

DEVELOPMENT OF A CUE-BASED FEEDING EDUCATION PROGRAM IN THE NICU  
TO ENHANCE THE SELF-EFFICACY OF CAREGIVERS

By

Jazmin Rivera

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## **Doctoral Project Approval**

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Jazmin Rivera

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Department of Brain Health

Donnamarie Krause, Ph.D.  
*Graduate Coordinator*

Jefferson Kinney, Ph.D.  
*Graduate Program Chair*

Alyssa Crittenden, Ph.D.  
*Vice Provost for Graduate Education &  
Dean of the Graduate College*

## **Abstract**

In the neonatal intensive care unit (NICU), a neonate may experience feeding difficulties due to their prematurity, physiological, and neurological status. Under these circumstances, a caregiver's role can be diminished and cause a loss of self-efficacy due to the inability to provide care and feed their infant in the NICU. After examining the literature, guided by the Model of Human Occupation and the Transformative Learning Theory framework, a cue-based feeding (CBF) program was developed and implemented at the University Medical Center (UMC) Hospital NICU department to enhance the caregiver's self-efficacy through an occupational therapy perspective. A feasibility evaluation of the feeding program and the data of the CBF program was performed to determine the outcomes of the feeding program. The preliminary results suggested that CBF education can increase the self-efficacy of NICU caregivers. In addition, the CBF program was successful to complete in the NICU department with NICU caregivers.

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## **Introduction**

Feeding is a fundamental occupation across the lifespan, for most term infants this occurs effortlessly (AOTA, 2020); however, it is estimated that about 80% of infants born prematurely will experience oral feeding difficulties during their hospitalization in the neonatal intensive care unit (NICU) (Pineda et al., 2020). This can occur due to medical complications and neurological immaturity or injuries (Pineda et al., 2020). These feeding difficulties may lead to a delayed hospital discharge and a lack of confidence in parents' ability to care for and feed their fragile infants (Cakmak & Karacam, 2018; Davis-Strauss et al., 2021; Han et al., 2020).

Although many NICUs have feeding practices such as the traditional volume-driven model set in place for infants with feeding difficulties, it is primarily based on the quantity rather than the quality of the feeding. This clinician-centered approach is based on the infants' weight, gestational age, and the volume consumed to drive the feeding (Kamran et al., 2020). Moreover, this method negatively affects an infant's neurodevelopment, parent- infant bonding, and infant communication (Thomas et al., 2021). The alternative, cue-based feeding (CBF) or the infant driven feeding (IDF) model, focuses on the infants' feeding readiness and feeding quality. CBF focuses on the infant's behaviors and cues to have an appropriate, safe, nurturing, and functional experience based on their level of development (Kamran et al., 2020; Spagnoli et al., 2023). This approach promotes positive oral feeding experiences, parent-infant bonding, development of the infant and the caregiver roles, identities, and the development of the caregiver's self-efficacy (Shaker, 2013; Spagnoli et al., 2023; Thomas et al., 2021).

Development of a CBF program and parental education in the NICU is essential and supports the American Occupational Therapy Association (n.d.) vision and mission. Caregivers engage in their meaningful occupations as caregivers for their infants in the NICU through

evidence-based interventions while gaining the knowledge of cue-based feeding from the perspective of occupational therapy.

## Statement of the Problem

There is an insufficiency of self-efficacy among caregivers' perceived experience and knowledge of feeding provided in the NICU. Oral feeding is a complex process for infants in the NICU and is one of the most prominent issues that affects the infants' health and quality of life. However, caregivers receive little support in their parental role while in the NICU and even less support after discharge (Garfield et al., 2022; Spence et. al., 2023). This leads to caregivers being unaware of how to optimize their infant's oral feeds and understand their infant's feeding cues in the NICU, as feeding strategies are often taught too late or too little (Thomas et al., 2021). Furthermore, this leads to a lack of self-efficacy in caregivers to provide high quality care for their newborn and a decreased parent- infant bonding (Mirlashari et al., 2020).

## Operational Definitions

- *Cue-Based Feeding/ Infant-driven feeding*: An infant feeding method that is based on the infant's cues and behavioral expression of hunger to begin feeding.
- *Traditional Scheduled Feeding/ Volume-driven feeding*: An infant feeding method that is based on a feeding schedule and feeding quantity.
- *Caregiver Education*: Education provided to caregivers for the NICU feeding program.
- *Neonatal Intensive Care Unit*: A specialized intensive care unit at UMC hospital for infants born prematurely or critically ill.

## Significance of the Problem for Occupational Therapy

Feeding is a co-occupation that is shared or done with two or more individuals. Feeding is a significant caregiving activity in the NICU and a transactional co-occupation between the caregiver and the infant. It is recognized that the caregiver's ability to provide parenting skills is related to their confidence and ability to perform caregiving activities (AOTA, 2017). In

addition, feeding may also be affected when caregivers are not properly educated on their infant's feeding and feeding cues (Thomas et al., 2021). Currently, there is a need for caregiver education for their infants' feeding needs, for enhancement of a caregiver's self-efficacy, and carry-over after discharge (Spagnoli et al., 2023). Occupational therapy (OT) practitioners in the NICU can enhance a caregiver's self-efficacy by engaging in the co-occupation of feeding and providing caregiver education in the NICU. To optimize the performance of this co-occupation, OT practitioners can focus on the clients' oral motor and sensory integration, parent-infant bonding, neurodevelopment, and family/caregiver education (AOTA, 2017; Hardy et al., 2018; Caretto et. al., 2000).

### **Anticipated Outcomes**

The anticipated outcome for this project was to enhance self-efficacy in the feeding occupation of UMC NICU caregivers during hospitalization. The feeding education was intended to extend care, as caregivers return home and continue to use these learned feeding strategies. A subsequent anticipated outcome was the feasibility of the CBF education program at UMC Hospital. The feeding program was designed to be practical and safe for caregivers.

### **Needs Assessment**

There was limited research found on educating NICU caregivers on the CBF method. Current research evidence focused on educating the NICU health professionals, such as nurses and speech therapists, on this feeding style and implementing it on NICU infants, rather than the primary caregivers of premature infants, who received a general NICU feeding education (Spagnoli et al., 2023; Mirlashari et al., 2020; Kadiroglu & Guducu Tufekci, 2021). Additionally, there was limited research on the topic of increasing the self-efficacy of NICU caregivers through CBF education. Among those, most of the research focused on the self-efficacy of

caregivers with general NICU education rather than CBF education (Parhiz et al., 2016; Sohrabi et al., 2021; Mirlashari et al., 2020; Garfield et.al., 2022; Kadiroglu & Guducu Tufekci, 2021). This yielded the need for a feeding program development to contribute to the knowledge of the OT profession and bridge the gap in CBF education to enhance the self-efficacy of NICU caregivers.

## **Literature Review**

According to the World Health Organization (WHO) (n.d.), infants born before 37 weeks of gestation are considered premature infants. Premature infants face more challenges due to medical complications and neurological immaturity or injuries (Pineda et al., 2020). Based on their gestational and post-menstrual age, a premature infant's feeding competence may be diminished. It is estimated that about 80% of infants born prematurely will experience oral feeding difficulties during their NICU hospitalization (Pineda et al., 2020). Consequently, these feeding difficulties can contribute to an infant's failure to thrive, lead to an increased length of stay in the hospital, reduce parent-infant interactions, and increase readmissions to the hospital (Han et al., 2020). Furthermore, these feeding difficulties may lead to a lack of confidence in parents' ability to care for and feed their fragile infants (Cakmak & Karacam, 2018; Davis-Strauss et al., 2021). Oral feeding is a process that is necessary for growth and development and a dynamic process between the infant and caregiver. Hence, appropriate feeding protocols should be established for infants with feeding difficulties in the NICU.

### **Cue-Based Feeding and NICU**

The NICU department is a specialized setting for neonates who are born prematurely or due to medical complications. Along with a premature infant's stable medical status, attaining independent oral feeding is a criterion for an infant's discharge (American Academy of Pediatrics, 2008). Traditionally, infants were admitted into the NICU following the volume-driven culture, measured by the infant's weight and gestational age (Lane et al., 2021). Skilled health professionals rely on the physician's order to complete an infant's feeding session enforced by a feeding schedule. The focus of this method was emptying the bottle, which was performed through manipulation despite the infants' physiological stress, satiety cues, and suck-

swallow-breathe coordination (Shaker, 2013; Lane et al., 2021). Feeding an infant past their stress and stop signs has been shown to lead to maladaptive feeding behaviors and oral aversion to the breast and bottle (Shaker, 2013; Lane et al., 2021). Moreover, this method may negatively affect an infant's neurodevelopment, parent-infant bonding, and infant communication (Thomas et al., 2021). An alternate feeding method in the NICU is the cue-based feeding method.

