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Murray State University Honors College

HONORS THESIS

Certificate of Approval

The Evolution of the Role of Speech-Language Pathologists in the NICU: Are Educational Programs Supporting the Change?

Melanie Spinnie
December 2023

Approved to fulfill the requirements of HON 437

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Becky Jones, Instructor
Communication Disorders

Approved to fulfill the Honors Thesis requirement of the Murray State Honors Diploma

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Date of Defense: May 1, 2023

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The Evolution of the Role of Speech-Language Pathologists in the NICU: Are Educational Programs Supporting the Change?

Submitted in partial fulfillment
of the requirements
for the Murray State University Honors Diploma

Melanie Elizabeth Spinnie
December 2023

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Abstract

The purpose of this thesis was to determine the progressive roles of speech-language pathologists (SLP) in performing feeding and swallowing interventions in preterm infants in the neonatal intensive care unit (NICU) and evaluate the education SLPs receive regarding this topic, as well as how this can affect their work in the NICU and what changes in curriculum and experience should be made for SLPs to best serve this fragile population. SLPs have not always been the primary providers in this field, so it is crucial to understand these established roles and how they have changed and will continue to change. As these roles have grown, it has become increasingly important to understand the educational needs of SLPs for these roles and to determine if the education and experiences provided to students aligns with these roles. This research was conducted by completing a literature review related to the evolving roles in the treatment of dysphagia in preterm infants. This included a study of the diagnoses related to feeding and swallowing found in premature infants in the NICU as well as the proper interventions to put into place. The extensive qualifications required of SLPs in the NICU were discussed along with their specific aspects, which included the extent of the educational background on dysphagia and the potential for field experience for ongoing education. Inter-collaborative care across disciplines, including occupational therapists, physical therapists, and nurses, is a crucial part of the success of feeding and swallowing in preterm infants. The cooperation of these disciplines and their overlapping skills were explored as well. Among the most significant points established were the understanding of how the roles of SLPs in the NICU have evolved, the need for shifting educational requirements to align with these changes, the importance of family-centered care in this setting, and the necessity of collaborating with various other healthcare professionals in order to provide the best care and result in the best outcomes.

Introduction

In 2001, the American Speech-Language-Hearing Association (ASHA), the governing body over speech-language pathologists (SLPs), audiologists, speech-language pathology assistants, and speech-language-hearing scientists, released a position statement entitled "Roles of SLPs in Swallowing and Feeding Disorders" (American Speech-Language-Hearing Association, 2001). This statement defined these roles, including the evaluation and management of those with swallowing and feeding disorders and attempted to clarify the scope of practice of SLPs for these particular services (American Speech-Language-Hearing Association, 2001). However, ASHA stated in this position that in the area of pediatric dysphagia, evidence-based data is limited, and the need for research in this area is substantial (2001). At that time, the research regarding treatment by SLPs in the neonatal intensive care unit (NICU) was not quite as in-depth (American Speech-Language-Hearing Association, 2001).

In looking into the continuing and evolving roles of speech-language pathologists in the NICU, an understanding of typical feeding and swallowing and the etiology of the disorder is critical in order to properly provide the best possible care to infants. Competence in these areas can contribute to SLPs' confidence in assessment and treatment. Feeding is defined as "the process involving any aspect of eating or drinking, including gathering and preparing food and liquid for intake, sucking or chewing, and swallowing" (American Speech-Language-Hearing Association, n.d.). Feeding provides children and caregivers with opportunities for communication and social experiences that form the basis for future interactions, and while speech-language pathologists are educated on feeding and swallowing in graduate level work, this has not always been the case, and with new responsibilities came updated coursework. More

shifts in the roles and responsibilities of SLPs in the NICU are cause for more recent updates to the educational requirements for working in this setting.

Swallowing, as a part of the feeding process, is a complex process during which foods, liquids, and saliva are transported from the mouth into the stomach while maintaining protection of the airway. When aspects of the typical swallow become disordered, dysphagia is the result. Dysphagia, or difficulty swallowing, can occur in any of the four phases of swallowing (oral preparatory, oral transit, pharyngeal, esophageal) and can result in aspiration. Aspiration refers to food, liquid, or saliva passing into the trachea past the level of the vocal cords (American Speech-Language-Hearing Association, n.d.). Dysphagia in preterm infants in particular is often defined and characterized by immature sucking, uncoordinated suck, swallow, and breathe sequencing, or a combination of the two. This can lead to delays in both breastfeeding and bottle-feeding, poor weight gain, and dehydration during the early postnatal weeks (Arvedson et al., 2010). Preterm infants oftentimes cannot gain total oral feeding status in the early weeks after birth. The functions of the suck, swallow, and breathe pattern must occur sequentially and in synchrony through the previously mentioned phases of swallowing with no negative pulmonary (breathing) effects. The difficulty in this lies in the fact that the components of these three functions mature at different times, which can cause coordination breakdowns in the preterm infants attempting to complete oral feeding.

In reviewing what determines prematurity and various levels of prematurity it can be noted that incidence of premature birth has increased by over 2% in thirty years, from 9.4% in 1981 to 11.72% in 2011 (Zimmerman, 2016). Preterm births in the United States make up about 400,000 births per year, and the outcomes of these births will define the health of a large amount of the next generation (Kamity et al., 2021). Infants being classified as “premature” or “preterm”

is based on the gestational age of the infant, or the number of gestational weeks at birth (American Speech-Language-Hearing Association, n.d.). In other words, it refers to how long from the point of conception the fetus was carried before being born (American Speech-Language-Hearing Association, n.d.). According to Xu and Filler, these infants are classified based on their age at the time of birth as premature at less than 37 weeks, very premature at less than 32 weeks, and extremely premature at less than 28 weeks (2005). A majority of the time, low birth weight infants are also preterm, with varying levels of low birth weight. Low birth weight is defined as less than 5 pounds and 8 ounces, very low birth weight at less than 3 pounds and 5 ounces, and extremely low birth weight at less than 2 pounds and 3 ounces. Prematurity and low birth weight are both major biological factors that place not only infants but also young children at a high risk for a variety of developmental delays or disabilities.

