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THE SPEECH-LANGUAGE PATHOLOGIST'S ROLE IN THE NEONATAL INTENSIVE CARE UNIT

Jennifer L. Dewier

Southern Illinois University Carbondale, jdewier@siu.edu

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THE SPEECH-LANGUAGE PATHOLOGIST'S ROLE IN THE NEONATAL INTENSIVE
CARE UNIT

By

Jennifer Dewier
B.A., Indiana University, 2009

A Research Paper
Submitted in Partial Fulfillment of the Requirements for the
Master of Science Degree

Department of Communication Disorders and Sciences
in the Graduate School
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RESEARCH PAPER APPROVAL

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Fulfillment of the Requirements

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Master of Science

in the field of Communication Disorders

Approved by:

Dr. Kenneth O. Simpson, Chair

Dr. Maria Claudia Franca

Mrs. Kathryn Martin, M.S. CCC-SLP

Graduate School

Southern Illinois University Carbondale

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Annually, approximately 13% of births in the United States are preterm, and since 1990, the survival rate of this population has increased by 20% (Arvedson, Clark, Frymark, Lazarus, & Schooling, 2010). With increasing amounts of infants entering the neonatal intensive care unit (NICU) directly following birth, there is great demand for medical professionals who are specialized in caring for preterm infants (Blackburn, 1998). Preterm infants are defined as those infants born at 37 weeks gestation or earlier (Rossetti, 2001). Intervention approaches in the NICU have evolved to focus on individualized developmental care and multidisciplinary teams that are present throughout each infant's experience, including speech-language pathologists (SLPs) (Arvedson et al., 2010).

The American Speech-Language-Hearing Association (ASHA) requires that SLPs working in the NICU possess the following skills and knowledge bases: evaluation and treatment of communication, feeding and swallowing, parent and caregiver education and counseling, and staff education and collaboration (ASHA, 2005). The SLP is not limited to the above roles and knowledge base. In addition, SLPs in the NICU need to possess the necessary skills to provide transition and discharge planning, follow-up care, education and supervision of other SLPs, in addition to advocacy and public education for serving infants in the NICU. They also need to conduct continued educational research in neonatal development in order to support efficacy of treatment, or evidence-based practice (EBP) techniques (ASHA, 2004).

Family centered care is a focus of service delivery in the NICU, ensuring total inclusion of the family in the care and decision-making process for their baby. In addition, developmental care, a broad category of interventions, is designed to minimize the stress effects of the NICU environment on the infant and family (ASHA, 2005). Furthermore, the SLP must recognize and be sensitive to a family's cultural beliefs, values, language, and practice.

The role of the SLP providing services in the NICU is emergent. This paper will review the primary roles of the SLP in the NICU, as well as discuss the team collaboration that is a vital element of success for the infants in this population. In addition, future research areas involving SLPs in the NICU will be discussed.

Communication of the Infant

Evaluation

Evaluation and intervention of the infant's communication, including appropriate pre-linguistic and behavioral interactions, is one of the primary roles of the SLP in facilitating communication development. The first step of the developmental assessment should include a comprehensive chart review including medical history and prior evaluations (ASHA, 2005). The findings need to be compared to clinical observations, and must be based on the infant's adjusted gestation age, not the chronological age. Although the process of developmental assessment involves comparing a child with children of comparing age (Rossetti, 2001), the medical community uses the infant's adjusted or corrected age, when they evaluate the baby's growth and development to differentiate from their actual gestational age. The adjusted age can be calculated by subtracting the number of weeks at which the infant was born from 40 (full-term gestational period) (Rossetti, 2001). Most infants "catch up" to their peers developmentally in 2-3 years, and after that, differences in size and development are likely due to individual differences, rather than prematurity (Rossetti, 2001).

