

**FEEDING AND SWALLOWING IN THE FIRST TWO YEARS OF LIFE: WHAT  
ROLE FOR THE SLP**

by

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**ABSTRACT**

**Background**

Infant feeding and swallowing disorders are increasing in prevalence due to medical advances and improved outcomes. Many professionals may work with these infants; however, professional roles in infant feeding remain undefined. Should speech-language pathologists be members of infant feeding and/or swallowing teams? What influences opinions and knowledge: formal education and/or increased experience in the field?

**Aims**

1. What do undergraduate students, graduate students, and certified clinicians think about the SLPs as members of infant feeding and swallowing teams?
2. Where do undergraduate students, graduate students, and certified clinicians report learning about the role of the SLP in infant feeding and swallowing disorders?
3. When would undergraduate students, graduate students, and certified clinicians choose to learn about infant feeding and swallowing disorders?

**Method**

An anonymous survey was created and distributed to students (n = 98) and certified clinicians (n = 90) via the secure Qualtrics Survey System.

## **Results**

A majority of students and clinicians agreed that it is extremely important to use a team based approach to care for infants with feeding and/or swallowing disorders (undergraduate students 50%, graduate students 77%, clinicians 87%). The participants reported learning about infant feeding and/or swallowing disorders in a variety of settings. The percent of participants who reported never having learned about this topic varied (undergraduate students 42%, graduate students 27%, and clinicians 2%). More undergraduate students would choose to learn about this topic as a part of their undergraduate education (83%), while graduate students (78%) and clinicians (51%) would choose to learn as a part of their graduate education.

## **Conclusion**

Regardless of experience, speech-language pathology students and clinicians believe that SLPs do have a role on an infant feeding and/or swallowing team. The training that is provided for SLPs who wish to work in this highly specialized area is inconsistent and dependent upon available academic resources. Providing education during formal class and/or clinic is important to the participants in this study. It is necessary to understand that this education may provide a false sense of competency and may potentially influence the likelihood of students to continue seeking out educational and hands-on learning opportunities.

## TABLE OF CONTENTS

<b>PREFACE.....</b>	<b>XIII</b>
<b>1.0 INTRODUCTION.....</b>	<b>1</b>
<b>1.1 EATING AND DRINKING .....</b>	<b>1</b>
<b>1.2 SOCIAL ASPECTS .....</b>	<b>2</b>
<b>1.3 NUTRITIONAL ASPECTS.....</b>	<b>3</b>
<b>1.4 NUTRITIONAL DEVELOPMENT .....</b>	<b>4</b>
<b>1.4.1 Prenatal development .....</b>	<b>5</b>
<b>1.4.2 Development throughout infancy .....</b>	<b>5</b>
<b>1.5 FEEDING DEVELOPMENT.....</b>	<b>7</b>
<b>1.5.1 Feeding development .....</b>	<b>7</b>
<b>1.5.2 The feeding relationship .....</b>	<b>9</b>
<b>1.6 FEEDING AND SWALLOWING DISORDERS.....</b>	<b>10</b>
<b>1.6.1 Feeding disorders .....</b>	<b>10</b>
<b>1.6.2 Swallowing disorders across the lifespan.....</b>	<b>11</b>
<b>1.6.3 Special considerations for infants.....</b>	<b>13</b>
<b>1.6.4 Prematurity .....</b>	<b>16</b>
<b>1.6.5 Congenital conditions .....</b>	<b>18</b>

1.6.6	Consequences of feeding and swallowing disorders .....	19
1.7	<b>WORKING WITH INFANTS WITH FEEDING AND/OR SWALLOWING DISORDERS.....</b>	<b>21</b>
1.7.1	History.....	22
1.7.2	Professionals .....	23
1.7.3	Roles of SLP.....	24
1.8	<b>RESEARCH QUESTIONS.....</b>	<b>26</b>
1.8.1	Aim .....	26
1.8.2	Importance.....	27
2.0	<b>METHODS .....</b>	<b>28</b>
2.1	<b>PARTICIPANTS .....</b>	<b>28</b>
2.1.1	Students.....	28
2.1.2	Clinicians .....	29
2.2	<b>SURVEY .....</b>	<b>30</b>
2.2.1	Qualtrics.....	31
2.2.2	Human Research Protection Office.....	32
2.3	<b>DATA ANALYSIS.....</b>	<b>32</b>
2.3.1	Characterizing populations.....	33
2.3.2	Research question 1: Perception of roles .....	33
2.3.3	Research question 2: Where did they learn.....	34
2.3.4	Research question 3: When would they choose to learn .....	35
2.4	<b>PILOT STUDY .....</b>	<b>36</b>
3.0	<b>RESULTS .....</b>	<b>38</b>

3.1	<b>SURVEY RESPONSES.....</b>	<b>38</b>
3.2	<b>DEMOGRAPHICS.....</b>	<b>39</b>
3.2.1	<b>Question 1: Perception of roles.....</b>	<b>42</b>
3.2.2	<b>Question 2: Where did they learn .....</b>	<b>48</b>
3.2.3	<b>Question 3: When would they choose to learn .....</b>	<b>55</b>
3.3	<b>NARRATIVE COMMENTS .....</b>	<b>57</b>
3.3.1	<b>Question 1: Perception of roles.....</b>	<b>57</b>
3.3.2	<b>Question 2: Where did they learn .....</b>	<b>60</b>
3.3.3	<b>Question 3: When would they choose to learn .....</b>	<b>61</b>
4.0	<b>DISCUSSION .....</b>	<b>63</b>
4.1	<b>RESEARCH QUESTION 1 .....</b>	<b>63</b>
4.2	<b>RESEARCH QUESTION 2 .....</b>	<b>65</b>
4.3	<b>RESEARCH QUESTION 3.....</b>	<b>69</b>
4.4	<b>IMPORTANCE OF INDIVIDUALIZATION .....</b>	<b>70</b>
4.5	<b>RECOMMENDATIONS FOR FURTHER STUDY .....</b>	<b>71</b>
5.0	<b>CONCLUSION.....</b>	<b>73</b>
5.1	<b>SUMMARY .....</b>	<b>73</b>
5.2	<b>LIMITATIONS.....</b>	<b>74</b>
5.3	<b>EDUCATIONAL SIGNIFICANCE.....</b>	<b>75</b>
5.3.1	<b>An educational caveat.....</b>	<b>75</b>
5.4	<b>CLINICAL SIGNIFICANCE.....</b>	<b>77</b>
	<b>APPENDIX A : SURVEY FOR STUDENTS.....</b>	<b>79</b>
	<b>APPENDIX B : SURVEY FOR LICENSED CLINICIANS .....</b>	<b>87</b>



**BIBLIOGRAPHY..... 96**

## LIST OF TABLES

Table 1. Demographic Data for Students.....	40
Table 2. Demographic Data for Clinicians .....	41
Table 3. Who should be working with infants with feeding and/or swallowing disorders .....	43
Table 4. What are some responsibilities that you think an SLP may have when working with infants with feeding and/or swallowing disorders? .....	46
Table 5. What are your main duties when working with infants who have feeding and/or swallowing disorders?.....	47

## LIST OF FIGURES

Figure 1 Phases of Swallowing.....	11
Figure 2 Infants with feeding and/or swallowing disorders should be cared for by a team. ....	42
Figure 3 Should SLPs work with infants who have feeding and/or swallowing disorders?.....	44
Figure 4 How important is an SLP to the infant feeding and/or swallowing team?.....	45
Figure 5 When you began working with infants with feeding and swallowing disorders did you have responsibilities that you did not feel qualified to do? .....	48
Figure 6 When did students and clinicians learn about infant feeding and/or swallowing disorders? .....	49
Figure 7 While in school did you have any class or clinic time that specifically discussed infant feeding and/or swallowing disorders? .....	50
Figure 8 How much class time did you spend on infant feeding and swallowing?.....	51
Figure 9 Who taught you about infant feeding and swallowing in class? .....	52
Figure 10 How much clinic time did you spend on infant feeding and swallowing?.....	53
Figure 11 Who taught you about infant feeding and swallowing in clinic? .....	54
Figure 12 When would SLP students and clinicians choose to learn about infant feeding and/or swallowing disorders?.....	55
Figure 13 If this material is addressed in school, should it be in class and/or clinic? .....	56

Figure 14 How important is it to have class or clinic time dedicated to infant feeding and/or swallowing disorders?..... 57

## PREFACE

This project never would have been completed without the honesty and enthusiasm of the students and clinicians who chose to answer the survey. Thank you to everyone who volunteered to share their knowledge and opinions with the hope of improving the educational experience for future speech-language pathologists.

To my family for your words of encouragement and for pretending to be as interested in infant feeding and swallowing as I am.

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**Why:** as an outsider watching friends care for their infant daughter with dysphagia, I was inspired by the comfort they received from the health professionals they worked with. As a graduate student clinician, I saw discrepancies in the role of the SLP as a member of the infant feeding and/or swallowing team. How do we ensure we are providing the best care to infants and their families if the role of the SLP is undefined?

**Nomenclature:** the term infant is used for all children from birth to two years of life.

## **1.0 INTRODUCTION**

There are many background factors that are important when discussing infant feeding and/or swallowing disorders. Understanding typical development helps us to recognize irregular patterns of growth. Development begins prenatally and continues through the lifespan. Typical development throughout infancy requires nutritional and physiological changes, as well as social relationships.