At the stage of infanthood is when the brain grows and develops more quickly than at any other point in life (Xu & Filler, 2005). For parents, an infant's time in the NICU is a defining point in relationships with their baby, with each other, and with the healthcare system as a whole. Having the proper support in the NICU for preterm infants is crucial in facilitating their development and overall well-being, which becomes the responsibility of SLPs as well as the many other healthcare professionals on staff.

Significance

Speech-language pathologists have a rather large scope of practice, ranging in areas such as speech, language, and cognition. When people think of SLPs and what their jobs entail, working in the NICU setting is not a typical answer. Individuals should be aware that although infants are unable to verbally communicate, the necessity of SLPs in treating feeding and swallowing disorders is supported by their knowledge of the anatomy and physiology of the

speech and swallowing mechanisms as well as the processes of swallowing in all age groups, from infants and pediatrics to adults and geriatric populations. SLPs have unique roles in performing feeding and swallowing interventions in the NICU, but this has not always been the case as they have slowly become more involved over time. Based on the roles outlined by ASHA, SLPs need to advocate more strongly for the best care for preterm infants with feeding and swallowing disorders by establishing their place in the NICU, and other health professionals should be educated on these roles.

Review of Literature

Roles of SLPs Prior to ASHA's NICU Statement

Speech-language pathologists were involved in the neonatal intensive care unit (NICU) before American Speech-Language-Hearing Association (ASHA) released their official statement on roles of SLPs in treating feeding and swallowing in the NICU, which wasn't released until 2004. One article outlined the roles and responsibilities speech-language pathologists had at the time as well as discussing how these may potentially change or improve in the future, including working on development of feeding and swallowing mechanisms and working alongside other healthcare professionals (Dunn et al., 1993). The purpose of this study was to investigate the roles of SLPs in assessing and treating NICU infants because of various factors influencing the emergence of these roles. Included in these contributing factors is the increased survival rate of preterm infants, and prematurity often increases risk of other difficulties and delays that require treatment. While SLPs have had roles and responsibilities in the NICU prior to 1993, they were not outlined specifically or evaluated based on the needs of preterm infants. Other roles of SLPs with infants and toddlers, as well as their families, have begun receiving more attention in the literature, but there has been little documentation of developments relating to the roles of SLPs in the NICU (Dunn et al., 1993).

According to Dunn et al., it was discovered that the SLP's expertise with feeding therapies in older children could be transferable to infants in the NICU (1993). At the time this article was written, this may have been a function served by occupational therapists in many hospitals, meaning that it was not specifically outlined as a responsibility within the realm of SLPs. Feeding is one of the most critical activities for an infant in the hospital. It is important that feedings are highly nutritional as well as efficient because they provide the infant with basic

skills to advance development within deficient or immature systems, and with SLPs understanding the workings of the swallowing mechanism, facilitating these feedings has become one of their primary roles (Dunn et al., 1993).

Dunn et al. created a survey in order to explore the current roles of SLPs in the NICU as well as predict how this role is likely to be expanded sometime in the future (1993). This was completed in hour-long telephone interviews for the first phase and a written questionnaire in the second phase. SLPs that worked in NICU settings provided names of more SLPs working in this area in a “snowball effect” in order to expand the sample. Because only 11% of the SLPs that participated in the survey worked exclusively with the birth-to-three population, it was indicated that very few speech-language pathologists were able to specialize completely in serving the NICU population. To put this into perspective further, 64% of the SLPs that were surveyed worked 10 hours or less in the NICU each week, and only 9% of the SLPs surveyed worked for more than 20 hours each week in the NICU. When asked how they, as clinicians, ultimately ended up working with NICU infants, there were many varying answers. The most prevalent response (23%) was that the occupational therapist (OT) and/or physical therapist (PT) saw the need and made referrals to the SLPs. This is an indication that other health professionals recognized the importance of SLPs working in NICUs even prior to ASHA’s statement on the topic.

The educational backgrounds of the survey respondents in terms of working with the NICU population were varied. Different backgrounds consisted of no graduate school training, a unit within a dysphagia course, or an entire course on the birth-to-three population inclusive of the NICU setting (Dunn et al., 1993). Of those surveyed, 26% had no training on the birth-to-three population, even within a course; 40% of those surveyed had an entire course on pediatrics;

and 77% of these individuals had no training with the NICU population in graduate school. From the respondents, the most frequent answer as to which resources were most helpful in their training for working in the NICU was the education provided to them by other professionals, including occupational therapists (OT), physical therapists (PT), nurses, other speech-language pathologists, and various others. This was followed by hands-on experience, research, conferences, neurodevelopmental treatment training and previous practicum. Despite all of these, 75% of the SLPs surveyed for this study believed that changes in training could allow for better facilitation of their knowledge and skills, adding to the idea that shifts in education need to be made to align with the roles of SLPs in the NICU.