Cue-based feeding (CBF) was developed to initiate feeding based on the infant's developmental hunger cues and feeding readiness (Lane et al., 2021). These feeding cues included the infant being alert and awake, rooting, bringing hands to mouth, and sucking on fingers or pacifier (El Aziz & Abd El Aziz, 2017). CBF is an individually tailored approach that builds upon the premature infants' cues and strengths and supports their vulnerabilities throughout their feeding sessions (Samane et al., 2022). CBF is primarily based on the quality rather than the quantity of feeding to enhance safe and functional feeds that will focus on the infant's hunger and stress cues (Lane et al., 2021). Compared to the traditional scheduled feedings, an infant's cues can be missed and lead to stress cues, such as crying, squirming, kicking and fatigue (El Aziz & Abd El Aziz, 2017). Additionally, these stress cues can lead to poor feeding, gulping, air swallowing, and poor latching to the bottle or breast (El Aziz & Abd El Aziz, 2017).

Samane et al. (2022) reported that infants who were fed when they showed signs and cues of hunger demonstrated fewer oxygen desaturations, fewer gavage feedings, and greater weight gain over time. In addition, the infants attained oral bottle feeding on an average of three days earlier than the control group. Consistent with Samane et al. (2022) findings, Kamran et al. (2020) showed that CBF had positive outcomes for preterm infants between the gestational age of 29 weeks to 34 weeks. Furthermore, investigating CBF with premature infants, El Aziz & Abd

El Aziz (2017) found that CBF showed increased quality of nipping, increased feeding readiness cues, earlier attainment in feeding, and full oral feeding by eight days when compared to the control group. CBF was demonstrated to be a safe and more effective approach in the clinic when they followed the infants' cues to oral feed, rather than feeding an infant through a schedule.

CBF can be applied to bottle- and breast-feeding. As oral feeding consists of bottle and/or breastfeeding in the NICU, Spagnoli et al. (2023) compared CBF with bottle and breastfeeding to the traditional scheduled feedings and demonstrated that following the infant's cues leads to early achievement of oral bottle feeding and breastfeeding, decreased in length of stay in very low birth weight infants, had earlier feeding attainment, and independent oral feeding of an average of five days earlier with 29-week-old infants. The researchers also identified that infants who were breastfed using the CBF approach had greater weight gain, less oxygen desaturation, and a decrease in gavage feeding compared to the traditional scheduled feedings. Comparable to Spagnoli et al. (2023) findings, Lane et al. (2021) compared CBF and the traditional feedings in less than 32-35 weeks old infants and demonstrated that infants 35 weeks post-menstrual age, had achieved their first oral feeding earlier by one day when compared to the traditional feeding protocol. The CBF infants who were less than 32 weeks old were noted to have a shorter length of stay in the hospital by twelve days but did not achieve early feeding attainment when compared to the 35-week infants. Although the less than 32 weeks and 35 weeks old infants had different findings, CBF was determined to be beneficial with both bottle and breastfeeding when compared to the traditional scheduled feedings. CBF enhances both breast and bottle feeding for infants and increases parent involvement in care (Nyqvist et al., 2013; El Aziz & Abd El Aziz, 2017).



## **Cue-Based Feeding and Caregiver Satisfaction**

Oral feeding is considered a co-occupation, a shared activity between an infant and a caregiver (Ritcher et al., 2024). As an infant demonstrates readiness to eat through the CBF approach, a caregiver can perform the reciprocal activity of feeding the infant. The infant's ability to orally feed is related to the caregiver's ability to understand the infants' cues and behaviors to feed their infant (El Aziz & Abd El Aziz, 2017; Shaker, 2013). Recognizing that there is limited research on CBF and education for caregivers about this topic, El Aziz & Abd El Aziz (2017) examined CBF on premature infants' and the parents' satisfaction with CBF education. The researchers observed that caregivers did not have adequate knowledge about CBF and their infants' feeding cues during their feeding sessions. They found that educating caregivers about CBF allowed caregivers to learn about their infant's cues and how to assess their feeding readiness. Caregivers also reported satisfaction with the CBF method, especially when they understood how their infants fed and what cues to be aware of. The results were consistent with Newland et al. (2013) who demonstrated that caregivers could effectively and safely guide their infants' feeding competence when they were able to determine their cues and feeding readiness. CBF allowed parents to feel more directly involved in their infants' care, increase their confidence, and respond to their infant's cues (Nair et al., 2014). CBF affords advantages for caregiver-infant bonding, the development of the infant and the caregiver roles and identities, and the development of the caregiver's self-efficacy (Shaker, 2013; Spagnoli et al., 2023; Thomas et al., 2021).

## **Caregiver Education and Self-Efficacy in NICU**

A caregiver's self-efficacy is the perception of their abilities to perform their infant's child-rearing activities (Garfield et al., 2022; Aliabadi et al., 2013). NICU caregivers oftentimes

express feelings of being unprepared and lower levels of confidence due to the atmosphere of the NICU setting and their premature infant's medical status (Garfield et al., 2022; Kadiroglu & Guducu Tufekci, 2021). Through education about their child's development, infant interactions, and observing health professionals complete the infant activities in the NICU, caregiving outcomes can be positively improved (Garfield et al., 2022; Sohrabi et al., 2021). Providing caregivers with education about their infants' care allows them to have more control and participate more in their infants' care (Sohrabi et al., 2021).

Caregiver education improves self-efficacy among mothers of preterm infants (Kadiroglu & Guducu Tufekci, 2021; Sohrabi et al., 2021). Kadiroglu and Guducu Tufekci (2021) employed caregiver education and training sessions for mothers on preterm infant care, nutrition, and parent-infant interaction. After the training sessions, they found that maternal bonding and perceived maternal self-efficacy had increased compared to the control group. Mothers with higher levels of self-efficacy demonstrated to be more attentive, competent, and display positive interactions with their infants (Kadiroglu & Guducu Tufekci, 2021). In line with these results, Sohrabi et al. (2021) provided caregiver education and training sessions which improved the infant's quality of care, dyad interaction increased, and the mother's self-efficacy to perform the infant activities was enhanced. In addition, these sessions increased the mother's adaptability to care for the infants and their self-esteem (Sohrabi et al., 2021).

Although mothers are often the primary infant caretakers, fathers also experience decreased levels of self-efficacy in the NICU. Fathers felt there were not enough empowerment opportunities and experienced a limited role in the NICU (Mirlashari et al., 2020). Mirlashari et al. (2020) conducted a study that provided fathers with education about the NICU environment and premature characteristics, baby basic care, and NICU practice training. The results showed

that self-efficacy and a bonding relationship had increased between the infants and fathers. Providing paternal involvement increased knowledge and competency in paternal parenting tasks (Mirlashari et al., 2020). Additionally, an emotional bond between the father and infant dyad can be created to improve involvement in their infant's care.

Even though most education is provided at the infants' bedside in the NICU, education can also be provided in different forms. Garfield et al. (2022), provided caregivers with an application (app) called NICU2HOME during their admission in addition to their routine care to evaluate their self-efficacy. The app consisted of five features to support infants and families. As the caregivers had the opportunity to use the app frequently, those who did had a higher level of self-efficacy throughout the program. The results suggested that parents could use technology as a form of intervention to increase dyad bonding, competence, and self-efficacy.

Caregiver education and training sessions on infant characteristics, routine care, general nutrition information, and parent-infant interactions were demonstrated to have increased the self-efficacy of caregivers (Sohrabi et al., 2021; Kadiroglu & Tufekci, 2021). In addition, providing caregivers with education about their infants had a correlation between increasing dyad bonding and the increase in self-efficacy (Kadiroglu & Guducu Tufekci, 2021). Educating caregivers with education about their infants demonstrated to improve family dynamics and caregiver-infant outcomes through bonding and self-efficacy.