The Apgar score was developed over 50 years ago and is used to evaluate the condition of newborn infants one minute after birth and to guide consequent interventions. Assigned a value of 0 to 2, the following characteristics are assessed: respiration, heart rate, color, reflex irritability, and muscle tone (Berger, Herting, Kuster, Muller, Poets, Rudger, Simma, Tschirch,

Urlesberger & Wauer, 2009). It is important to take caution with analysis of the infant's Apgar score, as the majority of infants in the NICU were born prematurely. According to Berger et al. (2009), their study provides evidence that the Apgar score is affected by a lack of consensus on how to evaluate preterm and ventilated infants. Based on this evidence and subsequent findings, it is important that SLPs base any decisions on a combination of formal and informal measures. The SLP may administer behavioral neurodevelopmental assessments, which are contingent upon additional training and certification. Physical growth patterns in infancy and neonatal neurobehavioral factors appear to be related. Results of these tests have been found to correlate significantly with intrauterine growth failure and birth weight (Berger, Cohen, Gaster, Scher, & Tirosh, 2000). It is imperative for clinicians to understand the underlying medical conditions that may affect the infant's physiological stability (Arvedson et al., 2010).

The central nervous system (CNS) is one of the last systems to mature and is rather immature at birth, leaving pre-term neonates to be at a significant disadvantage. There are six stages of CNS development. The first three stages (dorsal induction, ventral induction, and neuulation) are completed before the time of viability (ability to live) for preterm infants. The last three of the six stages of CNS development (migration, organization, and myelination) occur while this population of neonates is in the NICU (Blackburn, 1998). CNS organization is a vulnerable stage for preterm infants. The process during this stage is often referred to as the "wiring" of the brain. CNS organization is important for development of autonomic stability, motor maturity, state organization, attention and interaction, and self-regulation. The SLP also plays an important role in the evaluation and integration of CNS related functions such as attention, interaction, and the processing of sensory information (tactile, smell, taste, and hearing) (Blackburn, 1998).

Intervention of the Infant's Communication

“Communication intervention in the NICU should be focused on enhancing the infant's developmental outcomes by providing specific intervention strategies to facilitate social and interactive communication” (ASHA, 2005). Therefore the SLP's scope of practice encompasses family and caregiver education regarding communication and attachment among infants and their families.

There are several sources of stress in the NICU including medical and surgical procedures, pathological processes, pain, caregiver interventions, and the physical environment, especially light and sound. Neonatal stress can result in energy expenditure, which may alter healing, recovery, and growth. Calories and nutrients that are consumed by the infant are used to first meet physiological demands and to respond to stress. The remaining calories can be used for growth and development, a central goal for the SLP and other professionals (Berger, Cohen, Gaster, Scher, & Tirosh, 2000).

Multiple intervention approaches can be implemented, including, but not limited to: vestibular, auditory, visual, and tactile intervention. Areas of focus of intervention of the infant's communication include activities to promote prolonged periods of sleep, adaptation of the environment, and postural changes (Rossetti, 2001). Physical environmental adaptations may include posture adaptations such as positioning or swaddling (snugly wrapping the infant in blanket or cloth to restrict limb movement) to support the motor system, and controlling external stimuli, such as lighting and noise (Arvedson et al., 2010).

Research studies have addressed the effects of vestibular, auditory, tactile, and kinesthetic stimulation on state regulation. An infant's regulation or organization of their own state includes their ability to self-regulate the demands placed on them and their ability to achieve

awake/asleep state and transition patterns. For example, ASHA (2005) found that vestibular stimulation (VS) reduced the state level in term and preterm infants. VS reduced the intensity of internal needs (state disorganization, or crying) and allowed a sample of infants to attend to external events through advancement of quiet alertness (ASHA, 2005). Studies by Korner (1990) have shown that rhythmic patterning (vestibular and auditory stimulation) can enhance the attachment of a mother and her baby.

The sense of touch is one of the earliest perceptions to develop in early fetal development. In extremely small premature infants, their skin is very fragile requiring gentle care. Studies have indicated that for premature infants less than 30 weeks gestational age, touch may be more stressful rather than soothing to the infant's state of being (Nair, Gupta, & Jatana, 2003). It seems like infants this young are unable to regulate themselves and handle the same amount of stimuli as a full term infant. However, touching may be helpful for older infants. Additionally, infants respond differently to different kinds of touch. It is recommended that application of bland, sterile oil be applied to small preterm infants to help soothe them (Nair et al., 2003). The preterm infant, once aroused, may have difficulty modulating his or her level of arousal even after the stimuli, such as changing, feeding, and medical procedure are removed. There are handling procedures and techniques that can reduce stress significantly. Positioning the infant properly, by wrapping the infant tightly in a blanket or cloth (to restrict limb movement) has been shown to promote the development of flexor tone and can also be calming. Swaddling has been used by mothers in various cultures for many years and is especially important for NICU babies who have demonstrated low threshold for stimulation. It has been explored that swaddling of ill-infants can result in increased oxygenation and reduced heart rate (Rossetti, 2001).