When asked open-ended questions regarding what knowledge and competencies they recommended for SLPs in the NICU, the respondents replied with multiple areas of knowledge, which were compiled into a list (Dunn et al., 1993). This included, but was not limited to: neonatal neuroanatomy/physiology; fetal development; normal and abnormal development in cognitive, communicative, feeding/oral motor, motor, and social-emotional domains; positioning and handling of neonates; medical issues, terminology, and diagnoses; medical equipment; and how associated problems have an impact on developmental expectations, anatomy and physiology of the neonate, and respiration. The SLPs surveyed expressed a need for formal coursework at the graduate level to address the unique considerations during treatment and intervention of preterm infants in the NICU, who are medically fragile, as well as suggestions of practicum opportunities, workshops geared specifically for SLPs working in NICUs, videotape/hands-on training, and observations of experienced professionals in the NICU. The knowledge expected of SLPs in the NICU setting is specialized in order to best carry out their roles.

Beyond the content of what SLPs in this setting should know, these respondents recommended that they utilize other professionals (OT, PT, etc.) as resources; maintain public relations with physicians by attending rounds, care plans, and discharge meetings; obtain and/or update information through attending continuing education (CE) workshops and completing independent reading; clarify to others, physicians in particular, that their services are fulfilling a unique role and not taking over areas already covered by nursing staff; and provide interventions through a multidisciplinary team (Dunn et al., 1993). It was also determined that there is a definitive need to enhance the education of medical professionals regarding the role of the speech-language pathologist in the NICU and how the SLP's expertise could improve infants' functioning. SLPs have begun establishing a diagnostic and therapeutic role within the NICU throughout the United States, a role that is multifaceted, and their skill set in providing assessments, intervention of feeding skills, and education to other professionals and parents is unique.

The environment of the neonatal intensive care unit (NICU) as a whole serves as a source of significant stress for parents (Ward, 2001). There are a number of reasons as to why the NICU is a place of high anxiety and tension for parents, many of which are aspects of the NICU surroundings, such as loud sounds, unpleasant sights and procedures, crowds of healthcare professionals. Other factors include alterations in parental roles, uncertainty of the infant's outcome, and ineffective communication amongst healthcare professionals and parents. In cases like this, stressful experiences in the NICU can lead to multiple barriers in parent-infant interactions. Keeping these in mind, some goals for healthcare providers in the NICU should be to provide holistic, family-centered care and enhance the best possible outcome for the patient. While working to achieve the best outcomes for patients, it is important for healthcare

professionals in the NICU to recognize and address the perceived needs of parents of the patients. SLPs must work with the parents and caregivers, providing support, knowledge, and reassurance for them in these times of heightened anxiety and stress.

Parents of NICU infants participated in a 56-question statement inventory in which 56 various “need” statements were provided to them, each categorized by what kind of need is being met (Ward, 2001). For example, some needs were designed to provide parents with information, some were designed to provide comfort to the parents, and some were designed to assure NICU parents of the care and skills of the team of professionals. They were asked to choose and rank their top ten needs based on what they feel they need from the NICU setting and the experience as a whole. The needs determined by the parents to be the most helpful were assurance needs, proximity needs, and information needs, such as knowing exactly what is being done for their infant and being assured that their infant is receiving the best possible care. SLPs carry out these roles by explaining assessments and treatments prior to conducting them and possibly while conducting them so that all those involved know what is happening. In addition, by having a strong knowledge base and conveying that in conversations with these parents and caregivers, SLPs are ensuring that these individuals know that their infants are receiving the best care. Knowing about these needs are essential to providing the best care to infants because as the support for this fragile population, parents and caregivers need to have confidence in their child’s care team and in themselves in order to best support their child and provide a more positive environment for growth and development. SLPs are trained in these areas of assurance and other forms of counseling for parents within their coursework, but there is always room to know more, especially when considering NICU infants as the patients.

One article brought to light the unique qualifications of SLPs for providing services as early intervention providers for children that have speech, language, and swallowing disorders as well as children at risk of them (“Speech-Language Pathologists and,” 2003). The article stated that learning typical development of cognition and communication as well as having experience working with young children with speech, language, and swallowing disorders are required aspects of an SLP’s graduate program, academically and clinically. SLPs are qualified to treat any of these disorders in children as young as infants, even those that are born pre-term.

Roles as Defined by ASHA

As SLPs became more involved in the NICU setting, ASHA released a statement that established the primary roles and responsibilities of speech-language pathologists in the NICU. According to ASHA, SLPs must be knowledgeable and capable in the delivery of team-based services to preterm infants, as well as medically compromised infants, and their families (American Speech-Language-Hearing Association, 2004). Some basic competencies for SLPs in the NICU include normal embryology, perinatal/postnatal infant development, anatomic structure and function, and an understanding of modern research in neurobiology, physiology, and genetics in relation to infant behavior. SLPs should also be knowledgeable of atypical infant development, which can consist of theories, research findings, risk factors, etiologies, and medical conditions.

Maintaining hydration and nutrition through various feeding methods is also crucial to SLPs working in the NICU, and being able to know the advantages and risks of different methods and make informed decisions regarding treatment is especially important (American Speech-Language-Hearing Association, 2004). ASHA also laid out guidelines for family-centered practices and team-based processes. This included skills that SLPs should be competent

in, such as educating caregivers and staff, performing developmentally appropriate assessments, identifying normal structure and function versus abnormal structure and function, and recommending appropriate techniques. At a very high level of importance is providing education, counseling, and other forms of support to families of NICU infants as well as other caregivers and staff regarding preferred practices in the NICU.