### **1.1 EATING AND DRINKING**

Eating and drinking are daily behaviors that most people do not think about. The procedure of taking a bite of food or a sip of a drink is well ingrained. Most people do not have to consider the steps that go into eating and drinking safely. Healthy individuals do not have to worry about choosing food that is easy to chew. Time is not spent finding drinks that can be swallowed without coughing or choking. They are able to buy, prepare, and consume what they eat and drink based on preferences or nutritional qualities. These people can incorporate eating and drinking as more than a life-sustaining behavior, but as a part of leading a fulfilling life. Eating and drinking with friends and family can be a celebration of life or death. Food and drink can help create memories of vacations, religious services, or holidays. Good food is something to

remember and share. There are many social and nutritional benefits that accompany eating and drinking.

## **1.2 SOCIAL ASPECTS**

Mealtimes are largely social activities and many community events revolve around food. These occasions provide social experiences for those involved while also giving the guests an opportunity to consume foods outside of their normal diet. Going out to eat can enhance solidarity among social networks of people and foster feelings of joy and contentment (Warde & Martens, 2000). The social component of mealtimes can change within cultures. For example, fasting plays an important role in all major religions. Even though fasting is the absence of intake, it is an indicator of devoutness and atonement. When those who do participate break their fast, it is often done in a group and with celebratory intentions. In Judaism this contrast between the fast and the celebration is analogous to the connection with the divine being: without the fast, this link would be lost (Smit, 2014). The ability to choose when one eats and when one does not, is just as socially and religiously important as the ability to eat at all.

Mealtimes provide children with the opportunity to observe and practice appropriate behaviors. Interactions during mealtimes offer a window into the social order of society (Ochs & Shohet, 2006). Children in different cultures assume different roles during mealtimes. Some children may dine separately from the family with a nanny. Children may be expected to remain silent during the meal, while others may participate in the discourse. This gives the child the chance to understand contextually appropriate comments, often with the guidance of a parent (De

Geer, 2004). The children may observe who is served first or where family members are seated. They may notice that the women are expected to prepare the food that the men gather. Every interaction during mealtimes will teach the child something about social roles and cultural appropriateness (Ochs, 2006). Interaction during mealtimes can help the child to develop his/her understanding of culture.

### **1.3 NUTRITIONAL ASPECTS**

Beyond the social aspects of mealtimes, proper nutrition can lead to an enhanced livelihood, such as decreased incidence of certain cardiovascular diseases (Richards, 2009). Elderly individuals in good health may be able to live independently for longer (Chernoff, 2002). Beginning and maintaining a nutrient rich diet can positively influence quality of life as one ages.

A lifestyle that includes nutrient deficient foods may negatively impact life. Improper nutrition can influence risk of obesity or heart disease; two major causes of death in older women (Chernoff, 2002). Consumption of fats can lead to an increased risk for obesity. Obesity is a risk factor for many other diseases, such as hypertension and stroke. It is important to follow nutritional guidelines to decrease risk of disease.

While the specific nutrition guidelines change as one ages, the average recommendations center around limiting caloric intake while consuming a healthy diet (Richards, 2009). This pattern includes eating vegetables, fruits, grains, protein, and dairy while limiting fats, sugars, and sodium. Based on a 2000 calorie diet per day this includes consuming 16 ounces of fruits,



20 ounces of vegetables, 6 ounces of whole grains, 5 ½ ounces of protein, and 24 ounces of milk (USDA, 2016b).

Even though infants lack the developmental maturity to self-feed, these nutrients can be provided to the infants through multiple avenues. According to the center for disease control in 2013, approximately 77% of infants in the United States are breastfed, at least for some amount of time (CDC, 2013). There are many positive effects of breastfeeding, but most importantly, breastmilk provides the infant with all of the nutrients that are necessary for development, in a way that is hygienic and easily digestible (Sanders, 2013). Even if the infant is unable to breastfeed, modern formulas are being developed in ways that attempt to replicate the advantages of breastmilk (Sanders, 2013). The use of formula in place of breastmilk can be controversial since the benefits of breastmilk over formula are well known (Ho, 2013). If breastmilk is not an option for the infant, the World-Health Organization recommends a whey-based formula for the first year of life (Smith et al., 2016). The most important thing for infant development is meeting the intake recommendations and nutritional needs. While eating a balanced and health conscious diet throughout the lifespan can lead to positive outcomes, nutrition is especially important for childhood development.

#### **1.4 NUTRITIONAL DEVELOPMENT**

Development in infancy, the first two years of life, is crucial to future success. This study will focus on the infant population. However, much of the research defines a similar population as “pediatric.” For the purpose of this study, the term infancy will be used to refer to children in the

first two years of life. Proper nutritional development throughout infancy is essential for health and growth.

#### **1.4.1 Prenatal development**

Humans begin to require nutrients for development in utero. Since prenatal development is complex and multifactorial it is difficult to determine the direct influence of nutrition on human fetal development (Hirschi & Keen, 2000). Many studies about the effects of nutrition on fetal development are animal studies. A 2011 study by Hyatt et al. looked at maternal nutrition and fetal organ development in sheep. The authors found that suboptimal prenatal nutrition may lead to a higher risk for juvenile obesity (Hyatt et al., 2011). Similarly, maternal dietary restriction has a negative effect on development of metabolic systems in mice, leading to life-long metabolic deficits (Chun, 2012). Even with this limited knowledge base, it is conclusive that poor maternal nutritional status is a risk factor for fetal development (Chun, 2012; Hirschi & Keen, 2000; Hyatt et al., 2011). Malnutrition or undernutrition of the mother can result in fetuses or infants who are at a higher risk of “early fetal loss, growth retardation and prematurity, certain birth defects, and early postnatal death” (Hirschi & Keen, 2000, p. 495).

#### **1.4.2 Development throughout infancy**

If the infant is born without complications and with the proper in utero nutrition, there are still risk factors associated with malnutrition throughout childhood. If nutritional needs for development are not met either in utero or during infancy, changes in brain structure may also

manifest. These changes may lead to cognitive deficits or other metabolic, behavioral and general health problems, or even death (Chase & Martin 1970; Sanders, 2013; USDA, 2016a).

Infancy is a period of rapid growth and development. Nutritional needs must be met for typical development (Sanders, 2013). “Nutrient requirements per pound of body weight are proportionally higher than at any other time in the life cycle” (USDA, 2016a). While exact intake needs may vary, proteins are especially important for future development (Cormack & Bloomfield, 2015; USDA, 2016a). Growth will occur when the infant’s intake is greater than his/her basic caloric needs. These needs may vary based on energy expenditure, especially if the infant requires energy to fight an illness. An increased energy expenditure may lead to decreased growth, even if the infant is intaking an age-appropriate number of calories (Leitch, 2000).

Birth weight should double by six months, triple by twelve months, and quadruple by two years (Dixon & Crawford, 2012). Once the child exceeds the critical two-year period of growth, the nutritional needs continue to grow. On average, children aged two to three years require 1000 calories per day. This will steadily increase throughout adolescence until 18 years of age, when females require roughly 1800 calories per day, and males require 2000 – 2400 (USDA, 2016).

Nutrition is more than just calories. Micronutrients, such as vitamins and minerals, can vastly impact the development of normal learning, immunity, and reproductive health (Kapil & Bhavna, 2002). Vitamin A deficiency is a common preventable cause of childhood blindness. Iron deficiency can result in anemia which can negatively impact psychological development, including behavior. Consequences can be life-long if the infant or adolescent is not meeting these micronutritional needs.

## **1.5 FEEDING DEVELOPMENT**

Feeding disorders and swallowing disorders are different diagnoses, but they interact during infancy. Development of typical feeding behaviors is dependent upon multiple factors. Infants must coordinate behavior and physiology to feed and grow appropriately.

### **1.5.1 Feeding development**

Feeding can be described as “gathering food and getting ready to suck, chew, or swallow it” (ASHA, 2017, p. 1). Feeding should be an efficient process, taking no more than 20 to 30 minutes and causing little stress to both infant and caregiver. If an infant is constantly being fed there is no time for the infant to digest and begin to feel hungry. To facilitate the feeling of hunger and promote digestion, infants should feed every two to three hours. Infants in the first month of life require, on average, two and a half ounces of formula or breast milk per pound of body weight. This requirement steadily increases until they are taking roughly eight ounces three to four times daily by six months (Delaney & Arvedson, 2008). To meet these requirements, the infant must have the oral motor skills necessary for extracting milk or formula from either the breast or a bottle.

Normal feeding development throughout infancy is dependent upon a rhythmic nutritive suck. Sucking can be defined as wave-like tongue movement that is used to extract liquid by compressing a nipple (Sakalidis & Geddes, 2016). The ability to maintain a nutritive suck may be associated with the amount of feeding experience an infant is given: the more often a child is offered the nipple, the more successful he/she may be (Delaney & Arvedson, 2008). By six

months of age, the typically developing infant will begin to have more lateral tongue movement. Lateral tongue movement and core strength may demonstrate readiness for transition feeding. Around this time, it is appropriate to introduce the infants to spoon feedings with pureed foods (Delaney & Arvedson, 2008).

The critical period for the development of chewing is associated with the disappearance of the tongue protrusion reflex. This reflex is characterized by infants pushing food anteriorly out of the mouth upon presentation. The reflex may be protecting the infant from choking. If infants are introduced to spoon feedings while the tongue protrusion reflex is still apparent, spoon feeding may be traumatic and ineffective. It is important to introduce spoon feedings early, if appropriate. When children are introduced to textured foods after 10 months of age or so, they are less likely to readily accept solids (Delaney & Arvedson, 2008). When children reach six months of age, their feeding skills begin to develop rapidly. They can remove food from a spoon, chew and swallow a variety of textures, begin to self-feed, and become more actively engaged during mealtimes (Silberstein et al., 2009).