Changes in Physical Environment.

Physical environment can play a major role in intervention of NICU residents. Until recently, most infants in the NICU were exposed to high levels of fluorescent light, high noise levels and aggressive or excessive touching/handling (Rossetti, 2001). Modification of the NICU environment to minimize stress on the infant is a growing concern and the infants need to be subject to ongoing assessment. Assessment is to utilize infants' cues, such as signs of stress, stability, engagement (i.e., readiness to interact) and disengagement, sleep-awake status, and tolerance of stimulation (Blackburn, 1998). These environmental factors can be reduced and have been a focus for decreasing stress and lasting effects of the at-risk infants in recent years (Nair et al., 2003).

Moreover, studies have shown that high-level lighting may contribute to a higher occurrence of significant eye disease in surviving infants (Rossetti, 2001). This can be reduced by dimming the lights on a regular schedule, covering the infant's eyes with patches during procedures, and covering the incubators with blankets to reduce the amount of bright light, which also reduces environmental stress. Cycled lighting (i.e., turning lights down during night time hours) may be a useful technique to promote reduced heart rate, an indicator of energy consumption. Improved state organization, greater weight gain, and improved clinical status have been observed during the dim period. Studies show that in many cases, cycled lighting is done in a random fashion, and the SLP can be the advocate for greater consistency and structure (Blackburn, 1998).

According to Schultz (1987), high noise levels in the NICU can contribute to hearing loss in these preterm infants as compared to infants in the general population. Noise-related sources of stress can include the machines used in the NICU, the traffic flow of parents and families, and

the nurse staff that cares for the infants (Rossetti, 2001). Improving noise levels have been a concern to reduce environmental stress for the NICU residents. It is not possible to eliminate continuous background noise in this environment due to the nature and need for the machinery and equipment. This is of great concern to the SLPs, since high background noise may interfere with the infant's ability to discriminate speech, an important step in early language acquisition. Modifying the peak noises has been a growing concern and standard in NICUs around the country (Blackburn, 1998).

Intervention of low birth weight (LBW) and very low birth weight infants are increasingly important, as studies have shown problems in autonomic control, state and behavioral regulation later in life due to their stay in the NICU (Blackburn, 1998). Infants with LBW are at a greater risk for developing speech and language and communication delays. In addition, behavioral issues have been noted in infants who spent time in the NICU, including hyperactivity and internalizing disorders (ASHA, 2005). According to ASHA (2005), the degree and amount of touch and handling are still topics of future research discussion in the field.

Feeding and Swallowing

Evaluation

Typically, infants that are premature do not feed as readily as their infant full term counterparts (Lau & Schanler, 2000). Ultrasound studies revealed that non-nutritive sucking (NNS) and swallowing are developed in typical developing fetuses by 15 weeks gestation. In addition, forward tongue thrusting has been reported by 21 weeks gestation, tongue cupping at 28 weeks gestation, and suckling between 18-24 weeks gestation (Arvedson & Delaney, 2008). These are all important characteristics of safe and appropriate oral feeding skills.

SLPs play an important role in performing developmentally appropriate clinical assessment of the feeding behavior and swallowing mechanism. In addition, they are responsible for diagnosing sucking and swallowing disorders and determining the abnormal anatomy/physiology associated with deficits (ASHA, 2004). Occasionally, referrals are necessary to identify disorders that may impact the infant's ability to obtain nutrition (Lau & Schanler, 2000).