Continuing and Evolving Roles in the NICU

Following the release of ASHA's statement, the idea of cross-training in relation to dysphagia treatment was reviewed and the ethicality of it was considered ("Cross-training in Dysphagia," 2006). The issue of speech-language pathologists being asked or told by their employers to train other professionals to assume their roles placed significant pressure on them. Cross-training may occur across many different settings, not just in the realm of SLPs in dysphagia treatment, due to personnel shortages or budget limitations when employers are looking for a quick and inexpensive solution. A 2006 ASHA Leader article reviewed various position statements that ASHA released relating to cross-training as well as the roles of SLPs in swallowing and feeding disorders. The 1997 position statement referenced was related to multi-skilled personnel, explaining that cross-training of clinical skills at the professional level is not appropriate. Cross-training of clinical skills is defined as involving training other practitioners of one discipline to perform services that are traditionally regarded and accepted as within the scope of practice of another discipline for the purposes of efficiently meeting the needs of the patient caseload. The 2001 position statement that ASHA released about the roles of SLPs in swallowing and feeding disorders, referenced previously, stated that the SLP plays a primary role in evaluating and treating infants, children, and adults in the realm of swallowing and feeding, and it also lists different appropriate roles for SLPs, none of which involve training others to

provide dysphagia services. It is made clear in this article that treating dysphagia is a service that SLPs should provide, and that ASHA members should advocate for it now and in the future.

In a 2005 Healthcare Survey referenced in a graduate curriculum released by ASHA, 87% of speech-language pathologist respondents working in healthcare settings indicated they were the primary providers of dysphagia services in their facilities (American Speech-Language-Hearing Association, 2007). In contrast, only 16% of those SLPs working in healthcare settings reported that they provide dysphagia services to infants and/or children. Despite SLPs treating less children than adults for dysphagia, this number could indicate a lack of available sites of treatment or properly qualified individuals. As stated in the 2001 position statement referenced by this curriculum, diagnosis and treatment of swallowing disorders are both included in the scope of practice of SLPs. ASHA and the Council of Academic Accreditation (CAA) decided that graduate programs must respond to the education and training demands that arise in this scope of practice and provide students with the proper knowledge and skills that are required to effectively evaluate dysphagia as well as treat it across a variety of populations and practice settings.

Beyond the level of a graduate curriculum, it is the duty of SLPs to communicate with parents in the NICU (American Speech-Language-Hearing Association, 2007). If SLPs are not effective communicators, it can lead to patient dissatisfaction, increased complaints, and overall unease. Family-centered care, the curriculum explains, should be based on open communication and honesty between parents and individuals. While it is difficult to maintain effective communication as SLPs in the NICU setting due to the high pressure and hostile environment, it is necessary to be as family-centered in your approaches to care as possible so as to make for smoother treatment interventions. While SLPs are actively assessing and treating NICU patients,

developing relationships with parents and caregivers as well as educating them are equally important aspects that contribute to these seamless interventions and overall result in the best outcomes for patients.

Because of the difficulties a preterm infant can often have with the suck, swallow, and breathe functions, facilitation of oral feeding skills is typically a key focus in the neonatal intensive care unit (Arvedson et al., 2010). Rates of rehospitalization for preterm infants is much higher than for infants carried to term, and among the most common causes for readmission is feeding difficulty. If these issues are left unresolved, they can often persist and have long-term consequences. Even common medical procedures, like intubation, tube feeding, and suctioning, may be contributing factors to the disturbance of sucking and swallowing development. These procedures can lead to oral sensory and motor dysfunction because of negative experiences for the infant in the NICU (Arvedson et al., 2010). Gaining the ability to orally feed is frequently a primary criterion required to be discharged from the NICU for healthy preterm infants. The NICU setting provides a solid foundation for the continuation of a preterm infant's feeding development after being discharged from the hospital. SLPs work to intervene in feeding and swallowing in the NICU to minimize the risk of difficulties or complications later in infants' lives.

Most Recent Discoveries and Role Adaptations

In more recent years, there has been a variety of individuals, groups, and organizations that have been researching the roles of speech-language pathologists in treating feeding and swallowing disorders in preterm infants in the NICU as well as the educational and overall training needs of professionals in this field. One article examining this topic stated that incidence of premature birth has increased by over 2% in thirty years, from 9.4% in 1981 to 11.72% in

2011, and that the incidence of pediatric dysphagia is estimated to range from 25% to 45% in children that develop typically and 33% to 80% in children with developmental disorders (Zimmerman, 2016). Preterm infants make up more than 40% of the patients followed in feeding disorder clinics, which can be partially due to untreated feeding problems from infanthood that persist into early childhood and can then manifest as long-term feeding disabilities. While SLPs are vital members of the interprofessional care team for premature infants as well as their families, they often enter the NICU environment (and other pediatric dysphagia settings) lacking the area-specific training that would have better prepared them to work with these fragile, medically complex infants.

As stated by Zimmerman, ASHA encouraged graduate programs to evolve, increasing education and training demands as well as providing students with the knowledge and skills necessary to meet the needs for evaluating and treating dysphagia (2016). Experience in adult dysphagia does not qualify an individual to provide assessment or management services for pediatric dysphagia, and the education gained in the area of adult dysphagia is not sufficient in the case of pediatrics or NICU settings. Despite this being the case, courses in pediatric dysphagia are not often embedded into the curriculum for SLP master's programs, which places SLPs and pediatric dysphagia patients both at a disadvantage. Upon this discovery, a study was completed to estimate how many SLP master's programs offer pediatric dysphagia courses and, similarly, how well-prepared SLPs feel to work with this particular population.