### **Occupational Therapy and NICU Education**

Occupational therapy is one of the skilled healthcare professionals providing infant care in the NICU, especially feeding education. In addition to the knowledge of the infant's medical status, medical diagnosis, neurodevelopment, procedures, and equipment in the NICU, the role of an occupational therapist (OT) involves aiding in the transactional relationship between the

infant and the caregivers to perform the co-occupations necessary for emerging roles (AOTA, 2018).

Occupational therapists can meet the infants' and caregivers' needs by identifying their strengths and vulnerabilities. Occupational therapy focuses on caregiver education to increase proper feeding techniques and developmental milestones that will encourage caregivers to be involved with their infants in the NICU and feel more confident while caring for them (AOTA, 2018). Practitioners can focus on oral motor skills in feeding, parent-infant bonding, neurodevelopment, and family/caregiver education (AOTA, 2017; Hardy et al., 2018; Caretto et al., 2000).

## **Statement of Purpose**

Even though feeding is a prominent caregiving activity in the NICU, caregiver education on feeding strategies is often provided too late or too little into their infant's hospital admission (Thomas et al., 2021). CBF and caregiver education have been demonstrated to have positive outcomes for premature infants (Samane et al., 2022; Spagnoli et al., 2023; Kaman et al., 2020; Lane et al., 2021; Abd El Aziz & El Aziz, 2017; Parhiz et al., 2016; Sohrabi et al., 2021; Mirlashari et al., 2020; Garfield et.al., 2022; Kadiroglu & Guducu Tufekci, 2021). At the time of this capstone project, UMC hospital did not have a cue-based feeding protocol established although guidelines for a feeding algorithm were used for their NICU population. This feeding algorithm considers the infant's gestational age, level of risk, and level of medical complexity. Additionally, a standard feeding education for their caregivers had not been established. Therefore, the purpose of this program was to develop a CBF education program at UMC hospital to enhance the self-efficacy of caregivers of NICU infants through an occupational therapy lens.

## **Hypothesis**

The hypothesis of the program was that developing a CBF education program at the UMC NICU department would be feasible to enhance the caregiver's self-efficacy to feed and care for their infants.

## **Theoretical Framework**

Two theoretical frameworks, the Model of Human Occupation and Transformative learning theory, were chosen to guide the development and implementation of the CBF education program through an occupational therapy lens and learning process.

### **Model of Human Occupation**

Kielhofner's (2008) Model of Human Occupation (MOHO) is a client-centered model of practice that focuses on the nature of occupational performance. This model consists of four dynamic and interconnected components: volition, habituation, performance capacity and environment. These components were utilized in the CBF education, as a caregiver's self-efficacy may be diminished due to their infant's admission to the NICU and feeding difficulties. The caregiver's volition, their values and personal causation, to participate in their infant's care and tasks was utilized because it was meaningful to them. Subsequently, habituations, their habits and roles, were established and developed for the caregiver to participate in the caretaking role of their infants. Lastly, the caregiver's ability and capacity were promoted to perform the childcare tasks in parenting, feeding, and behavioral cues of the infant, at UMC NICU, the environment, and carry-over at home after their discharge.

### **Transformative Learning Theory**

Mezirow's (1997) Transformative Learning Theory encompasses the process of personal development that individuals go through leading to new perspectives in what they once viewed. The transformative learning theory is a learning process, beginning with a disorienting dilemma, self-examination, critical assessment, recognition, exploration, planning, knowledge and acquisition, provision of trying the roles, building competence and confidence, and reintegration to the newfound experience. Through the transformative learning theory elements, caregivers

developed their parenting roles. Beginning with their infant's admission into the NICU, the disorienting dilemma, caregivers began to self-examine and self-assess. The caregivers recognized and explored their new role as NICU caregivers. Following a plan of action of the CBF sessions and acquiring the knowledge from the CBF education, to care for and feed their infant in the NICU. The caregivers developed competence and confidence with the feeding education sessions. Following their new beliefs and found abilities to feed their infants after the feeding education was implemented. Reintegrating into their newfound roles as NICU caregivers.

## **Methodology**

### **Target Population**

The target population for the proposed program was a caregiver-infant dyad during their stay at the NICU unit. A caregiver (either mother or father) and an infant were considered a dyad that was necessary for the feeding program. Inclusive criteria for the participation of the program included NICU caregivers who are (1) age 18 and above; (2) English speaking; and (3) have sufficient cognitive function to provide informed consent. Caregivers (1) who have a history of mental impairment and (2) whose infant was not receiving care in the NICU unit were excluded from participation in the program. It was anticipated that a minimum of 10 participant dyads and a maximum of 30 dyads were to be recruited for the program.

### **Agency**

The capstone project and experience were implemented at the NICU at the University Medical Center (UMC) of Southern Nevada, a non-profit government-owned hospital. It is the largest public hospital in the state of Nevada and is home to a level III NICU. As a level III NICU, UMC specializes in premature infants born under 32 weeks, who are critically ill, require surgery, and infants who may require additional respiratory support (UMC Hospital Women & Newborn Care Center, n.d.). This capstone experience was completed under the direct supervision of a licensed and registered occupational therapist, who additionally holds a neonatal therapy certification.

### **Cue-Based Feeding Education Program**

The CBF program consisted of three sessions (see Table 1). In the first session, caregivers were provided with an educational handout about the environment of the UMC NICU department (Appendix A), which included an introduction of the physical environment,



equipment, UMC programs, and the professionals of the NICU developmental team.

Additionally, as the essential component during feeding and general care, the importance, and benefits of parent-infant bonding (Appendix B) in the NICU were introduced.

**Table 1**

*Outline of the Cue-Based Feeding Program*

<b>Education Session Outline</b>	<b>Education Handout</b>
Session 1	<ul style="list-style-type: none"><li>• PMP-SE Questionnaire</li><li>• UMC NICU Department Education</li><li>• Parent-Infant Bonding Education</li></ul>
Session 2	<ul style="list-style-type: none"><li>• Cue-Based Feeding Education</li><li>• Traffic Light Education</li></ul>
Session 3	<ul style="list-style-type: none"><li>• Feeding Positions Education</li><li>• PMP-SE Questionnaire</li><li>• Feasibility Survey</li></ul>

*Note:* PMP-SE= Perceived Maternal Parenting Self-Efficacy Questionnaire.

The second session involved education on cue-based feeding (Appendix C) for caregivers to be more aware of their infant’s feeding cues. Information covered what CBF is and the types of feeding cues and behaviors infants demonstrate during their feedings, whether stress or basic healthy cues. Additionally, a traffic light handout (Appendix D) for caregivers was provided to assist caregivers in being more aware of when to feed, pause, or stop their infant’s feeding, based on the traffic light color.

In the third session, a bottle and breastfeeding feeding positioning (Appendix E) handout was provided. This handout would provide caregivers with various feeding positions that would provide comfort and facilitate feeding for the caregiver and infant. Finally, at the end of the education sessions, the infant feeding handouts provided throughout the three sessions were placed in the binder for the caregivers to take home after their hospital discharge. This was intended to facilitate carryover for caregivers and infants when transitioning to their home environment.

Before the implementation of the program, a trial run with the participant dyads was conducted, following the same procedures to determine the effectiveness of the feeding program on NICU caregivers. The education handouts, time frame, and practicality of the program were assessed to better inform the NICU caregiver about the cue-based feeding program.

### **Instruments and Evaluation**

The Perceived Maternal Parenting Self-Efficacy questionnaire (PMP-SE) and a feasibility improvement survey were used to analyze and evaluate the feeding program. A 20-minute allotted time was provided for caregivers to complete the questionnaire and survey during the first and third sessions. The PMP-SE (Appendix F) is a 20-item self-report questionnaire divided into four sections: caretaking procedures, evoking behaviors, reading behaviors and signaling, and situational beliefs. The questionnaire used a Likert scale scoring system ranging from 1= strongly disagree to 4= strongly agree, with higher scores of 80 indicating higher levels of parental self-efficacy. The questionnaire consisted of questions such as “I can read my baby’s cues, I believe I have control over my baby’s care, etc.” to determine the self-efficacy of parents. The questionnaire was administered before and after the cue-based feeding education program implementation to understand the level of self-efficacy of the caregivers. The PMP-SE was

reported to have high reliability and validity for assessing self-efficacy in parents ( $p < 0.001$ ;  $r = 0.851$ ) (Tuncer & Yesiltepe Oskay, 2023).