A standard pediatric clinical evaluation begins with a review of chart and medical history and a physical exam including developmental assessment and observation of NNS and swallowing. Typically, the SLP will consult the nursery staff, caregivers and other members of the medical team to gain insight to determine the infant's readiness to feed orally. There is a battery of assessment tools available to assess breast feeding, bottle feeding, and sucking skills. These tools assess respiratory rate, heart rate, suck-swallow-breathe coordination, quantity of intake, and infant positioning (ASHA, 2005). Additional instrumental evaluations are also an option to evaluate the infant's swallowing musculature and mechanism, when necessary. Furthermore, instrumental evaluations can provide additional information about cardiac, respiratory and oxygen maturation, which should be monitored throughout the infant's time at the NICU.

SLPs must be sensitive to the delicate structures, dynamic functions of sucking and swallowing as well as their cardiopulmonary correlates, including color changes and nasal flaring. Videofluoroscopy swallow study, flexible endoscopic evaluation of swallowing, and ultrasonography are commonly used instrumental evaluations procedures. Results of these procedures can give insight about gastro esophageal reflux, gastric emptying time, homeostasis

and respiratory status of the infant, bolus presentation, viscosity of bolus, and swallowing variability (ASHA, 2005).

Intervention of the Infant's Feeding and Swallowing

SLPs must develop intervention strategies that are appropriate for the infant's medical condition, behavioral status, swallowing competencies and most importantly, their overall safety. It is imperative to identify potential physiological compromise and risk for aspiration to implement appropriate precautions to minimize the risks (ASHA, 2004). In order to minimize risk of aspiration and to promote proper ventilation, adequate coordination of suck-swallow-breathe is necessary. Aspiration is defined as the penetration of food or liquid into the airway below the level of the vocal folds (Rossetti, 2001). SLPs often use a combination of intervention techniques to enhance oral motor skills and to improve the coordination of suck-swallow-breathe (Lau & Schanler, 2000).

Readiness to orally feed also depends on the infant's ability to achieve and monitor awake states and the absence of apnea (ASHA, 2005). Apnea is defined as an episode of the pause of breathing for more than 20 seconds (Rossetti, 2001). Negative experiences for infants, including common medical procedures with infants in NICU (e.g., intubation, tube feeding, and suctioning) may be contributing factors to the disruption of sucking and swallowing development, as well as oral sensory and motor dysfunction. In addition, uncoordinated suck-swallow-breathe patterns are the most common factors that lead to dehydration, insufficient weight gain, and delays in successful breast or bottle feeding (Arvedson et al., 2010). Procedures and observations differ greatly from one infant to another, but the ultimate goal remains the same: a stable airway and adequate hydration and nutrition (Arvedson & Delaney, 2008).

Transitioning from tube feedings to independent oral feeding can be challenging for infants that are preterm, as well as their caregivers, and usually lead to prolonged stays in the NICU. The transition to nipple or bottle feeding is determined by a number of factors including the infant's ability to regulate cardiorespiratory rhythm, behavioral organization, and suck-swallow-breathe coordination. Factors that hinder this readiness include low birth weight, neonatal illnesses, and gestational age at birth (Arvedson et al., 2010). Effects of nasogastric tubes in infants with LBW include longer transition period (from tube to oral feeding), less forceful feedings, decrease in nasal airflow, and a decrease of oxygen saturation before, during, and after feedings (Arvedson & Delaney, 2008). Studies have shown that tube insertion can cause pharyngeal and esophageal trauma in this population (ASHA, 2005). Further research should address the prevalence of esophageal trauma and its long-term effects.

Oral Motor Intervention.

Oral motor intervention (OMI) has been a topic of interest for SLPs in the NICU, which includes NNS and oral stimulation. OMIs are opportunities that can assist in transitioning from gavage to bottle or breast feeding (Arvedson et al., 2010). NNS, rhythmic sucking accompanied by even respirations and swallowing of secretions, is a pre-requisite for the ability to nipple feed. This establishes the infant's ability to maintain an awake state and coordinate the suck-swallow-breathe pattern. Caregivers have employed NNS for decades as a calming method (typically with use of the pacifier), and has been shown to improve digestion of internal feeding and facilitate the development of sucking behavior (Rossetti, 2001).

In addition to NNS, a tactile-kinesthetic stimulation technique used in the NICU in recent years is termed Kangaroo Mother Care (KMC). Skin to skin contact, typically on the chest, between the mother and the infant, ideally for at least 30 minutes a day has been an important

factor for infants of LBW in their ability to achieve readiness for oral feeding (ASHA, 2005).