Infants moving from bottle feeding to spoon feedings demonstrate inaccurate oral movement and inconsistent control of structures such as the lips, tongue, and jaw. The advancement of textures and eruption of teeth are important factors in the development of chewing. The central incisors typically erupt first, between eight and twelve months, with the second molars erupting last, between 23 and 33 months (Le Reverend, Edelson, & Loret, 2013). By 12 months of age, children should have the appropriate lip strength to achieve and maintain lip closure. Poor lip strength may interfere with the ability to accept and contain food within the oral cavity (Delaney & Arvedson, 2008).

Chewing is important for decreasing the size of the food and creating a cohesive bolus in the oral cavity. Between six and nine months jaw movements will be a vertical munching pattern. A more circular or rotary movement is visible as the child ages. Jaw muscle tissue must develop in order for the infant to safely process more difficult foods (Le Reverend et al., 2013). As the infant begins to chew more solid foods, the muscles needed to increase chewing strength will develop. The infants need solids to test their strength and learn how to manage different textures. The more textures that the infant is introduced to, the more the proper musculature will develop. Infants will move their jaws with a similar range to adults by 12 months of age, and by 30 months the child can use the mature rotary jaw movement (Delaney & Arvedson, 2008; Le Reverend et al., 2013). Chewing development will continue into childhood. Different eating skills are necessary for various textures. Changes in chewing can be seen until five to eight years of age. This age range is representative of normal variation in development and change in dentition (Gisel, 1988).

### **1.5.2 The feeding relationship**

Many exchanges between caregivers and infants revolve around feeding during the first year of life. As an important and time consuming part of the day, feeding provides the context for parent-child interactions. The feeding relationship may be complicated by feeding disorders: children who have a more difficult time bonding with their caregivers may be more likely to develop feeding disorders, and children with feeding disorders may have more difficulty bonding with caregivers (Silberstein et al., 2009). The infant's biological immaturity or disposition to feeding difficulties may interact with certain maternal traits in a way that is detrimental to the

didactic feeding relationship (Silberstein et al., 2009). This relationship breakdown has been described by Silberstein et al. in 2009 as “higher maternal intrusiveness, less maternal sensitivity, more infant negativity and withdrawal, and struggle for control” (p. 503). These negative interactions are observed during feeding and during non-feeding interactions. Negative experiences in infancy may shape the way that the child approaches mealtimes as he/she grows.

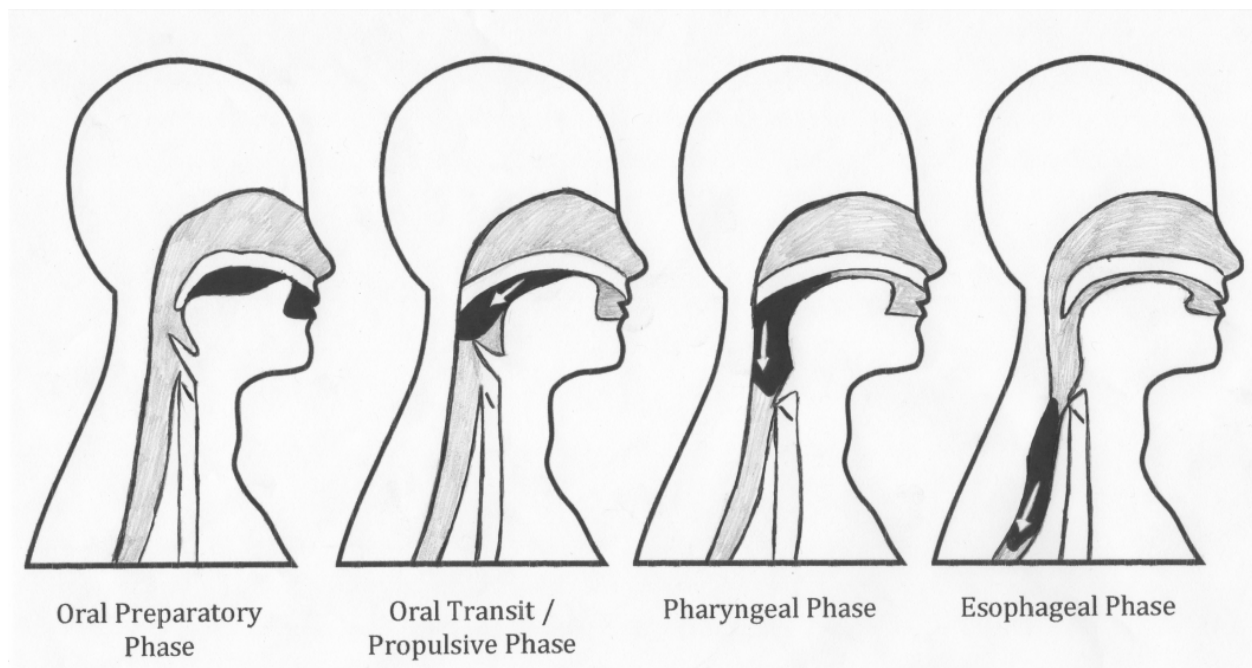
## **1.6 FEEDING AND SWALLOWING DISORDERS**

### **1.6.1 Feeding disorders**

Roughly 25%-45% of typically developing children, and up to 80% of children with developmental delays are reported to have a feeding disorder (Barratt, 2010; Davies, Satter, Berlin, Sato, & et al., 2006; Phalen, 2013; Silverman & Tarbell, 2009). A feeding disorder can include many behaviors: food refusal, rigid food preferences, developmentally inappropriate feeding skills, or any other behavior that affects the child’s ability to maintain an ideal nutritional status (Davies et al., 2006; Phalen, 2013). Beyond displaying ready to eat behaviors, such as remaining alert during feeds, the infant will require caregiver support to mature and have appropriate mealtime behavior and thoughts about eating (Davies et al., 2006). As an infant, feeding disorders may also manifest as stress cues such as straining, fussing, or grimacing (Wolf & Glass, 1992). These types of feeding related cues may be associated with discomfort stemming from internal pain cues, such as from a gastro-intestinal issue, and/or a swallowing disorder.

## 1.6.2 Swallowing disorders across the lifespan

A swallowing disorder, or dysphagia, is any difficulty actively transferring food and/or liquid from the mouth to the stomach. Swallowing difficulties can occur during any of the four phases of swallowing: oral preparatory, oral transit/propulsive, pharyngeal, or esophageal (see Figure 1). While physiologists accept the theory of these phases, the phases do not occur in isolation and are artificially separated. In reality, swallowing occurs as a fluid motion.



**Figure 1 Phases of Swallowing**

The oral phase of swallowing begins when liquid or solid food enters the oral cavity. It is often characterized by sucking and/or chewing. The chewed food or liquid in the oral cavity combines with saliva to create a compact unit: a bolus. The oral transit/propulsive phase is when the bolus is collected in the oral cavity and propelled towards the pharynx (Li et al., 2015).



Material may be propelled superiorly through the nasal cavity, resulting in nasal regurgitation, or nasopharyngeal reflux. This may cause an uncomfortable sensation and potential breathing difficulties (Newman, Keckley, Peterson, & Hamner, 2001).

The pharyngeal phase requires the bolus to be propelled down the pharynx towards the esophagus. Many physiologic events take place during this time to protect the airway. One of the most important mechanisms for airway protection is laryngeal closure at the level of the vocal folds (Li et al., 2015). Laryngeal closure is accomplished when the consumer holds his/her breath while eating or drinking. This protects the airway during the swallow.

When liquid enters the airway above the level of the vocal folds it is referred to as penetration (Rosenbeck JC, Robbins JA, Roecker EB, Coyle JL, & JL, 1996). When food or liquid material enters the airway to the level below the vocal folds, it is called aspiration (Rosenbeck JC et al., 1996). Aspiration can lead to health and respiratory difficulties, such as pneumonia, an inflammation of lung tissue. The laryngeal cough reflex is a protective mechanism against aspiration. A person may sense the aspirated material and reflexively cough to eject it. If material is ejected, the aspiration is considered less severe (Rosenbek et al., 1996). When material is aspirated without coughing, it is referred to as silent aspiration.

The esophageal phase begins when the bolus enters the upper esophageal sphincter. Esophageal pain or discomfort may arise from gastro-esophageal reflux, or the return of stomach content upwards towards the esophagus. The acidity of stomach contents can burn the esophageal tissue. This causes pain referred to as heartburn, and is also associated with coughing or hoarseness (Dore et al., 2008). Irritated esophageal tissue may also impact swallow function. Tissue in the esophagus and larynx may swell due to inflammation. The swelling, edema, in the larynx may result in airway compromise (Ahuja, Yencha, & Lassen, 1999). Pain may cause

patients to complain of a globus sensation, or that something is stuck in their throat. A globus sensation may have an etiology other than gastro-esophageal reflux, but it can be uncomfortable for the patient. Odynophagia, discomfort and pain while eating and drinking, may cause an association between eating and pain.

### **1.6.3 Special considerations for infants**

The incidence of pediatric swallowing disorders is unknown, however, it is generally accepted to be increasing (Lefton-Greif & Arvedson, 2007). Many more medically complex children are now surviving. The survival of these children contributes to the increasing incidence of pediatric swallowing disorders. Before successfully feeding orally, the infant should display the rooting reflex. The rooting reflex is seen when the face is turned toward the stimulus when the mouth or cheeks are touched (de Bildt et al., 2012). This reflex may be seen as early as 25 weeks of gestation, and is usually lost by 6 months in typically developing children. The persistence of this reflex may be related to neural anomalies that will not be discussed further as this study did not investigate neurological differences. It is important for the infant to display the rooting reflex in early infancy as it allows him/her to find the nipple during breast or bottle feeding. Reflexes can impact how successful feeding will be.