Of the top 100 speech-language pathology programs examined from the 2012 U.S. News and World Report's Best Graduate School Rankings, later expanded to 107 programs due to several programs not responding, only 21 offered a pediatric dysphagia course separate from adult dysphagia, not including those that had a general dysphagia course that covered pediatrics

within a unit (Zimmerman, 2016). From that point, Zimmerman sent a survey using the Survey Monkey® web portal via email attachment to a local SLP pediatric dysphagia group as well as posted on ASHA's Special Interest Group 13: Swallowing and Swallowing Disorders discussion board. In total, 175 SLPs' responses were used for analysis. These participants were divided into two groups based on their answer to whether or not they took a pediatric dysphagia course. Of the participants, 51 of them, or 29.14%, completed a pediatric dysphagia course during their master's program, and the remaining 124 participants, or 70.86%, did not complete one. In response to the question of how prepared the SLPs felt to work with the pediatric dysphagia population, 62.70% of those who completed a pediatric dysphagia course felt somewhat or very prepared to work with them, while only 23.33% of those who did not complete a pediatric dysphagia course felt somewhat or very prepared to work with them. The majority of participants who did not take a pediatric dysphagia course felt unprepared to work with this population.

SLPs can work in a variety of settings, and the coursework should reflect the specificity required of each of these settings (Zimmerman, 2016). An SLP working in the NICU setting should have an in-depth knowledge and understanding of medical issues that infants can face in the NICU, comorbidities that NICU infants can experience, and short-term as well as long-term complications that may impact feeding as well as speech and language development. Based on these roles, which are very similar to those outlined in years prior, the level of complexity of which a speech-language pathologist must understand medically requires a separate pediatric dysphagia course and cannot be covered in its entirety in a few hours within an adult-focused dysphagia class. Despite this reasoning being shared by ASHA as well as stated within their code of ethics, the majority of SLP master's programs themselves do not offer the additional coursework it would require to align them with ASHA's views. While continuing education

units, or CEUs, are necessary for SLPs to remain up-to-date as well as receive additional education and training, they do not provide, it explains, the in-depth level of coursework that a graduate level course provides. This article concludes that it is imperative to focus on adding this specific area of training by offering pediatric dysphagia courses for those interested in working with this population after graduation, and that such a course should include the topics of premature infants, the NICU environment, interprofessional teams, pediatric ICU, assessments and treatments completed with pediatric populations, and large focus on current research in the field. Pediatric dysphagia is, arguably, on the rise, and very few SLP master's programs in the United States offer a pediatric dysphagia course to align with the specific knowledge and skill set that is likely to make SLPs feel more prepared to work in a setting as specialized as the NICU. As roles of SLPs grow and change, they begin to rely on more unique skills and competencies, which leads to the need to implement updated coursework and practical experiences in order to keep up with these evolving responsibilities. Having a separate course for this topic may add weight to the SLP's ability to get a job within the NICU or other specialty feeding clinics because of the specific knowledge required in the field as well as the more recent changes in the knowledge and competencies required. This will, as a result, improve the overall experience and result of inter-collaborate care and improve outcomes with fragile infants.

Oral feeding readiness in preterm infants is often a concern towards the end of hospitalization (Kamity et al., 2021). Other major medical concerns are typically handled first and foremost, leaving the issue of oral feeding to be resolved later (Kamity et al., 2021). The long-term impact of the altered development of oral motor skills and abnormal feeding from not prioritizing oral feeding early on is not clear mostly due to a lack of studies on adults born preterm (Kamity et al., 2021). In treating infants with feeding or swallowing disorders, speech-

language pathologists in the NICU may be caught between two goals: facilitating "infant-led" feedings, and to minimize the infant's stay in the NICU (Arvedson & Ross, 2022). These goals are actually not unrelated because having the appropriate support of early feeding skills leads to quality feeding experiences as well as discharge to home. Although most NICUs focus on using developmentally supportive care, reducing the length of the infant's stay continues to be a major factor in care provided. Evidence suggests that the average age for reaching full oral feedings in healthy preterm babies is 36.5 weeks gestation, regardless of intervention. Oral feeding, it is explained, is a developmental skill that is, in large part, driven by maturation. However, approximately 40% of infants discharged from the NICU will demonstrate a feeding or growth problem in their first four years, even if they did not display any obvious feeding problems during their time in the NICU. This can be targeted by changing the focus of infant feeding from volume-driven to more developmentally appropriate experiences, and it may lead to improved feeding outcomes and less of a need for ongoing feeding therapy sources, beginning with helping parents to create positive experiences in feeding, as the primary feeders, in order to nurture development and the desire to eat.

A group of speech-language pathologists, physical therapists, doctors, psychologists, nurses, and family representatives came together from 2014 to 2015 to develop an evidence-based framework complete with guidelines to optimize the entire NICU environment and facilitate feeding (Arvedson & Ross, 2022). Once this international interdisciplinary group incorporated feedback, the committee published "Developmental Care Standards for Infants in Intensive Care" in 2021. These practices include the feeding, eating, and nutrition aspects of NICU treatment as well as other areas such as positioning and touch, reduction and management of pain and stress, and sleep and arousal. These standards explained that the competencies

outlined apply to physicians, nurses, and other healthcare professionals, as well as SLPs, because they are each separate components relevant to the NICU as a whole. If SLPs do not have background regarding any of these concepts, the quality of care will be lower for patients. In an attempt to avoid this lower quality of care, shifts and expansions of education in these areas for SLP students wanting to someday work in NICU are necessary.

In many units, the NICU staff as well as speech-language pathologists are the infant's primary feeders, and NICU policies may even encourage the "expert" to feed the infant (Arvedson & Ross, 2022). While family members often have natural expertise regarding their own infants when it comes to typically developing infants, families and caregivers of infants in the NICU need extensive education on the safest ways to feed them. The primary focus of SLPs regarding the feeding, eating, and nutrition standards is bringing the parent or primary caregiver to the center of simultaneously safe and enjoyable feeding. In the standards previously mentioned, it is specifically laid out that feeding experiences should not only be behavior-based, but that they should be baby-led, regardless of feeding method (breastfeeding, bottle feeding, or other methods). The SLP's role in this situation is to help the family understand their infant's communication and to respond appropriately to it. The article explains that SLPs are experts in communication and feeding/eating skills, and placing the family in the center of the decision-making process and partnering with SLPs to build skill and confidence is of much importance to the infant.

