assistants performed all assessments and engaged in multiple reliability checks with a third coder to ensure inter-rater reliability.

(a) We evaluated clinic information items [n=9] with the following assessments to gauge reading level, complexity, usability, and actionability.

SMOG (readability) [n=9]

PMOSE/IKIRSCH (document complexity) [n=3]

PEMAT (usability & actionability) [n=7]

(b) We evaluated the clinic environment with the Walking Interview (Health Literacy Environment Activity Packet) [n=2] and the HLE2 (Health Literacy Environment of Hospitals and Health Centers) [n=1].

Results: Overall, assessments revealed that to interact with clinic information items, literacy skills comparable to those of someone with skills at the high school level or beyond were required. SMOG scores indicated a high readability demand [e.g. website, email], requiring 9th-15th grade-level reading skills. PMOSE/IKIRSCH scores indicated a high complexity demand [e.g. charts, tables], requiring 4th-12th grade-level skills. PEMAT scores ranged from 38-75% [usability] and 0-83% [actionability], demonstrating a great range of information usability and actionability. Overall, environmental assessments revealed a mismatch between organizational demands and population literacy skills. Environmental assessment revealed facilitators [i.e. ease of reaching clinic by phone, hospital entryway well-marked] and barriers [i.e. challenging to navigate within hospital to clinic: signage inadequacies, crowded, overwhelming spaces] to navigating processes and physical space. HLE2 scores in 4 areas [i.e. institutional practices, navigation, culture and language, communication] ranged from 0-60%, indicating a need for health literacy to be prioritized at a hospital-systems level.

	Information Assessment Tool			
Material	SMOG (corresponds to Reading Grade Level) *Count NICU GraDS once	PMOSE / IKIRSCH Document Complexity Score (Grade Level)	PEMAT Usability (0-100%)	PEMAT Actionability (0-100%)
	N=9	N=3	N=7	
1. NICU GraDS Welcome Letter	14 (13*)	--	38	0
2. NICU GraDS Q&A	15 (13*)	--	69	60
3. NICU GraDS Website	16 (15*)	--	45	0
4. March of Dimes, Milestones	9	4 (4th-8th)	75	83
5. Tips on Communicating	10	--	69	60
6. Oral Health Early Start	10	--	60	60
7. NICU GraDS Family Feedback Form	12	5 (4th-8th)	--	--
8. NICU GraDS Referral Contact Sheet	11	6 (8th-12th)	--	--
9. NICU GraDS Appointment Email Reminder	11	--	73	60

Figure 1. Clinic informational materials scored by various assessment tools (SMOG, PMOSE/IKRSCH, and PEMAT).

Conclusion: Poor organizational health literacy reduces access for families of medically and developmentally complex children. Addressing barriers to organizational health literacy can improve health equity. As such, organizational health literacy assessment is a crucial aspect of addressing multi-level barriers to optimal outcomes. Assessment results provide concrete ways to address systems-level problems, including structural racism, via quality improvement and policy changes.

Learning Objectives:

1. Explain the relationship between health inequities and organizational health literacy

2. Identify and explore information and environmental health literacy assessment
3. Explore how organizational health literacy assessment can create opportunities for improving health equity, especially among medically and developmental complex children and their families

Health Literacy Environment of Hospitals and Health Centers [0-100%]	
Institutional Practices	**44%**
Part 1: Resources	80%
Part 2: Orientation, Development & Expectations	32%
Orientation	
Development	25%
Expectations	0%
	63%
Navigation	**60%**
Part 1: Arrival	60%
Part 2: Wayfinding	61%
Staff Assistance	84%
Hallways & Navigation Ease	50%
Services & Specialty Areas	13%
Culture & Language	**56%**
Communication	
Print Materials	58%
Forms	0%
Websites	1%
Patient Portals	71%

Figure 2. Health Literacy Environment of Hospitals and Health Centers (HLE-2) scoring of clinic, broken down by section (institutional practices, navigation, culture & language, and communication).

NT

Corresponding Author

Robert D. White, MD
Director, Regional Newborn Program
Beacon Children's Hospital
615 N. Michigan St.
South Bend, IN 46601
Phone: 574-647-7141
Fax: 574-647-3672
Email: Robert_White@pediatrix.com

Joy Browne, Ph.D., PCNS, IMH-E(IV)
Clinical Professor of Pediatrics and Psychiatry
University of Colorado School of Medicine
Aurora, Colorado
Telephone: 303-875-0585
Email: Joy.browne@childrenscolorado.org

Vincent C. Smith, M.D. M.P.H.
Boston Medical Center
801 Albany Street Room 2009
Boston, MA 02119
(617) 414-3989 (T)
(617) 414-3833 (F)
Email: Vincent.smith@bmc.org

Mitchell Goldstein, MD, MBA, CML
Professor of Pediatrics
Loma Linda University School of Medicine
Division of Neonatology
Department of Pediatrics
Email: mgoldstein@llu.edu