The phases of swallowing during infancy are conceptually identical to the phases during adulthood. The differences lie in anatomical changes that occur during development. The infant's hard palate is nearly flat at birth. This creates a surface to compress the nipple (Wambach, 2016). An infant's tongue will fill the small oral cavity. Downward tongue and jaw movements will assist with extraction from the nipple by creating negative pressure within the oral cavity

(Wambach, 2016). The infant also has fat pads on both cheeks. These buccal fat pads provide stability while sucking. Craniofacial growth will occur during the first years of life. The jaw will grow downward, the intraoral space will expand, and wave-like tongue movements on the palate throughout infancy will assist in creating the arched palate that is seen in adults (Wambach, 2016).

The oral preparatory phase requires the infant to latch to the nipple and create enough intraoral suction pressure to extract fluid from the nipple (Elad et al., 2014). An atypical oral preparatory phase may present as a weak or absent latch or anterior loss of the fluid from the mouth. Infants with craniofacial abnormalities or absent buccal fat pads may not be able to create the negative pressure needed to extract fluid from a nipple. An infant with weak jaw compression may also have difficulty extracting fluid. Difficulties for the infant during the oral transit phase may present as reduced tongue cupping or poor bolus control. Nasopharyngeal reflux during this stage may impact the success of infant feeding. The infant is breathing through the nose since the breast or bottle nipple is in the oral cavity. When liquid is propelled towards the nasal cavity, it may interfere with the infant's ability to breathe (Newman, Keckley, Peterson, et al., 2001; Newman, Keckley, Petersen, & Hamner, 2001). This can negatively impact the coordination of the swallow and breathe pattern.

During the oropharyngeal phases, the infant requires the same laryngeal protection as the adult. For this protection to occur, the infant must coordinate the swallow and breathe patterns. Sucking requires the coordination of the tongue, jaw, and palate to remove milk from the nipple. The tongue helps extract milk from the breast or bottle and transport the milk back towards the pharynx. Jaw compression allows for the compression of the nipple and creation of negative pressure within the oral cavity (Wambach, 2016). There are two theories to the sucking

mechanism: the stripping action and the intra-oral vacuum theory (Sakalidis & Geddes, 2016). The stripping action theory states that compression of the nipple is the main force of extraction. The intra-oral vacuum theory states that negative-pressure through the creation of a vacuum is the primary force. Newborns exhibit two types of sucking: nutritive sucking and non-nutritive sucking. Non-nutritive sucking, when the infant is not actively extracting, is often observed at the beginning and end of feedings and may have a role in developing the feeding behavior of the infant (Sakalidis & Geddes, 2016). The nutritive suck, when the infant is actively extracting milk while feeding, is the main focus of the suck: swallow: breathe mechanism.

The suck: swallow: breathe pattern may be developed as early as 32 weeks' gestation but it increases in strength by 40 weeks' gestation. Infants born preterm, before 37 weeks, may have an irregular sucking pattern without a stable ratio. The ratio of one suck to one swallow will predominate from roughly 35 - 40 weeks' gestation, or full term birth. At this time it is not unusual for an infant to have two to three sucks per swallow (Delaney & Arvedson, 2008). An infant who experiences difficulties coordinating this pattern may experience desaturations of oxygen or increased respiratory rate. This is due to the absence of patterned breathing, lack of oxygen, and/or coughing and choking due to liquid entering the airway (Goldfield et al., 2010; Goldfield, Richardson, Lee, & Margetts, 2006). Penetration may be normal in infants and not an accurate predictor of further problems (Delzell, 1999; Newman, Keckley, Peterson, et al., 2001). Preterm infants are at a high risk of silent aspiration, as newborn infants have not developed the cough reflex. The first cough that occurs in infancy is associated with the beginning of a cry. This occurs between one and two months (Thach, 2007). The cough at the beginning of a cough-cry sequence may be helpful when clearing aspirated material. A more powerful cough will continue to develop throughout infancy (Thach, 2007). Signs of aspiration include extended meal

time, emesis, coughing, difficulty breathing, noisy breathing, and anterior loss of fluid from oral cavity (Prasse & Kikano, 2009). The consequences of aspiration are similar for the infant: health and respiratory difficulties may arise.

The esophageal phase is also important in infant swallowing. Gastrointestinal (GI) development helps determine whether the infant will be able to meet nutritional needs via oral intake. Anatomically, the GI tract must elongate and the intestines must develop appropriate motility to increase tolerance for feeding (Neu & Douglas-Escobar, 2008). Gastro-esophageal reflux is one issue potentially stemming from underdeveloped or immature GI development. It can cause the child to display avoidance and distress signs, such as arching, straining, and fussing. Reflux, often referred to as spitting-up, may occur in up to 85% of typically developing children in the first 2 months of life (Balgowan, Greer, & D'Auria, 2016). However, if the child is feeling pain and associating this pain with feeding, then feeding will not be a pleasurable experience. If mealtimes become stressful to the infant, he/she will be less likely to appropriately coordinate sucking, swallowing, and breathing (Goldfield et al., 2010). Signs of infant stress, including fussing and crying, may impact the ability of the infant to protect his/her airway. The disordered feeding component, stress, impacts the ability for the infant to safely swallow. Feeding and swallowing disorders are difficult to separate. Successful mealtimes involve the interaction of feeding and swallowing behaviors.

#### **1.6.4 Prematurity**

Infants may have feeding and swallowing difficulties due to prematurity, or birth before 37 weeks of gestation. The incidence of pediatric dysphagia may be increasing due to the number of

premature babies who are now surviving (Lefton-Greif & Arvedson, 2008). Worldwide, roughly 15 million infants, 1 in every 10, are born preterm. Preterm infants have greater difficulty establishing breast or bottle feeds and meeting their early nutritional needs (Delaney & Arvedson, 2008). The underlying reason for these difficulties is developmental immaturity (Delaney & Arvedson, 2008; Lau, 2016). The proper suck: swallow: breathe pattern necessary for nutritive sucking develops in utero at approximately 32 to 34 weeks. If an infant is born prior to thirty-two weeks, he/she would not be expected to feed orally (Delaney & Arvedson, 2008; Lefton-Greif & Arvedson, 2016). The developmental immaturity would not allow the infant to establish a nutritive suck. Without a nutritive suck, the infant would not be expected to extract from the breast or bottle.

Preterm infants are at a high risk for silent aspiration due to an absent cough reflex. Nasal regurgitation is also more prevalent in preterm infants. Immaturity of the swallowing mechanism may cause the nasal regurgitation (Newman, Keckley, Peterson, et al., 2001). This is one explanation for apneic episodes while feeding: if the fluid is entering the nasal cavity it will inhibit respiration.

Due to their developmental immaturity, many premature babies will end up in the neonatal-intensive care unit (NICU) for the first few days or weeks of life. Some of these babies will receive intervention for swallowing right away. Others will have more pressing medical needs and will receive nutrients through intravenous or tube feeding methods. These fragile infants must be medically stable before feeding behaviors or dysphagia is addressed. Medical stability is more important than oral feeding for some fragile children. Time spent on life-saving measures or recovering from surgical procedures may impact time allotted to work on oral motor or feeding skills. Some children may never be able to suck from the breast or the bottle. These

children may be seen at follow-up or outpatient clinics to develop their immature oral motor skills. Others will be seen as older infants or toddlers for intervention as they enter educational programs, such as early intervention or preschool.

### **1.6.5 Congenital conditions**

Feeding and/or swallowing difficulties may accompany conditions present at birth. Cleft lip and palate are the most common orofacial defects and are associated with many congenital syndromes (Goswami, Jangra, & Bhushan, 2016). Cleft lip and palate occur together in roughly 50% of cases while isolated cleft lip or cleft palate each occur 25% of the time. The feeding difficulties for infants with cleft lip and palate are associated with the oral and nasal cavities. The cleft in the palate creates space between the oral and nasal cavities. This impacts the ability to generate negative pressure that is necessary to extract from a nipple (Goswami et al., 2016). The rigidity of the palate normally provides the infant a place to press the nipple to assist with extracting milk. Nasal regurgitation also results from the cleft palate (Lindberg & Berglund, 2014). The palate typically separates the nasal and oral cavities and assists in directing milk towards the pharynx as opposed to into the nasal cavity. Feeding time is often prolonged for these infants which may provide negative consequences for both the infant and the caregivers (Goswami et al., 2016; Lindberg & Berglund, 2014). Mothers of children with a cleft lip/palate are often concerned about feeding their infant. This fear is the result of a lack of information and support from healthcare professionals (Lindberg & Berglund, 2014). Children with cleft lip/palate are subjected to oral surgeries at a young age. There are complications associated with primary palatal surgery, including the need for secondary surgeries as the child ages (Ha, Koh,

Moon, Jung, & Oh, 2015). Infants who have oral surgeries may associate objects in and around their mouth with surgery or pain. Maternal fear combined with associations of pain may cause the infant to react negatively towards mealtimes.

Children with Down syndrome may also have feeding difficulties in infancy. Up to 80% of children with Down syndrome, a condition arising from a chromosomal defect, may experience feeding or swallowing disorders (O'Neill & Richter, 2013; Shaw, Garcia, Thorn, Farley, & Flanagan, 2003). Children with Down syndrome may have many developmental delays, including delays in oral motor skills. Persisting tongue protrusion is often seen and may interfere with the ability to extract from a nipple. A weak suck and weak or absent rooting reflex can also contribute to difficulties feeding (Shaw et al., 2003). These children may develop feeding difficulties associated with self-feeding deficits and oral-motor weakness (Jackson, Maybee, Moran, Wolter-Warmerdam, & Hickey, 2016). Children with Down syndrome may have anatomical anomalies of the airway (Jackson et al., 2016). Decreased oral motor function and airway anomalies are factors associated with a high risk of aspiration. Oral and pharyngeal dysphagia is common in children with Down syndrome (Jackson et al., 2016; O'Neill & Richter, 2013). In order to prevent feeding and/or swallowing problems, these children need to be seen by medical professionals.