KMC has been associated with decreased hospital stay, increased state of alertness, and shorter periods on assistive ventilation machines. Mothers who practice this technique appear more likely to breastfeed and feel a more attached relationship with their infant (Rossetti, 2001).

Once an infant is considered ready to safely oral feed, there are a number of factors to take into consideration by the SLP and neonatal nursery staff. Studies have shown that bottles permitting a faster flow increases milk intake (Lau & Schanler, 2000). Caregivers have reported this as a negative feature in that the fast flow bottles can lead to choking (aspiration) (Lau & Schanler, 2000). Milk flow out of the bottle can be halted if accumulated negative pressure inside the bottle reaches equilibrium with the opposing suction amplitude provided by the infant. Feedings under these circumstances result in extreme fatigue as a result of a great deal of energy expenditure. This can be a factor of poor weight gain of premature infants during the initiation of oral feedings. Since fatigue is such a safety and nutritional concern, it is necessary to restrict the duration of oral feedings to a maximum time of 20 minutes.

Earlier studies have shown that feeding performance of infants born before 30 weeks gestation improved by using the standard bottles used in NICU nurseries (Lau & Schanler, 2000). These bottles allotted milk flow to be “self-paced” as opposed to “unrestricted”. The decrease in flow decreases frequency and volume during each swallow, which can improve the coordination of swallow-breathe. Pacing, or removal of the bottle at predetermined intervals, allows the infant to regulate their respiration. Healthy infants often do this on their own, by alternating between active sucking with no breathing and pauses of rapid breathing while blocking the nipple hole with their tongue to stop milk flow (Arvedson et al., 2010).

Team Collaboration

It is inevitable that the SLP will face challenges within this environment. It is vital for the professionals of the NICU to work together to create a first class environment for all who are a part of this fragile atmosphere. Infants and their families rely on these professionals for education, help with decision making, and most importantly, quality care (ASHA, 2005).

Although there are likely many NICU units with supportive staff that possess these qualities, there is always room for improvement. It is key that the professionals maintain respect and trust for one another, while continuing to support another's decisions. The NICU team consists of the following professionals: neonatologist, pediatrician, neonatal nurse practitioner, registered nurse, case manager, social worker, speech-language pathologist, occupational therapist, physical therapist, respiratory therapist, registered dietician, surgeon, and developmental specialist (Rossetti, 2001).

A study conducted by Dunn, Kleeck & Rosetti (1993), surveyed 45 SLPs working with infants in NICUs across the United States. A large portion of the survey focused on the involvement of the SLP as a team member, and the perception of the profession by doctors and nurses. Approximately 84% of SLPs recognized a need for increased education of medical personnel, more specifically, to alleviate barriers that the SLPs face in service delivery. A common point in the SLPs responses were that the doctors and nurses were not supportive of the benefits the infant would receive from SLP intervention (Dunn et al., 1993). Time, scheduling demands, and financial concerns were indicated as barriers for the SLPs collaboration with the medical team. The majority (91%) of SLPs investigated expressed a need for continued information and administrative support for program development to expand their role in the

NICU. Despite varying support from colleagues, 50% of the SLPs stated that they did not have an adequate mechanism for exchanging information with their colleagues.

SLPs have begun establishing service delivery for infants who are medically fragile in the NICU and their families (ASHA, 2004). However, the lack of support and knowledge about the SLPs importance as a team member cannot be ignored. SLPs are often required to be their own advocate and educator for their role and significance on the NICU team. Large NICUs in the United States often have one SLP on staff, with the smaller units sharing SLPs with neighboring cities and hospitals (Dunn et al., 1993). It is necessary that SLPs demonstrate their value and establish respect as a team member of the NICU.

The survey by Dunn et al. (1993), revealed that the majority of respondents had help from other professionals to gain more access into the medical environment. The SLPs domain in the NICU is fairly new, and 75% of the SLPs surveyed believe that changes in training could better facilitate their knowledge and skills. The majority of SLP graduate programs around the country offer no training with the NICU population, but rather a course focused on the birth-to-three population, focusing on Early Intervention programs. It is of great importance that SLPs who are interested in working in the NICU accelerate their education and training by hands-on experience, research, conferences, and additional neurodevelopment treatment training (Dunn et al., 1993).