The feasibility survey (Appendix G) was developed for the program and caregivers were encouraged to complete it in the third session. The survey was developed as a Likert scale, 1= strongly disagree to 5= strongly agree, using a scoring system with higher scores of 40 resulting in high feasibility rates of the program. Additionally, two open-ended questions to determine the feasibility of the feeding program at the hospital. The responses to the open-ended questions were intended to inform future improvement of the program. This survey consisted of Likert questions such as, “The education provided me with increased knowledge about feeding, the education provided increased knowledge about the NICU, the instructor provided me with opportunities to ask questions, and open-ended questions such as, how can we improve the program? What was the most useful information? etc.”

## **Procedures**

There were three phases of the development of the CBF program. The first phase was to assess the needs and obtain approvals for the NICU department. Followed by phase two, the participant recruitment and program implementation, and phase three, the evaluation of the feeding program.

In phase one, Institutional Review Board (IRB) approvals from UMC Hospital and the University of Nevada, Las Vegas (UNLV) were obtained (Appendix H). A needs assessment and analysis were conducted to identify the specific needs of the UMC NICU health professionals and the NICU caregivers. A letter of consent to observe the NICU department, shadow a NICU occupational therapist, and implement the program was obtained from the Director of the NICU. NICU observation was completed during the first week to discern the type of feeding style used

at UMC Hospital. This consisted of familiarizing the feeding styles used in the NICU department, the feeding schedules set for NICU infants, the types of feeding positioning the healthcare professionals used, the type of caregiver education used, whether direct or indirect, and the education materials used throughout the education sessions.

In phase two, a convenient sampling was used to recruit NICU caregivers at UMC hospital over the age of 18 years and within the occupational therapy caseload. A caregiver-infant dyad was recruited during the NICU occupational therapy sessions. A flyer (Appendix I) with the occupational therapy student's (OTD/S) contact information for the program was provided to the NICU caregivers. Eligible and interested participants were given 48 hours to consider their participation in the feeding program. Participants contacted the OTD/S for participation and verbal consent was obtained. An information consent form (Appendix J) about the program was additionally provided to the NICU caregivers. A mini-mental state examination (MMSE) was performed as a cognitive screening on eligible participants to proceed with the feeding program before the first session. Followed by the implementation of the cue-based feeding program for UMC NICU caregivers. One hour was allotted for each of the feeding sessions for education and questions and answers with caregivers. The three CBF education sessions were conducted during their infant's NICU admission.

Lastly, in the third phase, the cue-based feeding program was evaluated based on the results of the PMP-SE questionnaire and quality improvement survey. Both the PMP-SE and feasibility survey were analyzed using a scoring system. The open-ended questions were utilized as feedback to improve the feeding program. Results would indicate if the caregiver education provided enhanced the self-efficacy of NICU caregivers and the feasibility of the feeding program for future use at UMC hospital.

## **Data Collection and Management**

Upon participant completion of the PMP-SE questionnaire and the feasibility survey, the data collected was converted into an electronic format within 24 hours. The data was stored in a Google Drive that was regulated and protected by UNLV with a 2-step password authentication. The data collected adhered to the university policy and was stored for a maximum of three years. Only the capstone student and the faculty mentor had data access.

## **Ethical and Legal Considerations**

Approval from the IRB was obtained from UMC hospital (#UMC-2023-519) and UNLV (#UNLV-2023-512) as the NICU infants are a vulnerable population. Protection of participants' confidentiality was followed through the HIPPA guidelines and IRB regulation of the hospital. Verbal informed consents were obtained during the occupational therapy treatment sessions and program information. Participants were assigned client numbers to ensure anonymity during the data collection process.

Identifiable files were kept in a folder separate from all other project related files and folders. The primary investigator and OTD/S were the only parties permitted access to any source of information about the participants through a password encrypted google drive. Results of the program were not shared with participants or any other medical party. Results were only used for data collection to remain anonymous throughout the program. Results were additionally protected through the password encrypted Google Drive to maintain confidentiality.

Potential risk and harm were considered for the participation in the program during education implementation and data collection. There was no known harm noted in the literature, and there was no more than minimal potential risk for participation in the program. Nevertheless, the occupational therapist was available if potential risks needed to be addressed.

Furthermore, individuals who consented to take part in the feeding education program were entitled to withdraw their consent at any time. However, the data that had been collected prior to their withdrawal, were used for analysis and the purposes of the program development. Participants were also informed that participants can be withdrawn from the program without their consent if there is a concern for safety.

## **Data Analysis**

A descriptive analysis was performed to explore the data analysis. The NICU caregivers' demographic data of gender was collected to determine how many fathers or mothers were at their infant's bedside for education. The Wilcoxon Signed Rank test, a non-parametric test, was used to identify the differences of the PMP-SE pre- and post-participation within a sample. Microsoft Excel was utilized to analyze and evaluate the data collected. The central tendency was identified through a mean, a score that occurs frequently, the median, the 50<sup>th</sup> percentile score, and the mean, the average score. The variability through the range, standard deviation, and standard error was identified. In addition, a descriptive analysis was used to identify a post-participation measurement of the feasibility survey to examine closed-ended questions. A descriptive analysis was used to identify a post-participation measurement of the feasibility survey to examine closed-ended questions. The qualitative information was categorized into strengths and areas of improvement from the feedback of the open-ended questions.

## **Results**

There were three phases of the development of the CBF program. The first phase consisted of results from the program preparation and development. Phase two is the results of the program implementation in the NICU department, and lastly, phase three is the results of the program evaluation.

### **Phase 1. Program Preparation**

In phase one, the IRB approvals were obtained from UMC Hospital and UNLV to proceed with the feeding program. A letter of consent was received from the NICU Director to conduct the program in the NICU department. The importance of a CBF education program to NICU caregivers was concluded after completing a needs assessment. Feeding readiness and cues were assessed by the speech and occupational therapists to provide the infant with a positive feeding experience in accordance with evidence-based practice. Infants were fed based on the UMC's feeding guidelines, the therapists' assessment, and doctor's orders. The NICU unit at UMC uses Dr. Brown's bottle system, standard bottles, and slow-flow bottles dependent on the infant's feeding assessment. Additionally, a need for standard feeding education handouts was necessary, as general caregiver education was provided verbally at the infant's bedside by the developmental team.

### **Phase 2. Program Implementation**

The trial run was implemented with two caregivers in the NICU. One caregiver did not complete all three sessions due to the infant's discharge order. This demonstrated that when infants had discharge orders, sessions were to be completed within one to two days with permission from the caregivers. The results suggested that the three education sessions were a beneficial amount for caregivers to receive the information without feeling overwhelmed.



Scheduling the feeding sessions was based on the caregiver's availability. This demonstrated that sessions could be completed within different time frames, such as three consecutive days, a week, or a day. The time allotted for the education, questionnaires, and survey were sufficient for the caregivers to complete. In addition, the education was provided before or after the caregivers spent quality time with their infants.

Of 16 caregiver-infant dyads recruited for the program, 11 dyads completed the program. Three cue-based feeding sessions were completed with either the mother or father caregivers at the infant's bedside (nine mother and two father caregivers). Both mother and father caregivers received the education together when they were at the infant's bedside, however, to maintain consistency for the program, the feeding sessions proceeded with one primary caregiver when both were not available. Feeding sessions were not completed if infants were discharged and/or the inability to coordinate with caregivers' schedules. Upon completion of the cue-based feeding education, handouts were placed in a binder for caregivers to take home after discharge for continuation of the program.

### **Phase 3. Program Evaluation**

The program evaluation, phase three, evaluated the results of the feeding program. The PMP-SE was administered before and after the program. Table 2 illustrated the demographic data, comparison of PMP-SE before and after participation in the program, and feasibility survey. The PMP-SE scores before the program implementation ranged (minimum and maximum scores) from 42-78 with a mean (SD) of 62.2 (11.6) and a median of 61. The PMP-SE scores after the feeding program showed a range of 56-80 with a mean (SD) of 72.8 (8.1) and a median of 75. The results from the Wilcoxon signed test demonstrated statistically significant differences between before and after the program implementation among participants ( $p < .006$ ).