#### **1.6.6 Consequences of feeding and swallowing disorders**

There are many consequences of dysphagia. If food material enters the airway and reaches the lungs, chest infections may develop. Further, the human body receives nutrients and hydration by absorbing the calories from food that reaches the stomach. If the child is experiencing a



disruption in the swallowing mechanism, then he/she may become malnourished or dehydrated. This malnourishment can lead to negative effects, including stunted growth or death.

Similarly, an infant who is protesting or avoiding feedings may also become malnourished or dehydrated. While the feeding and swallowing mechanisms are separate theoretically, it is important to remember that they interact: a child may be presenting with feeding avoidance behaviors due to pain or an association of pain. Gastroesophageal reflux may cause inflammation in the esophagus or pharynx (Dore et al., 2008). Inflamed tissue becomes irritated while eating and drinking. Nasal regurgitation can also be painful for the infant. When fluid is entering the nasal cavity it is difficult to maintain an appropriate suck: swallow: breathe cycle (Newman, Keckley, Petersen, et al., 2001). The disruption of this cycle can cause the infant to breath with increased effort. When the infant becomes uncomfortable during feeding, he/she may cry, grimace, or refuse further intake. The avoidance of feeding can impact how often the infant practices his/her oral motor skills. An infant who does not tax the oral musculature may have difficulty developing advanced feeding skills (Delaney & Arvedson, 2008).

When infants are unable to orally ingest enough nutrients to thrive, due to either disruptive feeding behaviors or a swallowing disorder, they require intervention. There are interventions for these children that have proven effectiveness. Seubert et al. in 2014 reviewed recent literature relating to antecedent therapy, or interventions provided immediately prior to offering the child food or drink. This review included 26 participants with feeding disorders from a total of 16 articles. These antecedent interventions were found to be beneficial when used in combination with other techniques. One example of a technique is extinction. When using this strategy the caregiver does not allow the child to avoid mealtimes (Seubert, Fryling, Wallace, Jiminez, & Meier, 2014). Different treatment interventions rely on the manipulation of nipple

size or viscosity of the fluid provided to the infant. Cichero, Nicholson, & September (2013) state that:

Some of the methods of managing feeding and swallowing issues in infancy include alterations to positioning, swaddling, jaw or cheek support, tongue resistance exercises, external pacing to promote feeding rhythm, tactile stimulation, use of nipple shields, changes to teat type or flow, and thickening of human milk or formula (p. 132).

Some children who do not have the developmental, neurological, motor, or sensory ability to orally take food regardless of treatment, require more aggressive intervention (Cichero, Nicholson, & September, 2013). A nasogastric tube that leads from the nasal cavity to the stomach, or a gastrostomy tube that is inserted directly through the stomach wall may need to be placed. Other alternative methods exist, including providing nutrients and hydration directly to the small intestine or intravenously.

## **1.7 WORKING WITH INFANTS WITH FEEDING AND/OR SWALLOWING DISORDERS**

Many specialists work with infants who have feeding and/or swallowing disorders. Medically complex cases require input from different professionals. SLPs are professionals who may assist with diagnosis and treatment of these infants. There is no clear consensus of which professionals should be included on the infant feeding and/or swallowing team.

### 1.7.1 History

Which professionals have the responsibility to diagnosis and treat infant feeding and swallowing disorders is unclear (Fisher & Dusick, 2014; Manikam, 2000; Mathisen, Carey, & O'Brien, 2012). Due to the increase in infants requiring services there has been an influx of new professionals working with these clients. Historically, specially trained nursing staff have taken over the role of caregiver for infants in the neonatal intensive care unit (NICU) (Cricco-Lizza, 2016). Nurses are often with the infant and family more than anyone else who is caring for the child, and they have a range of responsibilities. Many nurses are responsible for educating the family on the importance of breastfeeding and may be offering support to the mothers about initiating oral feeding (Cricco-Lizza, 2016). The SLP has been recognized as a professional whose knowledge about infant swallowing function may prove that SLPs are qualified to have some of the same responsibilities (Fletcher, 2005).

Uncertainty regarding professional roles extends beyond the NICU to outpatient clinics that newly discharged infants or older toddlers may attend. While children have been seen as outpatients for many years, it was not until later in the twentieth century that SLPs began to have a place beyond the educational realm. According to Miller and Groher in 1990, the second highest percentage of people hired in medical settings between 1982 and 1984 were SLPs and audiologists. This timeframe is cited as the period of the greatest shift from the educational to the medical realm (Miller & Groher, 1990). Miller and Groher state that, during this time, the SLP was viewed as a therapist without much emphasis on diagnosis. Since the medical model in the United States is formed with an emphasis on differential diagnosis, the speech *therapists* were not seen to have a role at the bedside or in acute settings (Miller & Groher, 1990, p. 25).

While there is more understanding of the role of the SLP as a *pathologist* with a role in assessment of “oral-motor and respiratory status of the child during the act of eating and swallowing” (Fisher & Dusick, 2014, p. 3), these responsibilities may overlap with the pediatrician and/or occupational therapist (OT). The OT traditionally has been assessing feeding as an activity of daily living (ADL), which is considered an area of occupation by the American Occupational Therapy Association. Since there is so much debate about the care of these infants, who actually should be working with these individuals is unclear.

An alternative to individual professionals competing for care is the interdisciplinary team approach. This approach emphasizes professionals with differing areas of expertise coming together to collaborate on the patient’s plan of care (Nancarrow et al., 2013). When implemented appropriately, interdisciplinary teams can lead to positive patient outcomes (Lam & Ruby, 2005; Yoo et al., 2014).

### **1.7.2 Professionals**

An accepted list of professionals who should be involved in the care of infants with feeding and swallowing disorders does not exist. In fact, many different sources have entirely different ideas about who should provide care. Manikam et al. in 2000 states that the interdisciplinary team should be comprised of (at minimum) a “gastroenterologist, nutritionist, behavioral psychologist, and occupational and/or speech therapist” (Manikam, 2000, p. 34). In 2006, Davies et al. states that families who have children with feeding disorders see professionals including physicians, nutritionists, nurses, educators, child care providers, therapists, and mental health professionals (Davies et al., 2006). Others believe that the interdisciplinary team should be comprised of

physicians, SLP, OTs, psychologists, and a registered dietician (Fisher & Dusick, 2014; Simonmeier, 2007). Kennedy-Krieger Institute employs pediatric gastroenterologists, nurse practitioners, behavioral psychologists, clinical specialists, behavior data specialists, developmental playroom specialists, SLPs, OTs, pediatric nutritionists, and social workers as member of their pediatric feeding team (Girolami, 2012). Contrarily, Fletcher & Ash (2009) believe that the lactation consultant and the SLP are the two professionals needed for the infant's "feeding dream team" (Fletcher, 2005).

While multiple suggestions are given for who should be included in the feeding team, many involved professionals believe that an interdisciplinary team approach is most appropriate due to the complexity and heterogeneity of these patients (Davies et al., 2006; Fisher & Dusick, 2014; Manikam, 2000; Mathisen et al., 2012; Simonmeier, 2007). When many professionals are involved, there is a greater potential for well-rounded and appropriate care. Well-executed collaboration with a defined sharing of roles can lead to positive patient outcomes (Lam & Ruby, 2005; Yoo et al., 2014). There is also room for overlapping or undefined roles. OTs and SLPs may be questioned if both are assessing oral motor or oral readiness skills. Lactation consultants may feel as if breastfeeding concerns should be directed to them. Confusion may lead to inconsistent care or negative team collaborations.

### **1.7.3 Roles of SLP**

Although the role of the SLP in infant feeding and swallowing disorders has been contested in recent history, the American Speech Language and Hearing Association (ASHA) states that SLPs do have a role in caring for these children (ASHA, 2001). The SLP should serve as "a primary

professional in assessment and management of individuals with swallowing and feeding disorders” (ASHA, 2001, p. 12). This includes areas such as performing clinical and instrumental assessments, making decisions regarding the management and treatment in feeding and swallowing disorders, providing counseling or education to the parents and families, and serving as a member of an interdisciplinary team, when appropriate (ASHA, 2001).

When considering the healthcare framework in the United States where professionals get compensated based on the delivery of services, “fees for service”, it seems obvious that the national organization would advocate for SLPs to work on infant feeding teams. Other countries, such as Australia, who do not provide reimbursement in this way still believe that SLPs should have roles that include “assessment and intervention of preterm infant communication, feeding and swallowing” (Mathisen et al., 2012, p. 823). This tells us that SLPs are not just seen as a billable service in this area. Rather, they are a profession that brings beneficial knowledge to the care of infants who have feeding and/or swallowing disorders.

Other sources suggest different roles for the SLP, such as evaluating and facilitating success in oral feeding, evaluating respiratory status, assessing oral-motor skills, providing the family with strategies and information, and optimizing feeding and swallowing outcomes (Fisher & Dusick, 2014; Fletcher, 2005; Simonmeier, 2007). Amid all of this confusion, the question remains; what is the role of the SLP in infant feeding and swallowing?

How then can (or should) we educate the next generation of clinicians on professional roles in this area? If SLPs are unsure of our role with infants who have feeding and or swallowing disorders, then how do we provide appropriate education to future clinicians? We do need to fight for our corner of expertise but we also need to be respectful and understanding of other experts and their contributions to the care of patients. Rarely is a patient only going to be

helped by one professional group and infants present us with highly complex medical, psychological and social issues. To understand how we might better provide education to our students (and maybe other professionals) we need to know what people think about the issue. Do opinions and knowledge change with increased experience in the field? Is there a need for increased educational experiences during formal schooling? In order to answer these questions, this study set out to determine student and clinician perceptions of the role of the SLP as a member of an infant feeding team. This includes information regarding the education they received, whether or not different educational opportunities are appropriate and wanted, and their perception of the role of the SLP on the infant feeding and/or swallowing team.