Parent and Caregiver Education and Counseling

Parents have reported that the life support of the NICU causes great anxiety and fear (Ward, 2001). Insertion of tubes, injections given to the infant, intravenous lines, and blood draws have been the procedures shown to cause the most parental stress. The caregivers frequently feel like they are invading the space of professionals and often feel lost and out of

place in this unfamiliar environment (Martin, 2001). Once parents have the opportunity to learn the function of the interventions and the machines attached to the infant, their perceptions of stress and anxiety tend to decrease (Basbakkal, Ozbek & Turan, 2008). Parent and family participation should be implemented from the beginning. The caregiving role may be empowered by including the family in monitoring the equipment and their infant, decreasing stress, and boosting confidence (ASHA, 2005).

Martin (2001) provided important factors that may influence the caregiver's role as advocate. For example, parents need to be included as part of the NICU team, assisting in the treatment and decision making process for their child. Often, decisions are made with the welfare of the child first and foremost. Parents' needs are generally put lower on the list of priorities, but they are usually content with their child's needs as the center of focus. However, this may not be the best option in caring for infants and their families as a unit (Martin, 2001). Increased parental and caregiver involvement may be a key in providing greater continuity of care for the infant following their stay in the NICU. The more knowledgeable they become during this period, the better they will be able to make informed decisions in the future (Martin, 2001). Caregivers must be praised by supportive staff in the NICU for their ability to learn to parent in this unique environment. They need to be encouraged to interact with professionals on a regular basis, instead of playing a quiet role on the sideline while the professionals make their decisions for them (Ward, 2001).

Transition to Discharge Planning

Planning for discharge and the dynamics of the transition from NICU to home must begin early in the child's hospital stay. Initially, the focus must be directed towards the general medical condition of the child, but emphasis needs to also be placed on the adjustment of the infant and

family once the child is dismissed from the NICU (Martin, 2001). While in the NICU, the caregiver's role as a primary provider must increase. Caregivers need to be feeding, holding, bathing, and changing their infant when the infant becomes medically stable. It is of utmost importance that the staff includes caregivers as much as possible to participate in major milestones such as first bottle, first clothes, first time out of incubator, and first bath. In addition, continuity of care can ease the transition from the NICU to the home for both the infant and the family (Martin, 2001).

Although each infant case is different, there are general medical requirements that must be met in order to discharge from the NICU. For example, once the infant reaches four pounds six ounces or 34 weeks gestation, the infant must maintain a body temperature while in an open crib (Nair et al., 2003). In addition, the infant must feed by mouth, with substantial and consistent weight gain history, and the infant must be free of medications and oxygen that must require hospital management (Blackburn, 1998). The parents must possess qualities that confirm that they can provide the basic physical needs of their infant. In addition, it is important that the caregivers have the ability to identify problems that may arise, and implement a plan needed (Ward, 2001).

Transitional time may be filled with successful or difficult and frustrating events for both the infant and the family (Ward, 2001). Basic training and post-discharge programs are essential for the family support, and the SLP is responsible for the planning and organization of these details. Their experiences in the hospital have been anything but "normal" and the expectation that the transition will be "normal" is far from reality (Rossetti, 2001). According to Barker (1991), several themes emerged following careful questioning of caregivers pertaining to their insight into the problems they may encounter post-discharge. Parents expressed uncertainty

about the amount of adjustment needed by the entire family and how well the new infant would be incorporated into the family. In addition, parents expressed doubt about their ability to provide ongoing care and their ability to monitor and manage problems that may arise. With this, comes the fear of the potential death of their infant under their care. Feeding issues are typical concerns, in that the success of breastfeeding may be questionable, and proper nutrition has been a priority since the infant's admittance to the NICU (Rossetti, 2001). These are common fears and issues with parents, and the SLP is responsible for alleviating these fears by empowering the families with education, participation, and feelings of confidence (Basbakkal et al., 2008).