Inter-Collaborative Care

While speech-language pathologists have their own unique roles in the neonatal intensive care unit, teamwork is crucial in situations of caring for infants in the NICU primarily because it is necessary to consider other perspectives in order to see the whole picture. Occupational

therapists, physical therapists, and speech-language pathologists work hand-in-hand and work closely with each other in the NICU setting. Roles of SLPs as a part of one of these teams can vary slightly depending on the particular place, but across NICUs, the strength and effectiveness of each interdisciplinary team working there is a major factor as to what enables these infants to thrive. SLPs have consistently worked with other professions in the NICU, such as nurses and physicians, but the collaboration as a part of a team to develop a care plan together is a much more recent concept, as is planning treatments with each other.

It is explained that physical therapists (PTs), occupational therapists (OTs), and speech-language pathologists work to coordinate their care for newborns and try to "cluster" it in order to give the infant the maximum amount of rest between interventions (Spellman, 2019). Cluster cares are grouping treatments together so infants can have longer periods of neuroprotective rest between feedings and other interventions. This could consist of the PT or OT working with the infant before or after the SLP does a feeding or providing alerting therapy before PT or OT care if the infant does not tolerate being woken after a feeding. OTs take the lead in infant massage for waking and regulating the baby for feeding, whereas PT works on gross motor skills that support postural stability, which is important to establishing functional feeding and swallowing skills. For older infants, this could include various positioning options, based on any of the concerns that the OT or PT may have.

Each of these disciplines has its own specific and unique expertise and perspective that they bring to the NICU team (Spellman, 2019). For physical therapists, this consists of positioning and gross motor control movement, which are important for efficient feedings. Occupational therapists, however, have roles more on the side of sensory integration and the education of families and staff, such as teaching parents and NICU staff members how to help

infants participate and regulate for functional activities. OTs promote an infant's ability to self-soothe or be soothed by others as well as incorporate fine motor and visual motor skill development. They also, as previously mentioned, take the lead in infant massage and teach infant massage to other staff. PTs and OTs are professionals in their respective fields based on their knowledge and educational backgrounds, and this education is different from that which SLPs receive in graduate programs. SLPs have the overall roles of feeding and swallowing in the NICU based on their backgrounds in dysphagia, therefore it is important for them to have good relationships with the other members of an interprofessional team in order to provide the best possible care for the infants and their families. However, the depth of educational experiences with pediatric dysphagia and NICU feeding and swallowing can have an effect on confidence in being able to work as a part of a team to provide the best quality of care. SLPs and the other professionals on the inter-collaborative teams have a proactive approach to development rather than the "wait and see" approach. Each discipline will determine when it is most appropriate, clinically speaking, to initiate consults, and after assessment is when SLPs help determine a recommended therapy frequency. Having multiple sets of eyes on an infant patient may mean that someone takes notice of something that otherwise would have been missed.

Maintaining good relationships and teamwork skills with other professions in your workspace while still maintaining individual roles unique to each profession is a balance (Spellman, 2019). The goal is to provide the infants with the best possible care, which is not done by providing interventions in which other disciplines feel they have the most expertise and/or experience. Being open and willing to communicate is key. Collaboration can occur regarding frequency of sessions as well as main goals and priorities of the therapy care plan, which is based not only on the families' needs but also on what the infant can tolerate. More

fragile infants may not tolerate sessions with the PT, OT, and SLP every day, meaning that it is necessary to prioritize which therapy is most critical at any given point. These three disciplines make up the NICU Core Team, meeting for projects, including presenting to NICU staff and establishing NICU competencies for other members of the therapy team. This idea of collaboration across disciplines in the NICU was present prior to ASHA's statements regarding SLPs' roles, but the idea of working so closely with others was not determined to be a key role until it was outlined in the statement regarding knowledge and competencies of SLPs working in the NICU (American Speech-Language-Hearing Association, 2004). Early intervention from all three professionals can support better long-term outcomes in cognition, language development, sensory processing, and motor development because the neuroplasticity of an infant's brain makes the newborn period a critical time.

As the scope of practice for SLPs has evolved over the years, clinicians in a wide variety of practice settings have redefined their roles and expanded their knowledge base to provide the highest quality of services to the growing population of people with communication and swallowing disorders ("Role Ambiguity and," 2009). Collaborative models of care have been a large part of the changes being made, factoring in new skills of dynamics and conflict resolution. With these roles shifting so rapidly, this raises questions of boundaries and overlap in scope of practice between SLPs and other professionals. Increased demands in the hospital setting require specialized knowledge and skills which go beyond the generalized scope of practice of SLPs as well as being required to do more with less, focusing on protocol-based practices. In addition, the shortage of qualified personnel has resulted in hiring individuals that do not have the proper qualifications to reasonably perform the work of SLPs. While ASHA's position is that SLPs do not "own" any aspect of their scope of practice and cannot dictate what other professions can or

cannot do, SLPs must understand other team members' expertise while articulating their professional value regarding their unique knowledge and skills in the NICU ("Role Ambiguity and," 2009).