## **1.8 RESEARCH QUESTIONS**

### **1.8.1 Aim**

The role of SLPs as members of infant feeding teams is widely discussed. To understand how we might better provide education to our students we need to know what people think about the issue. Since no specifications on the roles of these professionals as members of the team exist, this study will investigate what students and certified clinicians think about the role of the speech-language pathologist as a member of the infant feeding team. Even though ASHA's technical report on the role of the SLP in swallowing and feeding disorders states that SLPs have a role in the care of infants with feeding and swallowing disorders (ASHA, 2001), this

study will be the first step towards discovering what thoughts pervade student and clinician groups. I am interested in exploring the following questions:

1. What do undergraduate students, graduate students, and certified clinicians think about the SLPs as members of infant feeding and swallowing teams? (referred to as *perception of roles*)
2. Where do undergraduate students, graduate students, and certified clinicians report learning about the role of the SLP in infant feeding and swallowing disorders? (referred to as *where did they learn*)
3. When would undergraduate students, graduate students, and certified clinicians choose to learn about infant feeding and swallowing disorders? (referred to as *when would they choose to learn*)

### **1.8.2 Importance**

Investigating differences in clinician and student perceptions may help to identify gaps in knowledge about the role of the SLP in infant feeding and/or swallowing disorders. The field of occupational therapy has used a similar methodology to help update the current curriculum about topics such as evidence-based practice (Aliko, 2012).

Providing a more comprehensive education to students will help the field of speech-language pathology advance. Our patients deserve the best clinical care and families deserve highly educated and competent clinicians. In order to provide the best clinical care SLPs must be sure of our role. The current study could help to update the undergraduate and graduate curricula in infant feeding and/or swallowing disorders.



## **2.0 METHODS**

In order to investigate perception of the role of the SLP in infant feeding and/or swallowing disorders, undergraduate students, graduate students, and certified clinicians were invited to participate in an online survey. The survey included closed and open-ended questions that centered around investigating the three main questions of this study: What do undergraduate students, graduate students, and certified clinicians think about the SLPs as members of infant feeding and swallowing teams, where do participants report learning about the role of the SLP in infant feeding and swallowing disorders, and when would undergraduate students, graduate students, and certified clinicians choose to learn about infant feeding and swallowing disorders?

### **2.1 PARTICIPANTS**

#### **2.1.1 Students**

Undergraduate and graduate students were surveyed in order to compare the results between students with different levels of education. Undergraduate students must have been enrolled in a communication science and disorders program, or any program intending to prepare undergraduate students for a graduate degree in speech-language pathology. Undergraduate students were included if they were planning to pursue a graduate degree in speech-language pathology. Students were excluded if they did not plan to pursue a graduate degree in speech-

language pathology. This exclusion controlled for potential students who were choosing to use their undergraduate degree to pursue a different field of work. These students may not have been as involved in potential educational activities which could influence their understanding of infant feeding and swallowing disorders. Graduate students must have been attending an accredited university for a clinical degree in speech-language pathology. Students must have been pursuing a graduate level degree. Clinical doctoral or PhD students were excluded because their clinical knowledge may extend beyond what is typical for a precertification student. The students were excluded from this study if they have done their undergraduate or graduate requirements outside of the United States, since the educational curricula differ.

### **2.1.2 Clinicians**

Certified clinicians were invited to participate in the survey in order to provide insight from those who have completed educational requirements. To be included in this study the certified clinicians were required to hold their certificate of clinical competency (CCC). This means that the clinicians included completed a master's level program, a clinical fellowship, and had passed the PRAXIS exam in speech-language pathology. The clinicians must have worked with infants who have feeding and swallowing disorders either at the time of the survey or in the past. This was determined by the questions regarding current employment setting, number of infants seen per week with feeding and/or swallowing disorders, and what percent of time is spent with infants who have feeding and/or swallowing disorders. There was no minimum exclusion regarding amount of time spent with these patients.

Benner (1984) stated that time in practice is not sufficient to result in expertise and suggested that self-reflection is necessary to refine or confirm clinical decision-making skills. These pieces together lead to better clinical and experiential outcomes. Clinical experience measured in years on the job may or may not relate to competence. Even though it is impossible to judge whether or not experience has led to clinical expertise, this study defined “certified clinician” as meeting ASHA requirements. Since this study was interested in common perceptions, it is of limited importance if the clinicians are “experts.” The clinicians reported how long they have been in their current position and they were given the opportunity to rate themselves as belonging to one of the five stages of clinical competence as outlined by Benner: novice, advanced beginner, competent, proficient, or expert (Benner, 1984). The self-rating system allowed comparisons of those who report different levels of clinical competence.

- Novice: one who has no experience in situation in which they are expected to perform.
- Advanced beginner: one with developing knowledge who is efficient and skillful in parts of practice.
- Competent: one who demonstrates efficiency, is coordinated and has confidence in his/her actions.
- Proficient: one who perceives situations in terms of the long term goal. He/she learns from experience and recognizes when the normal course does not take place.
- Expert: one who operates from an understanding of the total situation. Performance by an expert is flexible and highly proficient (Benner, 1984).

## **2.2 SURVEY**

The research team recruited participants for the study via email communication. A sample of students was recruited via communication through a gatekeeper. Professors were contacted and

asked to send the survey to their undergraduate and graduate students. The professors acted as gatekeepers and did not disclose how many students were invited to take the survey or who completed the survey. The gatekeepers were used in order for those invited to remain anonymous. The researchers did not know how many people were invited to take the survey.

Clinicians were approached via emails through the national association, ASHA. ASHA has nineteen special interest groups (SIGs), including special interest group 13, which is specifically for swallowing and swallowing disorders (dysphagia), and special interest group 16 for school-based issues. SIG 13 was chosen due to the nature of the research questions. Many people who are interested in feeding and swallowing are members of this SIG. Inviting these members to participate in the study provided the researchers with the largest accessible population of SLPs who work with infants with feeding and/or swallowing disorders. In order to account for those clinicians who work outside of the medical field, the survey was distributed to SIG 16, school-based issues, as an attempt to expose all relevant parties to the survey. All members of the special interest group had access to email communication with the other members. Clinicians were invited to complete the study if they met the inclusion criteria. All clinicians were encouraged to pass the study on to other clinicians and/or students. The special interest groups acted as the gatekeepers for the clinicians.

### **2.2.1 Qualtrics**

The survey was distributed using the secure web-based Qualtrics Survey Service. Broad demographic data was requested such as age and experience in the field. More specific questions on the perception of the role of the SLP included topics such as what specific responsibilities

they believe SLPs have in this setting, and where and when the participants learned about infant feeding and swallowing disorders. The survey for undergraduate and graduate students can be found in Appendix A. The survey for certified clinicians can be found in Appendix B.

### **2.2.2 Human Research Protection Office**

The Human Research Protection Office (HRPO – previously known as the Institutional Review Board) at the University of Pittsburgh reviewed this study. The survey design was classified under the heading of “Tests, Surveys, Interviews, or Observations,” which is a minimal risk exempt review under HRPO. The study met the requirements for an EXEMPT study under section 45 CFR 46.101(b)(2) on June 13, 2016. HRPO reviewed the initial invitation email, the Introductory script, the Student Survey, and the Clinician Survey.

## **2.3 DATA ANALYSIS**

The data are reported based on the prevalence of each response option. The data are described below as “the nature of responses”. This allows us to make observations about the rate of each response. Criteria for conducting good qualitative research were employed in this study (Parker, 2004; Yardley, 2000). According to Braun & Clark (2014) “qualitative research offers rich and compelling insights into the real worlds, experiences, and perspectives of patients and healthcare professionals in ways that are completely different to, but also sometimes complimentary to, the knowledge we can obtain through quantitative methods” (Braun & Clarke, 2014, p. 1).

### **2.3.1 Characterizing populations**

In order to characterize the populations, demographic data was collected. This included age, gender, location of undergraduate and graduate school, degree that was held or being pursued, type of setting that the participants were currently employed in, years at the current position, positions that have been held in the past, average number of patients with feeding and/or swallowing disorders that were seen in a week, percent of time spent with infant feeding and/or swallowing disorders, and personal rating of clinical competency.

Most of the demographic information in the survey was examined by the nature of the responses. The open text question for demographics asked what the participant's specific areas of interests were, if any. This question gave us a better idea if this survey was completed by students who had a specific interest in infant feeding and/or swallowing disorders. Certified clinicians were also given the opportunity to answer this question. Some clinicians who see infant patients may not have a vested interest in infant feeding and/or swallowing disorders.

### **2.3.2 Research question 1: Perception of roles**

The first research question focused on what undergraduate students, graduate students, and clinicians thought about SLPs as members of infant feeding and/or swallowing teams. The nature of responses included the opinions of students and clinicians based on their responses. For example, participants were asked to rate how strongly they agreed that SLPs should work with infants who have feeding and/or swallowing disorders. The responses included definitely yes, probably yes, might or might not, probably not, definitely not. We reported how many students

and clinicians responded with each rating. Other questions included: should children with feeding and/or swallowing disorders be cared for by a team, how important is the SLP to the infant feeding and/or swallowing team, and who should be working with infants with feeding and/or swallowing disorders? These questions allowed us to look at how the students and clinicians thought about the role of the SLP in feeding and/or swallowing disorders.