Counseling and support programs are available to families post-discharge. These are important for the families to have the opportunity to express their feelings openly in a non-judgmental area and discuss successes and difficulties with families who have experienced similar situations (Rossetti, 2001). There are nation-wide support programs, such as the March of Dimes, and there are many local chapters available that are supported by the local hospital or organization. Online support groups are also available as an option, and are designed to help parents, caregivers, siblings, and grandparents of infants who have spent time in the NICU. The SLP should be in contact with the family post-discharge to support, answer questions, and refer, if necessary. The support groups should be sensitive to individual, cultural, and personal perspectives of the family (ASHA, 2005).

Additional SLP Roles

Aside from the primary roles of the SLP in the NICU, there are important roles that are required by ASHA for ethical service delivery. Certified and licensed SLPs are responsible for professional education and supervision of students and clinical fellows, as well as personal education and training of clinical skills. This can include continuing education (required by

ASHA), in which the SLP must keep up-to-date on EBP research, standards and techniques in speech-language pathology, and related disciplines pertinent to the NICU environment. SLPs are required to educate fellow staff members within the NICU as well as the community.

Additionally, SLPs are responsible for providing information to families regarding continued services once the child is discharged, such as early intervention (EI) (ASHA, 2004).

According to the ASHA's guidelines related to roles and responsibilities of SLPs in NICU (2004), it is within the SLP's scope of practice to "provide public education and advocacy for serving infants and families in the NICU" (ASHA, 2004). ASHA states that this is an essential part of a successful and comprehensive program and would include the following: development and management of comprehensive care programs, outreach into communities as well as through interactions with administration and professional staff, and information to families to facilitate community services for both the infant and the family. Research should be based upon clinical and scientific advances to enhance knowledge relevant to communication development, feeding and swallowing development, and disorders for infants in the NICU (ASHA, 2005).

Conclusion

The earliest assessment and intervention provided by the SLP may be in the NICU. Over the last two decades, clinical interests of children in the birth-to-age-three population have expanded the SLPs role as a care provider and team member in the NICU. Reduced mortality rates among neonates of the NICU units seems to be associated with factors such as medical and technological advances based in research (Blackburn, 1998). Service providers in this setting strive for not only the preservation of life, but also the quality of the life that is saved (Rossetti, 2001). In order to provide ethical service delivery, SLPs must have knowledge of normal and

abnormal infant development in the following domains: cognitive, communicative, feeding and oral motor, motor, and social-emotional. In addition, it is imperative for the SLPs to have a great understanding of how associated problems (i.e. diseases, apnea, failure to thrive) can impact the developmental expectations, anatomy and physiology of the neonate, and respiration (Dunn, Kleeck, & Rossetti, 1993).

Family-centered care must be incorporated into each situation in order to adequately respond to parental needs and concerns. The SLP plays a vital role in this team approach. Adequate education and parental empowerment are key components to building a trusting relationship between the NICU team and the parents (Ward, 2001).

Additional research needs to be conducted to develop a greater understanding of how the SLP can enhance the outcome of the infants who have resided in a neonatal intensive care unit. Future research could examine the amount and intensity of touch and handling infants that allows attachment using caution regarding hypersensitivity issues. Different ways of educating the parents and caregivers of proper techniques would be essential elements of the research. This could greatly impact the infant's stay in the NICU.

Additionally, it would also be beneficial to examine how the positioning of the infant can impact their flexor and muscle tone later in life. Rosetti (2001) discusses the benefits of KMC and swaddling, and how these techniques may enhance attachment and increase oxygenation and reduced heart rate in infants. However, infants in the NICU are often left to lie flat on their backs, especially in the isolettes. This positioning is different than that of the natural curved fetal position they would maintain in utero, and may contribute to restricted range of motion later in life (Blackburn, 1998).

Furthermore, future investigations should examine the development of speech discrimination and how this relates to the temporal lobe and the infants' perception of speech sounds versus non speech vocalizations. Blackburn (1998) discussed the importance of reducing environmental noise, which can delay the infants' prelinguistic ability to discriminate speech. It would be advantageous to expand to include the infants' organization of speech and non speech sounds. More specifically, how incoming auditory stimuli of non-speech vocalizations, such as a laugh, cough, sneeze, or cry differ from speech. This may help future cases of hyposensitive infants of the NICU.