One document released by ASHA that has since been updated specifically outlined knowledge and competencies required of applicants in order to be considered to be a certified SLP, and it went into effect as of January 2006 ("2005 Standards and," 2005). As stated in Standard III-B, applicants must show knowledge of basic communication and swallowing processes, including biological, neurological, psychological, developmental, acoustic, linguistic, and cultural factors. In the implementation of this standard, emphasis is placed on information relating to normal and abnormal development regarding both communication and swallowing. Documentation of this knowledge may include credit on a transcript, clinical experience, research projects, or independent studies. Within Standard III-C, knowledge and competencies of applicants included communication and swallowing disorders and their etiologies, characteristics, and anatomical and physiological aspects. Specifics included oral function for swallowing as well as phases of the swallow. Coursework regarding the implementation of this knowledge is expected to occur primarily at the graduate level, and the documentation is the same as Standard III-B, meaning coursework can reflect this knowledge. As explained in Standard III-D, applicants must possess knowledge of the prevention, assessment, and intervention for people with communication and swallowing disorders as well as the principles and methods associated with each, which included anatomical and physiological aspects as well as psychological and developmental aspects and how cultural factors affect these. Documentation regarding this standard once again included transcript credit as well as other methods. Within the concept of program of study, Standard IV-G stated that applicants must

complete a program of study that includes supervised clinical experiences that were sufficient enough to achieve certain skills outcomes, including providing counseling regarding communication and swallowing disorders to clients or patients, family members, caregivers, and other relevant individuals. Acquisition of these skills in the nine major areas of practice, as listed in Standard III-C, must be documented through clinical practicum experiences, academic coursework, labs, examinations, and various other methods. All of these standards helped to determine that swallowing and the disorders associated with it are within the knowledge and competencies of certified SLPs, and that coursework should be reflective of the standards, which explains the addition of a dysphagia course. It would seem reasonable that the establishment of these roles would lead to the addition of a dysphagia course for graduate curriculums that align with the knowledge and competencies explained in the document, meaning that this document is the closest indicator as to when dysphagia courses were implemented in ASHA-accredited graduate programs.

Analysis/Discussion

The purpose of this research was to determine the progressive role of speech-language pathologists in performing feeding and swallowing interventions in preterm infants in the neonatal intensive care unit and to evaluate the education SLPs receive regarding this setting and how it aligns with the needs of the NICU population. This was completed through the review of literature prior to ASHA's official stance, the official statement itself, literature after ASHA's statement, the most recent discoveries and adaptations of SLP roles, and the roles regarding inter-collaborative care in the NICU. This discussion aims to analyze SLPs' roles working with this population and how they have evolved to fit the needs of the NICU as well as whether education of students has kept up with these changing roles. This analysis shows the importance of SLPs having unique roles in treating preterm infants regarding feeding and swallowing and supports the idea of these roles adapting over time to better serve the NICU.

Interpretations/Implications

From the beginning of this research, SLPs have held positions in the NICU, but these roles were not as clearly defined as they have come to be within the past few years. From the survey conducted by Dunn et al., it was concluded that while some roles of SLPs in working with infants and toddlers have been receiving more attention, the lack of preparedness that SLPs feel about working in the NICU has had little documentation (Dunn et al., 1993). From the data collected in this article, very few (11%) of the SLPs that took the survey worked specifically with the birth-to-three population, which aligns with the fact that only 9% of those surveyed worked more than 20 hours weekly in the NICU. Based on a typical 40-hour work week, this implies that there are very few SLPs working specifically with the NICU population with caseloads consisting entirely of NICU patients. The knowledge and skills explained by Dunn et

al. have significant similarities to those later detailed in ASHA's 2004 position statement, supporting its accuracy and relevance.

The ASHA Leader in 2006 made statements on the roles of SLPs in treatment of dysphagia and how it is not professionally appropriate to cross-train individuals from other health-related professions to carry out these roles ("Cross-training in Dysphagia," 2006). Various position statements in this article referenced from ASHA laid out guidelines relating cross-training and feeding and swallowing disorders, stating that SLPs play a primary role in evaluating and treating infants as well as other ages in this area, and that training other professionals to do so is not within these roles and responsibilities outlined. This is supported by the 2003 article that stated that SLPs are uniquely qualified to provide these services from an early intervention standpoint in the field of swallowing ("Speech-Language Pathologists," 2003). SLPs as ASHA members are encouraged to advocate for themselves in performing these roles to avoid cross-training ("Cross-training in Dysphagia," 2006). SLPs having confidence in their knowledge, competencies, and skills will allow for better treatment outcomes for preterm infants in the NICU setting.

Because 87% of respondents in a survey for SLPs working in healthcare settings indicated that they were the primary providers of treatment for dysphagia in their respective facilities, it can be concluded that SLPs have secured the main role in evaluating and treating feeding and swallowing disorders (American Speech-Language-Hearing Association, 2007). This is, of course, not universally accurate based on just this one survey, but it aligns with the 2001 position statement from ASHA describing that diagnosis and treatment of dysphagia are included in the scope of practice of SLPs, showing that these roles have maintained their importance consistently through the few years between the two pieces of literature. At the same

time, roles in providing dysphagia services within this specific age group are not as widely heard of or completely accepted, even as of less than 20 years ago. This is why it was ultimately decided that graduate programs needed to respond to the demands of SLPs working in these setting and provide more up-to-date and relevant information that are more applicable within the scope of practice. One way to accomplish this is by providing the proper knowledge and skills to be competent in effectively evaluating dysphagia and treating it across various populations, including preterm infants, and settings, including the NICU in hospitals.