**Table 2***Cue-Based Feeding Program Results*

	<b>Before</b>	<b>After</b>	<b>P-Value</b>
<b>Number of participants (N)</b>	11	11	
<b>Demographic Data</b>			
Caregiver Gender (M: F)	2:9	2:9	
<b>PMP-SE Score</b>			
Mean (SD)	62.18(11.58)	72.81(8.07)	.006*
Median	61	75	
Range (min-max)	42-78	56-80	
<b>Feedback Feasibility Survey</b>			
Mean (SD)		38.72(1.95)	
Median		40	
Range: (min-max)		34-40	

*Note:* The PMP-SE (Before and After) with a total score of 80 and Feasibility Survey with a total score of 40 (After) used a Likert scale of 1 through 5. Total scores are displayed. F = female; M = male; max = maximum; min = minimum; N= number of participants; SD = standard deviation, P= p-value,

\*: p <.05.

With a total score of 40, the feasibility survey showed a score range of 34-40, a mean (SD) of 38.2 (2.0), and a median of 40. Table 3 illustrated the qualitative analysis of the open-ended questions. The caregivers' perception of the strengths and areas of improvement were identified. Strengths of the program consisted of the most useful education handouts, the content of education showed an appropriate level of health literacy reinforced to their knowledge about the topic, and that the education provided would be recommended to other caregivers. Areas for

improvement involved locating a room outside the NICU, as some caregivers found it difficult to focus and complete the session when they were with their infant.

**Table 3**

*Qualitative Analysis of Feasibility Survey*

<b>Categories and Caregiver Responses</b>	
Strengths of program	<p>Most useful</p> <ul style="list-style-type: none"> <li>• “Feeding positions were the most useful information”</li> <li>• “Knowing her cues, I didn’t even know what cues were, so that helped me a lot”</li> <li>• “The feeding cues and traffic light signals were helpful”</li> </ul> <p>Recommended to other caregivers</p> <ul style="list-style-type: none"> <li>• “This is a great source of education for new moms”</li> <li>• “100% recommend to other parents in the NICU”</li> </ul> <p>Content of education was appropriate</p> <ul style="list-style-type: none"> <li>• “I was very educated on how to feed my baby”</li> <li>• “Everything was self-explanatory”</li> <li>• “Everything was very educational”</li> <li>• “Education was easy and understandable”</li> </ul>
Areas of improvement	<p>Education Location</p> <ul style="list-style-type: none"> <li>• “It was hard to stay focused while holding my baby in the NICU”</li> </ul>

*Note:* “”: caregivers survey responses

## Discussion

The purpose of this capstone program was to develop a CBF program to increase the self-efficacy of NICU caregivers. Before feeding education implementation, it was found that NICU caregivers had low self-efficacy about their infant's caretaking activities, feeding cues, and behaviors. Following the CBF sessions on parent-infant bonding, feeding cues, stress cues, and feeding positioning, it was found that their self-efficacy had significantly improved. Caregivers were more attentive as they were able to identify their infants' feeding cues during their feeding sessions. The results were in line with the studies that caregiver education and training sessions improved the self-efficacy of NICU caregivers (Sohrabi et al., 2021; Kadiroglu & Guducu Tufekci, 2021; Garfield et al., 2022; Mirlashari et al., 2020; Sohrabi et al., 2021). Additionally, educating caregivers on the different feeding positions was found to enhance the caregiver's self-efficacy, as they learned the different bottle feeding and breastfeeding positions that could be used in accordance with the dyads comfort. By the end of participation, the caregiver-infant dyad was able to learn from each other as the infant displayed cues and behaviors and the caregiver completed the reciprocal activity of feeding the infant.

The results from the feasibility survey suggested that developing and implementing a feeding program at UMC Hospital was achievable. Caregivers felt the program was easy and understandable, felt comfortable asking questions throughout the sessions, increased knowledge and self-efficacy, and received useful information during the feeding sessions. Caregivers believed the most useful information learned was bottle- or breast-feeding positions, feeding cues, and the feeding cues in a traffic light format. In addition, the training with a doll for the different feeding during the second and third sessions helped the caregivers learn new positions that were more comfortable during the feeding sessions with their infant.

## **Limitations of the Project**

Potential limitations of the feeding program were identified. The targeted population for the current project was NICU caregivers at UMC hospital thus making it less generalizable to a population of caregivers outside of the NICU setting. Sampling bias may have occurred due to a convenient sampling at one hospital site for participant recruitment. The PMP-SE questionnaire was used to determine the self-efficacy of the caregivers; other factors, such as stress and anxiety, related to the caregiver's self-efficacy were not explored. The feasibility survey was not a standardized assessment and was developed specifically for the CBF program and NICU caregivers, therefore the reliability and validity were not established. In addition, infants have a varied average length of stay at the hospital and adhere to fewer caregiver education sessions upon a discharge order. Additionally, confounding factors such as caregivers' number of pregnancies, how many children have been admitted into the NICU, and the caregivers' age were not controlled in the analysis of the current project.

## **Implications for Research**

- Educating NICU caregivers on CBF highlights a gap and need in the knowledge of NICU feeding and its effectiveness requires further investigation.
- Programs focusing on caregiver education support caregivers in their parenting roles and abilities during their hospitalization and carryover to home.

## **Implications for Practice**

- Given the evidence that supports caregiver education in the NICU, occupational therapists should provide caregivers education about their infant's feeding cues and behaviors to increase self-efficacy.

- Occupational therapists should adequately educate caregivers on CBF during the co-occupation and NICU caregiving activity of feeding. Education about CBF allowed caregivers to participate more in their infant's care and feeding sessions.
- Occupational therapist must ensure the education meets the health literacy of the caregiver.

### **Recommendations & Future OT Implications**

- Further research should address physical and emotional stress that caregivers may experience during the OT education sessions, as it may affect the retention of information, leading to greater loss of self-efficacy.
- Skilled health professionals are also considered caregivers in the NICU, further research can address how CBF education increases their infant feeding knowledge.
- Further research can investigate the CBF reinforcement post hospital discharge for NICU caregivers.
- This capstone supports AOTA's Centennial Vision (2007) and Vision 2025 by promoting health and wellness in the specialized setting of the NICU.
- The project is progressing towards the vision statement of continuing to develop a science driven and evidence-based profession in the NICU.
- Addressing the meaningful co-occupation of feeding of a caregiver-infant dyad.

## **Conclusion**

Oral feeding is a significant caregiving activity in the NICU and a transactional co-occupation between the caregiver and infant in the NICU. However, caregivers receive little support in their parental role while in the NICU and even less support after discharge (Garfield et al., 2022; Spence et. al., 2023). Occupational therapists are one of many skilled professionals providing education to this population. OT has a role in the feeding skills, development of the parent-infant relationships, and parent/caregiver education on how to interpret their infant's cues (Caretto et. al., 2000; AOTA, 2018).

This capstone project developed a CBF education program through an occupational therapy perspective, for NICU caregivers to enhance their self-efficacy in feeding their infants. After the CBF implementation at UMC hospital, the results demonstrated the feasibility of the program that educated caregivers about the UMC NICU department, parent-infant bonding, feeding cues, and feeding positions which enhanced the caregivers' self-efficacy. Caregivers were more aware during infants' feeding sessions for any feeding cues. Furthermore, the feeding program at UMC Hospital was feasible to be completed. The program demonstrated strengths and areas of improvement, which can be addressed with future research.

## Appendix A: About University Medical Center Hospital (UMC)

### UMC NICU DEPARTMENT

#### About

The UMC neonatal intensive care unit (NICU) is a highly specialized care setting for infants. UMC hospital is a level III NICU. In the NICU, infants get around the clock care from a team of UMC specialized professionals. It specializes in babies born before 32 weeks, babies who are critically ill, and babies who require surgery.

**UMC is the only hospital in Las Vegas who offers neurological (brain) and ENT (ear, nose, and throat) surgeries on infants.**

#### UMC Equipment

**Giraffe Warmers:** Specialized beds that provide heat and comfort while giving access to medical professionals during first hours of life.

**Giraffe OmniBed Carestations:** A stabilized baby will be moved here. It provides a controlled environment for growth and development with access for medical professionals to care for your infant.

#### The NICU team:

A **neonatologist**, a trained medical provider that cares for newborns that were born early or born with medical problems.

A **pediatric resident** is a physician who is completing additional training in pediatrics.

A **neonatal nurse** is a nurse who is at bedside and will carry out the orders from the doctor. The nurse will provide the status to the neonatologist.

A **respiratory therapist** specializes in treating the airways and lungs of the neonate for their oxygen levels.