In addition, further research should be conducted on the efficacy of OMI, which includes NNS and oral stimulation. Arvedson et al. (2010) discussed OMI as an important step to reach the ability to oral feed. Inclusive, studies should not only evaluate one form of OMI compared with another, but also compare OMI to other interventions such as managing flow rate, thickening of feeding, and providing pacing during the oral feedings. This line of investigation may provide resources for researchers to develop intervention strategies, and for families to implement strategies at home to promote healthy development and adequate weight gain.

Over the past two decades, research and medical advances in the NICU have improved the rate of survival for preterm infants (Dunn et al., 1993). Collaboration of the supportive staff in the NICU, including the doctors, nurses, and SLPs, are key elements for success within the unit (ASHA, 2005). The SLP is arguably the most qualified provider for swallowing, communication, cognition, oral sensory-motor function, and prevention of language and swallowing deficiencies later in life, and this reinforces the need for these professionals within the NICU staff. Given the wide-ranging and specialized skills that are needed for SLPs in the NICU and the rapidly advancing information and practices for this setting, the need for advanced

level training and continuing education is clearly apparent (ASHA, 2005). Ultimately, involvement of a qualified SLP within the NICU should help reduce infant mortalities and improve the quality of life for surviving infants.

REFERENCES

- Arvedson, J., Clark, H., Frymark, T., Lazarus, C., & Schooling, T. (2010). Evidence-based systematic review: Effects of oral motor interventions on feeding and swallowing in preterm infants. *American Journal of Speech-Language Pathology*, 19, 321-340.
- Arvedson, J., & Delaney, A. L. (2008). Development of swallowing and feeding: prenatal through the first year of life. *Developmental Disabilities Research Reviews*, 14, 105-117.
- ASHA. (2004). Knowledge and skills needed by speech-language pathologists providing services to infants and families in the NICU environment. *American Speech-Language Hearing Association*.
- ASHA. (2005). Roles and responsibilities of speech-language pathologists in the neonatal intensive care unit: Guidelines. *American Speech-Language-Hearing Association*.
- Basbakkal, Z., Ozbek, S., & Turan, T. (2008). Effect of nursing interventions on stressors of parents and premature infants in the neonatal intensive care unit. *Journal of Clinical Nursing*, 17 (21), 2856-2866.
- Berger, A., Cohen, A., Gaster, H., Scher, A., & Tirosh, E. (2000). Neonatal neurobehavioral assessment as relate to growth in infancy. *Journal of Reproductive and Infant Psychology*, 18 (1), 61-66.
- Berger, A., Herting, E., Kuster, H., Muller, C., Poets, C. F., Rudiger, M., et al. (2009). Variations of apgar score of very low birth weight infants in different neonatal intensive care units. *Acta Paediatrica*, 98 (9), 1433-1436.
- Blackburn, S. (1998). Environmental impact of the NICU on developmental outcomes. *Journal of Pediatric Nursing*, 13 (5), 279-289.

- Dunn, S. L., Kleeck, A. v., & Rossetti, L. M. (1993). Current roles and continuing needs of speech-language pathologists working in neonatal intensive care units. *American Journal of Speech-Language Pathology*, 2, 52-64.
- Lau, C., & Schanler, R. (2000). Oral feeding in premature infants: Advantage of a self-paced milk flow. *Acta Paediatrica* , 89, 453-459.
- Martin, A. (2001). Retrieved from Parent advocates: Born in the NICU:
<http://www.prematurity.org/advocacy-NICU.html>
- Nair, C., Gupta, G., & Jatana, S. (2003). NICU environment: Can we be ignorant? *Medical Journal Armed Forces India*, 12, 22-38.
- Rossetti, L. M. (2001). *Communication Intervention: Birth to Three*. Clifton Park: Delmar, Cengage Learning.
- Ward, K. (2001). Perceived needs of parents of critically ill infants in a neonatal intensive care unit (NICU). *Pediatric Nursing*, 27 (3), 281-286.

VITA

Graduate School

Southern Illinois University

Jennifer L. Dewier

jdewier@siu.edu

Indiana University Bloomington, IN

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Major Professor Maria Claudia Franca