Another highlighted role that is directly related to the preterm infants in the care of SLPs is providing education and training to parents and caregivers in the NICU. Providing family-centered care as well as educating family members and staff is referenced in ASHA's official statement on SLPs in the NICU from 2004 and supported by the 2001 article on "Perceived Needs of Parents of Critically Ill Infants in a Neonatal Intensive Care Unit" that stated goals for healthcare providers should align with what provides parents with the most support and lead to the best possible outcome for the patient. Also adding to the significance of this particular role is the 2016 article that mentioned the significance of being able to effectively communicate with parents, stating that not doing so could lead to patient and parent dissatisfaction and overall unease. SLPs in the NICU are not only focusing on their tiny patients but also on the family members and caregivers of the tiny patients in this stressful setting. Working with parents to bring them to the center of the feeding is essential because parents and caregivers will often have a natural expertise when it comes to typically developing infants, but they need assistance in how to best promote safe feedings in NICU infants. This also applies in the sense that SLP students are trained within coursework on how to counsel patients and families and advocating for their

best interests. SLPs are tasked with helping the family understand their infants' communication in the NICU and respond to it appropriately, aiding in parent-infant interactions.

SLPs have many areas in which they need to maintain in-depth knowledge and competencies from an academic standpoint regarding feeding and swallowing in preterm infants, which include typical and atypical fetal development, anatomy and physiology of the speech and swallowing mechanisms, neuroanatomy and physiology, any related difficulties and disorders associated with prematurity, and various other topics, as laid out in the 2004 statement presented by ASHA. Each of these identify different areas which SLPs should not only be familiar with but confidently knowledgeable about in both coursework from an educational perspective but also in experience from clinical work, like externship experiences. As explained in the 2016 article, having knowledge and experience with adult dysphagia does not provide the same level of expertise that receiving additional coursework and training in pediatric dysphagia would give to SLPs desiring to work in the NICU setting (Zimmerman). Courses in pediatric dysphagia are not offered in all graduate programs for speech-language pathology, and SLPs that want to work in this field will require different skill sets that typical dysphagia courses provide. This is further supported in the survey of SLPs working in the NICU setting, where a direct positive correlation could be noted between having a pediatric dysphagia course and increased levels of preparedness to work with the NICU population, and having these increased confidence levels can be associated with providing the highest standard of care for preterm infants in the NICU. This implies that in order to provide the best possible care for these infants, SLPs and ASHA members in general should advocate for shifts in SLP students' education as well as more opportunities working with NICU infants in graduate clinical experience. This aligns with the overlying role of SLPs in advocacy for themselves as qualified professionals and for the proper

education and training across various settings in order to provide the best possible care for their clients or patients.

Having experience working with other healthcare professionals is shown to improve the quality of care for the patients and improve the overall experiences for parents and caregivers (Spellman, 2019). This supports the idea that SLPs require the ability to work as a part of a care team and the overall quality of collaboration in a work environment. Not having the teamwork skills necessary to work with other professionals leads to more stress and less effective communication and treatment in this setting. Having this communication with cooperating healthcare professionals is a necessary skill for working with parents of preterm infants in the NICU, adding to the overall success in this setting.

Limitations

Within the research regarding roles of SLPs treating feeding and swallowing in the NICU, there were various limitations. One such limitation of this study was the limited amount of research available regarding this topic. Because feeding and swallowing in the NICU is not widely popular and still relatively new in the realm of SLPs, there are not many reliable studies or resources covering the work of SLPs, making it difficult to conclude that roles of SLPs in the NICU regarding feeding and swallowing are unique and ever-changing in every situation. In addition, the overall specificity of this topic led to a difficulty in finding enough material to fully reach a conclusion in relation to the overall question of this research area. Personal biases, limited sample sizes, and differences in background and experiences of various respondents are all aspects that may have impacted whether these research findings may apply universally or if they are exclusive to particular studies or groups.

Recommendations

Examining outcomes of NICU feeding and swallowing interventions in relation to an SLP's educational background should be done in order to determine whether education does have an effect on these interventions. More resources overall for SLPs, ASHA members, other healthcare professionals, and parents of NICU infants on these topics should be provided, meaning more surveys and studies should be conducted. It would also be beneficial for more focus on inter-collaborative care to be taken into consideration regarding SLPs working in the NICU due to the amount of collaboration required in the field. Also beneficial to the improvement of this area would be considering various other medical factors, such as cerebral palsy, cleft lip or palate, and breathing problems, and how they affect dysphagia, as that would add to training and skill sets that SLPs will need to have in order to properly treat these medically fragile infants. Noting shifts in the roles and responsibilities of SLPs working in the NICU has led to the question of what changes have been made regarding the education offered for the assessment and treatment of this population, which has not been evaluated thoroughly within this research. Building upon this idea by looking into what has and has not been changed to fit the needs of NICU SLPs would lead to professionals being able to advocate for proper education and training based on what ASHA has laid out regarding roles and responsibilities.

Conclusion

The results of this research provide some insight as well as a generalized understanding as to what the roles of speech-language pathologists are in the NICU setting and how they have grown and evolved over time. It has also shown the direction in which these roles may shift in future years. The information collected from this literature review showed that roles of SLPs are not only extensive in content but also ever-expanding, each of which holds significance relating to the care of infants and proper communication and interaction with their parents and caregivers as well as other staff in the NICU. Knowledge of these specific roles and competencies as well as the necessary educational backgrounds can lead to SLPs advocating for themselves in order to take their places as valuable members of the NICU care team as well as advocating for changes in education and training to better provide services in this area. Examining how these roles were implemented early on compared to the roles assigned to SLPs currently led to the conclusion that while SLPs have the same general roles, some areas have grown and otherwise been properly outlined, such as interdisciplinary collaboration in treating preterm infants and the importance of family-centered practice. With that, the educational responsibilities have shifted, and coursework and training experience should make shifts as well in order to reflect these changes and to better serve the NICU population. Overall, speech-language pathologists have a unique and important role in treating preterm infants in the NICU regarding feeding and swallowing, and this research supports the idea that these responsibilities and competencies have changed and will continue to do so as the needs of the patients continue to change.

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