A **physical therapist** will help strengthen the movement, muscles, and joints of the infant.

An **occupational therapist** has the knowledge of infant's developmental milestones, neuroprotective developmental care, family attachment and bonding, caregiver and infant mental health, and activities of daily living, such as feeding practices.

A **speech therapist** is trained to provide the developmental care of the infant's oral muscles to produce speech and improve feeding for nutritive sucking.

#### UMC Programs

Donor Breast Milk Program

NicView

#### Healthy Living Institute Classes:

Baby Basics

Boot Camp for New Dads

Breastfeeding Preparation

Infant and Child CPR

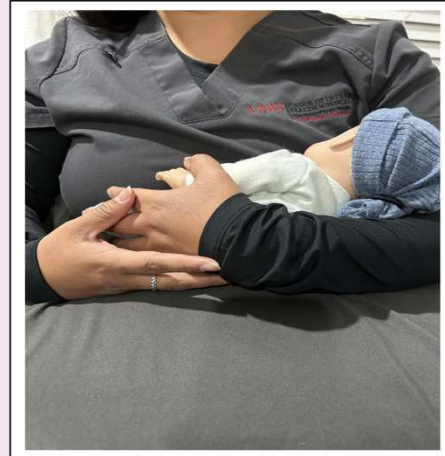


## Appendix B: Parent-Infant Bonding Education

### Parent- Infant Bonding

#### What is Parent-infant bonding?

Parent infant bonding is the process of attachment between you and your infant. This can be an emotional and physical connection. This begins in the womb but increases after childbirth (Makela et al., 2018).



#### Why is it important?

When caregivers are separated from the infant, the bond is threatened and creates challenges to the parent-infant closeness.

Important for cognitive, motor, and social development while being admitted in the NICU (Makela et al., 2018).



#### How do you incorporate bonding?

- Skin to skin or Kangaroo Care
- Feeding the infant
- Play
- Caregiving practices in NICU

(Kim & Rim Kim, 2022)

#### What are the benefits?

- Reduces caregiver stress, anxiety, post-traumatic stress disorder (PTSD)
- Increases caregiver confidence and sense of connection.
- Increases father's involvement in the NICU through skin-to-skin contact.
- Reduces length of hospital stay (Craig et al., 2015).

#### References:

Makela, H., Axelin, A., Feeley, N., Niela-Vilen, H. (2018). Clinging to closeness: the parental view on developing a close bond with their infants in the NICU. *Midwifery*, 62. 183-188.  
Kim, S & Rim Kim, A. (2022). Attachment-and relationship-based interventions during NICU hospitalization for families with preterm/low-birth weight infants: a systematic review of RCT data. *International Journal of Environmental Research and Public Health* 19(3). <https://doi.org/10.3390%2Fijerph19031126>  
Craig, J., Glick, C., Phillips, R., Hali, S.L., Smith, J., & Browne, J. (2015). Recommendations for involving the family in developmental care of the NICU baby. *Journal of Perinatology*, 35, 5-8. <http://dx.doi.org/10.1038/jp.2015.142>

## Appendix C: Cue-Based Feeding Education

### CUE-BASED FEEDING

#### What is cue based feeding?

- Feeding an infant by mouth when they are demonstrating signs or cues of hunger.
- Cue based feeding focuses on the quality of the feedings.
- Based on developmental cues
- Also known as infant-driven feeding, the infant will determine when they are hungry and how much they can tolerate.

#### Benefits of cue-based feeding

- Knowledge about your infant's hunger cues and behaviors.
- Infant guiding the feedings rather than overfeeding (Quality vs Quantity).
- Shorter NICU stays, greater weight gain, and earlier feeding attainment.
- Increased communication between parent and infant.
- Parent infant bonding.

#### What if my baby does not demonstrate cues?

- This does not mean your infant is going to be underfed.
- Your infant will be assessed by the NICU team every few hours for hunger cues while they are in the NICU.
- Your infant will get the proper nutrition they need for growth and development.

#### Types of Cues

- Bring hands to mouth
- Turning towards bottle or breast
- Lip smacking
- Increased activity
- Rooting

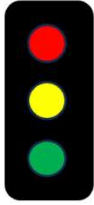
#### Stress Cues

- Gagging
- Crying
- Squirming
- Yawning
- Choking

#### References:

- Centers for Disease Control and Prevention. (2021) *Signs your child is hungry or full*. Centers for Disease Control and Prevention. <https://www.cdc.gov/nutrition/infantandtoddlernutrition/mealtime/signs-your-child-is-hungry-or-full.html>
- Lane, A. Pacella, J., Beal, J. R., Sahnoun, A. E., Fedo-Rosvold, S., Bellas, W. M., & Brower-Breitwieser, C. (2021). A cross-sectional analysis of infant-driven and traditional feeding outcomes for neonatal intensive care unit infants. *Journal of Perinatology*, 41(8), 1865–1872. <https://doi.org/10.1038/s41372-021-01084-9>
- Lubbe, W. (2017). Clinicians guide for cue-based transition to oral feeding in preterm infants: an easy-to-use clinical guide. *Journal of Evaluation in Clinical Practice*, 24, 80-88. DOI: 10.1111/jep.12721
- Shloim, N., Vereijken, C.M.J, Blundell, P., Hetherington, M.M. (2017). Looking for cues-infant communication of hunger and satiation during milk feeding. *Appetite*, 108, 74-82. <https://doi.org/10.1016/j.appet.2016.09.020>
- Is my baby hungry? Infant feeding cues and how to interpret them. (n.d.). Breastfeeding Center for Greater Washington. <https://www.breastfeedingcenter.org/blog/2022/1/18/infant-feeding-cues-and-their-importance>.

## Appendix D: Traffic Light Feeding Education



### Traffic light Feeding

#### Green means Go: Alert & ready to feed

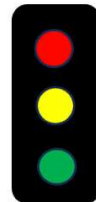
- I am awake and alert.
- I bring my hands to my mouth.
- I suck on my pacifier or hands.
- I root (turn my face) when my cheeks are touched.
- When feeding:
  - I hold a latch.
  - I have a good tone.
  - I can coordinate my sucking, swallowing, and breathing during my feedings.

#### Yellow means Caution: I may need support

- My sucking begins to slow down.
- I lose my tone and become floppy.
- I lose my latch.
- I start to fatigue and close my eyes.
- Milk may start dripping from my mouth.
- I might need:
  - Burping
  - Pacing of the feeding
  - Change in position.

#### Red means stop:

- If I fall asleep.
- I stop sucking.
- I turn away from feeding.
- I cough, choke, or gag.
- I become uninterested in feeding.
- Notice if there is any change in
  - My breathing
  - My heart rate
  - A change in color



## Appendix E: Feeding Positioning Education

### Bottle-Feeding Positions

#### Elevated side-lying

The caregiver is sitting upright in a chair with their feet flat on the ground. A pillow or cushion is placed on their back and on their lap for support. The infant is positioned on their side on top of the cushion on their lap. During the feeding, the bottle is held at a lower angle for better milk flow. This feeding position enhances better coordination of breathing and swallowing for the infant (Park et al, 2014; Medela, 2023).



#### Semi-upright

The caregiver is sitting upright in a chair with a pillow or cushion on their lap. The infant is positioned on their back elevated by a pillow or the caregiver's hand with a pillow under their arm. The infant is supported by their neck and head. This is the most common position used during bottle feeds. This position reduces the work of breathing for the infants (Park, 2014; Medela, 2023).



#### Cradle Hold

The cradle hold is the most popular position. The caregiver is sitting upright in a chair with both feet on the ground. A pillow is recommended to place on the caregivers back and under the elbow for support of the infant. The infant is positioned on their side with their head on your elbow and your arm cradling their body. Your infant is close to your stomach for additional support (Afshariani et al., 2019; Medela, 2023).



#### References:

Medela. (2023) 11 different breastfeeding positions. Medela. <https://www.medela.com/breastfeeding/mums-journey/breastfeeding-positions#cradle-hold>

Park, J., Thoyre, S., Knafi, G., Hodges, E., Nix, W. (2014). Efficacy of semielevated side-lying positioning during bottle-feeding of very preterm infants. *Journal of Perinatal Neonatal Nursing*, 28(1), 69-79. DOI: 10.1097/JPN.000000000000004

Afshariani, R., Kiani, M., Zamanian, Z. (2019). The influence of ergonomic breastfeeding training on some health parameters in infants and mothers: a randomized controlled trial. *Archives of Public Health*, 77(47). <https://doi.org/10.1186/s13690-019-0373-x>

# Breastfeeding Positions



## Side-lying

The caregiver and infant will lay on their sides on a bed. The caregiver will add pillows under their head for support and between their knees. Lie the infant on their side (either left or right) facing your breast. This is great for added comfort after delivery, especially after a cesarean section (Afsbariani et al., 2019; Medela, 2023).