Themes within the responses were also examined. This included qualitatively examining open text boxes for thoughts and opinions that were pervasive within and between the populations. Student and clinician opinions were examined in open-text format. These questions asked why the SLP was an important member of the infant feeding and/or swallowing team, and what does an SLP do as a member of the infant feeding and/or swallowing team. The clinicians were asked further questions: what were the participant's main duties when working with infants with feeding and/or swallowing disorders, is there anything that the participants were NOT doing as a member of the team that they felt like they should be doing, and, if so, who were performing these duties? Responses from the open-text questions were used to supplement and describe the quantitative data driven by the frequency and nature of responses. Full thematic analysis was not completed on the data set. Thematic analysis may provide flexibility when analyzing data such as these, but it may also result in missing nuanced responses while providing limited power (Braun & Clarke, 2006).

### **2.3.3 Research question 2: Where did they learn**

The second research question asked for the undergraduate, graduate, and clinician participants to report where they learned about the role of the SLP in infant feeding and/or swallowing

disorders. The nature of responses included how students and clinicians responded to questions based on education. These questions included; have the participants had any class, lecture, or continuing education time that specifically discussed infant feeding and/or swallowing disorders, how much time did the participants spend learning about infant feeding and/or swallowing disorders, when did the participants think they would learn about infant feeding and/or swallowing disorders, and where did the participants learn about infant feeding and/or swallowing disorders. The participants were also asked to detail who taught them in both class and clinic. This could have been an SLP professor, a guest lecturer, or another professional, all with varying areas of expertise.

#### **2.3.4 Research question 3: When would they choose to learn**

Research question three asked for the students and clinicians to report when they would choose to learn about infant feeding and/or swallowing disorders. These questions included; when the participants would wish to have learned about infant feeding and/or swallowing disorders, if the information should be addressed in class or clinic, and how important it was to have class or lecture time dedicated to infant feeding and/or swallowing disorders.

Students were asked when they wish they would have learned about infant feeding and/or swallowing disorders. This gave a better view into what educational knowledge students wish they had before entering specific clinical placements. Clinicians were asked a parallel open-text question that asked when participants wish they would have learned about infant feeding and/or swallowing disorders.



## 2.4 PILOT STUDY

A pilot study was deemed necessary since the ability to understand the survey was imperative to the outcomes. Since the survey was developed for this study it was important to know if any questions were unclear. This pilot was sent as a test, with the knowledge that information gathered would be used to craft the final drafts of the surveys.

A copy of the student survey was sent to 17 students via a gatekeeper. The gatekeeper does not disclose to the researcher who was contacted. The survey included all of the content questions, as well as an open text box for comments. Twelve responses were received after a one-week gathering period. Comments were received on the usability of the survey.

One participant recommended adding a “back” button. Another suggested adding an “I have never learned about this” option to questions requesting information about education. A third participant recommended adding an otolaryngologist (ENT) and a registered dietitian to the list of professionals who may work with infants with feeding and/or swallowing disorders. All of these suggestions were used in the final survey. A “back” button was added to the final survey, an “I have not had class time on this topic” choice was provided, and ENT and registered dietitian were added as options.

A comment was made about confusion regarding “year in school.” Since the pilot study was sent in the summer the participant did not know if she was a first-year or second-year graduate student. In order to eliminate this confusion, the final survey was distributed once the fall term began.

It was noted that many open-ended questions were left blank. Wording was changed in an effort to be more encouraging. When people answer questions, they do not want to feel like they

are incorrect. Instead of posing questions in a way that may have a “right” answer, an effort was made to be more open-ended in the wording. The question “what does the SLP do with infants with feeding and/or swallowing disorders?” was changed to “what are some responsibilities that you think an SLP may have when working with infants with feeding and/or swallowing disorders?”

The pilot study was distributed to gather more information about the usability of the survey and the results were not analyzed further. This pilot study provided useful suggestions for the creation of the survey. These suggestions were applied to both the student survey and the clinician survey. The final versions can be viewed in Appendix A and Appendix B.

### **3.0 RESULTS**

Two surveys were distributed: one to students in September of 2016, and the other to clinicians in July of 2016. A total of 98 students opened and completed at least one question on the survey. A total of 93 clinicians opened and completed at least one question on the survey. The responses from each survey were analyzed for the nature of responses and basic themes in open-ended responses.

#### **3.1 SURVEY RESPONSES**

This study had three main questions. The results to these questions are presented in stacked-bar graphs and are proportional in nature. This means that the stacked-bar graphs below show each answer as a proportion of the responses, rather than as a percentage. This allows us to compare the groups without making generalizations about percentage between groups of different sizes. The total number of responses per question is dependent upon how many participants answered it. These sections are separated into four parts: demographics, research question 1, research question 2, and research question 3.

1. What do undergraduate students, graduate students, and certified clinicians think about the SLPs as members of infant feeding and swallowing teams? (referred to as *perception of roles*)
2. Where do undergraduate students, graduate students, and certified clinicians report learning about the role of the SLP in infant feeding and swallowing disorders? (referred to as *where did they learn*)
3. When would undergraduate students, graduate students, and certified clinicians choose to learn about infant feeding and swallowing disorders? (referred to as *when would they choose to learn*)

### **3.2 DEMOGRAPHICS**

There were a total of 96 responses from students (see Table 1) and 93 from clinicians (see Table 2). Each question does not add-up to equal these numbers. Not everyone who opened the survey completed every question and questions that were left blank were not counted towards the total number of responses. Therefore, each question has a unique number of responses.

It is worth noting that zero respondents noted that they were from special interest group 16, alone. This is interesting since the survey was posted directly to the email messaging system for this group. It is possible that members of SIG 16 did not feel as if they qualified for this survey, or they abandoned it after starting it.

**Table 1. Demographic Data for Students**

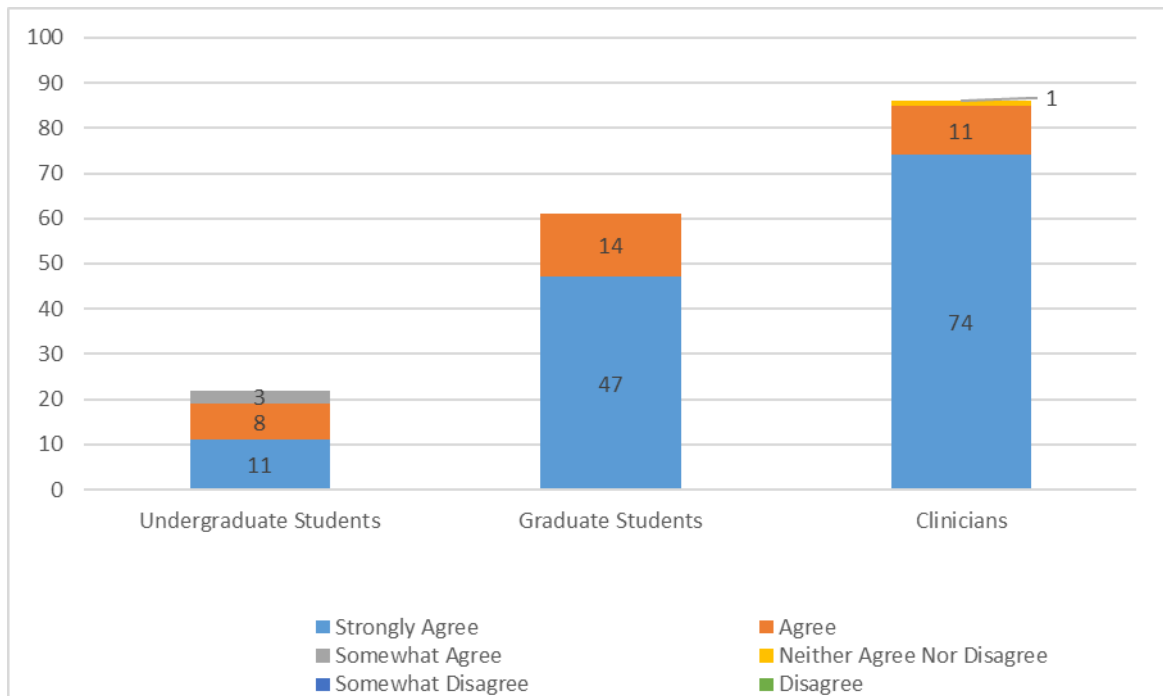
	<b>Students</b>
<b>Gender</b>	Male: 2 Female: 96 Other: 0 n = 98
<b>Age (years)</b>	Median: 22 Range: 18 -51
<b>Year in School</b>	Freshman: 8 Sophomore: 7 Junior: 11 Senior: 6 Post-baccalaureate: 0 First year graduate student: 40 Second year graduate student: 26
<b>Geographic Location of Undergraduate School</b>	West: 1 Midwest: 2 Southwest: 0 South: 3 Northeast: 92 Outside of the US: 0
<b>Geographic Location of Graduate School</b>	West: 0 Midwest: 2 Southwest: 0 South: 0 Northeast: 69 Outside of the US: 0 I have not started graduate school yet: 28
<b>Type of Degree Currently Seeking</b>	BA: 1 BS: 28 BPhil: 0 MA: 19 MS: 47 CScD: 2 – excluded PhD: 0 Other: 1
<b>Planning on Seeking Master’s Degree in SLP</b>	Yes: 81 Yes; but I need to finish the prerequisite requirements: 10 No: 5 Unsure: 0
<b>National Student Speech Language Hearing Association Member or Member of ASHA Special Interest Group</b>	National NSSLHA Member: Yes: 59 No: 37 Unsure: 2 Member of ASHA SIG: Yes: 7 No: 90
<b>Self-Ranking of Clinical Expertise</b>	Novice: 74 Advanced Beginner: 21 Competent: 2 Proficient: 1 Expert: 0