\*To be performed when infant and parent are both awake and alert\*

## Semi-elevated side-lying

The infant is positioned on their side on top of a pillow. This is the best position for breastfeeding but also used for bottle-feeding. During bottle feeding, it is held at a lower angle for better milk flow. This feeding position enhances better coordination of breathing and swallowing (Park et al, 2014; Medela, 2023).



## Cradle Hold

The cradle hold is the most popular position. The caregiver is sitting upright in a chair with both feet on the ground. A pillow is recommended to place on the caregivers back and under the elbow for support of the infant. The infant is positioned on their side with their head on your elbow and your arm cradling their body. Your infant is close to your stomach for additional support (Afsbariani et al., 2019; Medela, 2023).

### References:

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Park, J., Thoyre, S., Knafi, G., Hodges, E., Nix, W. (2014). Efficacy of semielevated side-lying positioning during bottle-feeding of very preterm infants. *Journal of Perinatal Neonatal Nursing*, 28(1), 69-79. DOI: 10.1097/JPN.0000000000000004

Afsbariani, R., Kiani, M., Zamanian, Z. (2019). The influence of ergonomic breastfeeding training on some health parameters in infants and mothers: a randomized controlled trial. *Archives of Public Health*, 77(47). <https://doi.org/10.1186/s13690-019-0373-x>

## Cross Cradle Hold

This position is similar to the cradle hold although, your infant is fully supported on your opposite arm of the breast to have a better latch to the breast. The caregiver is sitting upright with a pillow on their back with feet on the ground for support. A pillow on their lap or under their arm is added for additional support of the infant

(Afshariani et al., 2019; Medela, 2023).



## Football Hold

The caregiver is sitting upright in a chair with a pillow or cushion on their side. Additional pillows can be added to the caregiver's back for support and comfort. The infant is positioned alongside your side over the pillow with their head facing your breast and their bottom towards the chair. This position is beneficial for premature infants as it allows the caregivers to have a view of the infant's facial expressions (Afshariani et al., 2019; Medela 2023).

### References:

Medela. (2023) 11 different breastfeeding positions. Medela. <https://www.medela.com/breastfeeding/mums-journey/breastfeeding-positions#cradle-hold>

Park, J., Thoyre, S., Knafi, G., Hodges, E., Nix, W. (2014). Efficacy of semielevated side-lying positioning during bottle-feeding of very preterm infants. *Journal of Perinatal Neonatal Nursing*, 28(1), 69-79. DOI: 10.1097/JPN.0000000000000004

Afshariani, R., Kiani, M., Zamanian, Z. (2019). The influence of ergonomic breastfeeding training on some health parameters in infants and mothers: a randomized controlled trial. *Archives of Public Health*, 77(47). <https://doi.org/10.1186/s13690-019-0373-x>

## Appendix F: Perceived Maternal Parental Self-Efficacy Questionnaire



### Self-Efficacy Questionnaire.

#### Instructions to parents

Below are questions that relate to how you and your baby interact. When answering a question please tick the response you feel best describes your perception of the situation or how you might feel even if you haven't experienced some of the tasks yet. i.e. Strongly Disagree; Disagree; Agree or Strongly Agree.

		Strongly disagree	Disagree	Agree	Strongly agree
1	I believe that I can tell when my baby is tired and needs to sleep.				
2	I believe that I have control over my baby's care.				
3	I can tell when my baby is sick.				
4	I can read my baby's cues.				
5	I can make my baby happy.				
6	I believe that my baby responds well to me.				
7	I believe that my baby and I have a good interaction with each other				
8	I can make my baby calm when he/ she has been crying.				
9	I am good at soothing my baby when he / she becomes upset.				
10	I am good at soothing my baby when he / she becomes fussy.				
11	I am good at soothing my baby when he / she continually cries.				
12	I am good at soothing my baby when he / she becomes more restless.				
13	I am good at understanding what my baby wants.				
14	I am good at getting my baby's attention.				
15	I am good at knowing what activities my baby does <u>not</u> enjoy.				
16	I am good at keeping my baby occupied.				
17	I am good at feeding my baby.				
18	I am good at changing my baby.				
19	I am good at bathing my baby.				
20	I can show affection to my baby.				

## Appendix G: Feasibility Survey

### Feasibility Survey

Date: \_\_\_\_\_

1. The education provided increased my knowledge of the NICU setting.  
Strongly Disagree    Disagree    Neutral    Agree    Strongly Agree
2. The education provided increased my self-efficacy (belief in capacity) in caring for my infant.  
Strongly Disagree    Disagree    Neutral    Agree    Strongly Agree
3. The education given increased my knowledge of feeding and caring for my infant.  
Strongly Disagree    Disagree    Neutral    Agree    Strongly Agree
4. The instructor provided me with opportunities to ask questions.  
Strongly Disagree    Disagree    Neutral    Agree    Strongly Agree
5. The program binder provided me with opportunities to look back on information after hours, when I had questions.  
Strongly Disagree    Disagree    Neutral    Agree    Strongly Agree
6. The education was easy and understandable.  
Strongly Disagree    Disagree    Neutral    Agree    Strongly Agree
7. I felt comfortable asking my instructor questions about this topic.  
Strongly Disagree    Disagree    Neutral    Agree    Strongly Agree
8. Would you recommend this feeding education to other parents in the NICU?  
Strongly Disagree    Disagree    Neutral    Agree    Strongly Agree
9. How can we improve the program?
10. What was the most useful information that you received?



## Appendix H: IRB

UNIVERSITY MEDICAL CENTER OF SOUTHERN NEVADA  
INSTITUTIONAL REVIEW BOARD (IRB)  
1800 W. CHARLESTON BLVD.  
LAS VEGAS, NV 89102  
Main Phone#: (702) 383-7336  
Emergency#: (702) 383-2216  
Fax: (702) 383-2477  
Website: <https://www.umcn.com/IRPP/Home.aspx>



January 12, 2024

Aesa Jackson, OTR/L, CNT, NTMTC, NLP, CPST  
1800 W. Charleston Blvd.  
Las Vegas, NV 89102

**UMC IRB #:** UMC-2023-519

**Protocol Title:** Development of a Cue-Based Feeding Education Program in the NICU to Enhance Self Efficacy of Caregivers.

Dear Ms. Jackson,

Your request for expedited review and approval of the item(s) noted below has been received:

- Initial Review Submission Packet
- Cue-Based Feeding Education Program in the NICU Protocol dated 10/30/2023
- Information Sheet Consent – UMCUNLV, version dated 11/29/2023
- Department Letter of Support, version dated 12/14/2023
- Cue-based feeding education, version dated 12/05/2023
- Traffic Light feeding, version dated 12/05/2023
- FLYER CAPSTONE, version dated 12/05/2023
- Parent infant bonding pdf, version dated 12/05/2023
- Feeding positions, version dated 12/05/2023
- PMP-SE questionnaire, version dated 11/29/2023
- Feedback feasibility survey, version dated 11/29/2023
- UMC NICU department, version dated 12/05/2023
- All Investigators' CV, CITI training certificates and COIs are on file

Your request was reviewed and approved on 01/12/2024 in accordance with the following expedited review category:

**45 CFR 46.110(b) (1): Some or all of the research appearing on the list and found by reviewer(s) to involve no more than minimal risk.**

Category 7: Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

The research is approved for 30 patients that meet the approved criteria.

Expedited review and approval will be noted in the Institutional Review Board (IRB) minutes of the 01/17/2024 meeting.

UNIVERSITY MEDICAL CENTER OF SOUTHERN NEVADA  
INSTITUTIONAL REVIEW BOARD (IRB)  
1800 W. CHARLESTON BLVD.  
LAS VEGAS, NV 89102  
Main Phone#: (702) 383-7336  
Emergency#: (702) 383-2216  
Fax: (702) 383-2477  
Website: <https://www.umcsn.com/HRPP/Home.aspx>

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This research study meets the requirements for a Waiver of Documented Informed Consent in accordance with 45 CFR 46.116(d).

- (1) The research involves no more than minimal risk to the subjects;
- (2) The waiver or alteration will not adversely affect the rights and welfare of the subjects;
- (3) The research could not practicably be carried out without the waiver or alteration; and
- (4) Whenever appropriate, the subjects will be provided with additional pertinent information after participation.

**Under the 2019 common rule, 45 CFR 46.109(f)(1)(i), this study does not require continuing review. However, any changes to the approved protocol must be submitted to the IRB for approval. In addition, the UMC IRB requires that researchers submit a study closure form when the study is completed for the administrative purpose of tracking active research.**

If you have any questions, please contact the IRB at (702) 383-7336 or [UMCIRB@umcsn.com](mailto:UMCIRB@umcsn.com).

University Medical Center of Southern Nevada has a Federalwide Assurance (FWA#00002738) with the Office for Human Rights Protection (OHRP). The IRB is registered with OHRP (IRB00002394) and is in compliance with 45 CFR 46, 21 CFR 50, 21 CFR 54, 21 CFR 56, and Good Clinical Practice (GCP) Standards.

Per CFR 45 Part 46.112, research that has been approved by an IRB may be subject to further appropriate review and approval or disapproval by officials of the institution. However, those officials may not approve the research if it has not been approved by an IRB.

Sincerely,

A handwritten signature in black ink that reads "David E. Slattery". The signature is written in a cursive style.

**David E. Slattery, M.D.**  
**Chairman, Institutional Review Board**

Cc: Jazmin Rivera

Date: 2-15-2024

IRB #: UNLV-2023-512

Title: Developing and Implementing a cue-based feeding education program to enhance the self- efficacy of NICU caregivers

Creation Date: 9-25-2023

End Date:

Status: **Approved**

Principal Investigator: Chih-Huang Yu

Review Board: Ceded Studies

Sponsor:

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## Study History

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<b>Submission Type</b>	Initial	<b>Review Type</b>	Expedited	<b>Decision</b>	<b>Rely on External IRB</b>
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## Key Study Contacts

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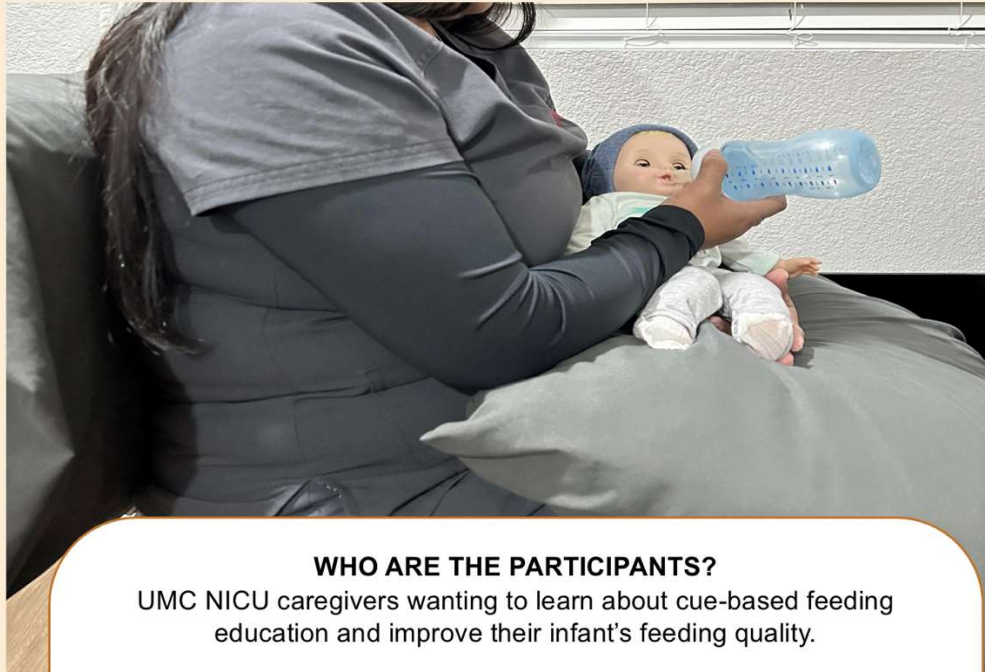
<b>Member</b>	Chih-Huang Yu	<b>Role</b>	Principal Investigator	<b>Contact</b>	chih-huang.yu@unlv.edu
<b>Member</b>	Jazmin Rivera	<b>Role</b>	Primary Contact	<b>Contact</b>	lara@unlv.nevada.edu

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## Appendix I: Flyer

# Are you a caregiver with an infant in the NICU?

We are conducting a study to explore the topic of cue-based feeding education from an occupational therapy perspective.



### **WHO ARE THE PARTICIPANTS?**

UMC NICU caregivers wanting to learn about cue-based feeding education and improve their infant's feeding quality.

### **LENGTH OF STUDY**

3 one-hour educational sessions during hospital admission.

### **TIMES OF COLLECTION**

A caregiver questionnaire and survey will be completed before and after the program

### **CONTACT INFORMATION**

Jazmin Rivera OTD/S: 702-330-7309

## Appendix J: Informed Consent Information Sheet



UNIVERSITY MEDICAL CENTER OF SOUTHERN NEVADA  
INSTITUTIONAL REVIEW BOARD (IRB)

### INFORMED CONSENT INFORMATION SHEET

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**TITLE OF STUDY:** DEVELOPMENT OF A CUE-BASED FEEDING EDUCATION PROGRAM FOR NICU CAREGIVERS

**INVESTIGATORS:** JAZMIN RIVERA OTD/S & AESA JACKSON OTR/L

**CONTACT PHONE NUMBER:** 702-330-7309

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The purpose of this program is to develop and implement a cue-based feeding education program to increase the self-efficacy of neonatal intensive care unit (NICU) caregivers. You are being asked to participate in the study because you are a caregiver of an infant in the NICU.

If you volunteer to participate in this program, you will be asked to participate in 3 one-hour sessions while your infant is admitted in the NICU. During this time, you will be asked to complete a questionnaire and program improvement survey before and after the program. In addition, you will learn about the UMC NICU department, feeding positions, feeding signs and behaviors of your infant, and the importance of parent-infant bonding while in the NICU.

Your survey responses will be anonymized and will not affect any future care that may be sought and once submitted you will NOT be able to withdraw your responses.

This study includes only minimal risks. You will not be compensated for your time.

For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact **the UMC Institutional Review Board (IRB) –at 702-207-8345, or via email at UMCIRB@umcsn.com.**

Your participation in this study is voluntary. You may withdraw at any time. You are encouraged to ask questions about this study at the beginning or any time during the research study.

**Participant Consent:**

I have read the above information and agree to participate in this study. I am at least 18 years of age.

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## Curriculum Vitae

Jazmin Rivera  
Jazmin.rivera9116@gmail.com

### Education

**University of Nevada, Las Vegas** Expected May 2024  
Occupational Therapy Doctorate  
Capstone title: Cue-Based Feeding Education to Increase NICU Caregiver Self-Efficacy  
Adviser: Chih-Huang Yu, OTR/L

**University of Nevada, Las Vegas** 2020  
Bachelors in Kinesiology  
Minor in Psychology

### Fieldwork Experience

UMC Hospital 2024  
National Blind Children's Foundation 2023  
Therapy Management Group 2023  
Cornerstone Christian Academy 2023  
My Turn Pediatric Speech Therapy 2023  
Centennial Hills Hospital 2022  
Encompass Health Rehabilitation 2021

### Work Experience

UMC Hospital -Cardiac Monitor Technician 2019- 2021  
Southwest Medical Associates- Cardiovascular Technician 2020- 2021

### Volunteer

Silverado Red Rock Memory Care 2022  
Select Physical Therapy 2019  
Encompass Health Rehabilitation Hospital of Henderson 2019  
Covenant Hospice Care 2016 – 2018

### Skills & Certifications

BLS/ CPR, EKG Certification, Koru Meditation, Suicide Prevention, CarFit. Dr. Browns IDF

### Professional Affiliations

American Occupational Therapy Association 2020 – Present  
Student Occupational Therapy Association 2020 – Present

### Honors and Awards

OTD General Capstone Education 2024  
OTD General Fieldwork Assistance 2023  
OTD General Program Scholarship 2022