**Table 2. Demographic Data for Clinicians**

	<b>Certified Clinicians</b>
<b>Gender</b>	Male: 1 Female: 92 Other: 0 n = 93
<b>Age (years)</b>	Median: 36 Range: 21 - 69
<b>Years Post Graduate School</b>	Median: 11 Range: 1 - 45
<b>Geographic Location of Graduate School</b>	West: 7 Midwest: 21 Southwest: 8 South: 28 Northeast: 23 Outside of the US: 6
<b>Most Advanced Degree</b>	MA: 30 MS: 51 M.Ed: 7 CScD: 1 PhD: 2 Other: 3
<b>Hold ASHA Certification</b>	Yes: 93 No: 0
<b>Geographic Location of Current Job</b>	West: 15 Midwest: 22 Southwest: 9 South: 23 Northeast: 20 Outside of the US: 4
<b>Member of ASHA Special Interest Group</b>	SIG 13: 85 SIG 16: 0 Both SIG 13 and SIG 16: 1 Another SIG: 3 No: 4
<b>Self-Ranking of Clinical Expertise</b>	Novice: 2 Advanced Beginner: 12 Competent: 14 Proficient: 38 Expert: 28

### 3.2.1 Question 1: Perception of roles

Most undergraduate students, graduate students, and clinicians reported that a team care approach should be used for infants with feeding and/or swallowing disorders (see Figure 2). The degree of certainty was relatively stable proportionally between groups.



**Figure 2** Infants with feeding and/or swallowing disorders should be cared for by a team.

Participants believed that a variety of professionals should be involved on the infant feeding and/or swallowing team (see Table 3). Multiple responses were encouraged, meaning that the participant could choose any or all of the professionals that he/she believed are important to the team. Responses were recorded by frequency. Since any one participant could choose any/all of the options, this data is reported in percentages instead of proportions. Connecting

responses to either an undergraduate or graduate student was impossible because the number of responses did not align with the number of participants. The students will be grouped into one “student” group for this question.

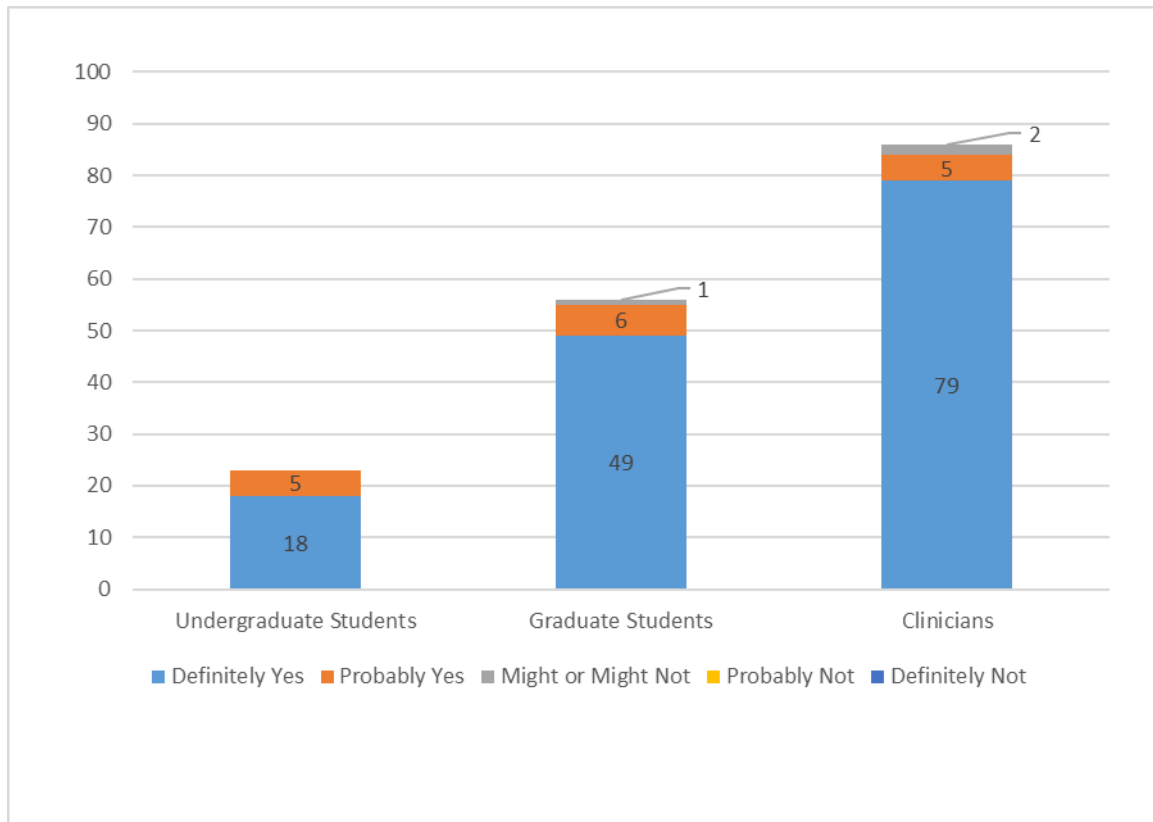
Of the 33 respondents who chose “other” the most common comments included that care is dependent upon the individual situation. Gastroenterology (11) and physical therapy (7) were cited as necessary. Other suggestions included various physicians (pulmonology, neonatology, cardiology, surgery), child-life specialists, respiratory therapists, and the family.

**Table 3. Who should be working with infants with feeding and/or swallowing disorders**

<b>Profession</b>	<b>Student Percent</b>	<b>Certified Clinician Percent</b>
<b>Behavioral psychologist</b>	19	43
<b>ENT</b>	68	80
<b>Lactation consultant</b>	50	81
<b>Nurse</b>	71	74
<b>Occupational therapist</b>	54	79
<b>Other</b>	2	33
<b>Pediatrician</b>	86	97
<b>Registered dietitian</b>	64	93
<b>Social worker</b>	21	53
<b>SLP</b>	100	99

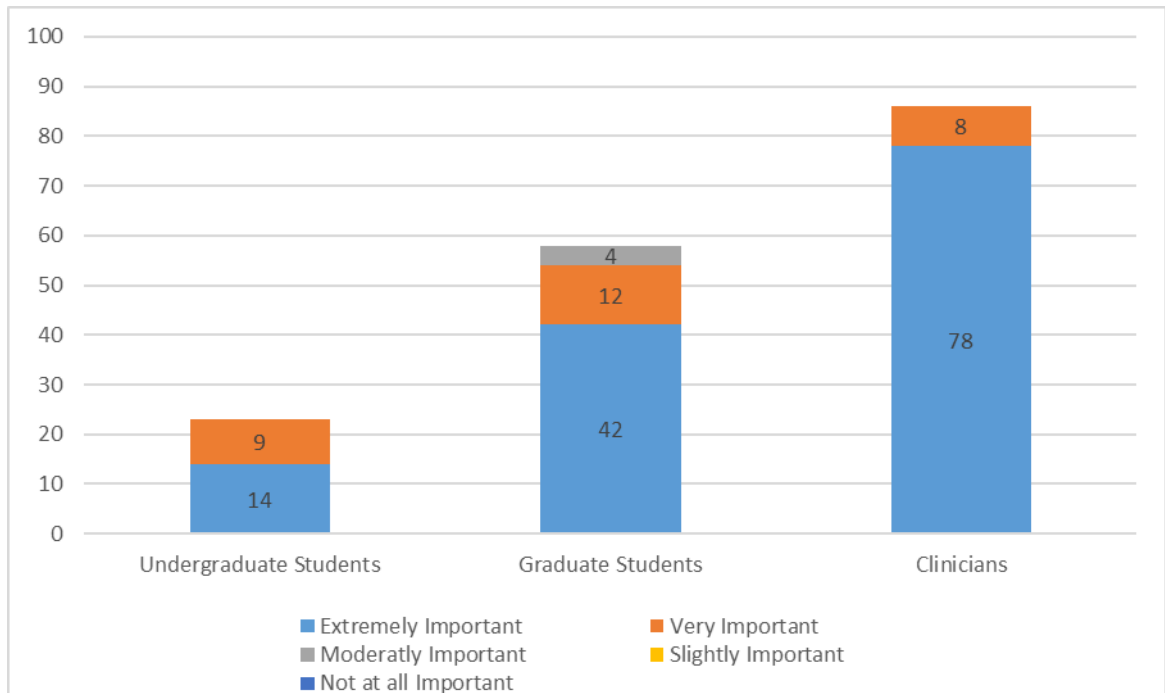
An overwhelming majority of participants report that SLPs should definitely work with infants who have feeding and/or swallowing disorders (see Figure 3).





**Figure 3 Should SLPs work with infants who have feeding and/or swallowing disorders?**

Undergraduate students were less certain about the degree that the SLP is important to the infant feeding and/or swallowing team. The majority of graduate student and clinician respondents reported that the SLP is extremely important to the infant feeding and/or swallowing team (see Figure 4). These responses expanded on the idea above that an SLP should be a member of the team. It gives us an idea of how important the participants believe the SLP is to a feeding and/or swallowing team.



**Figure 4 How important is an SLP to the infant feeding and/or swallowing team?**

Forty-five open-ended responses from students were recorded regarding clinician responsibility. Many themes in these responses were noted (see Table 4). Each participant’s response was only counted towards one theme. Some participants mentioned multiple ideas, but the only the first one was counted. The first idea mentioned was likely what the participant believed was most important.

**Table 4. What are some responsibilities that you think an SLP may have when working with infants with feeding and/or swallowing disorders?**

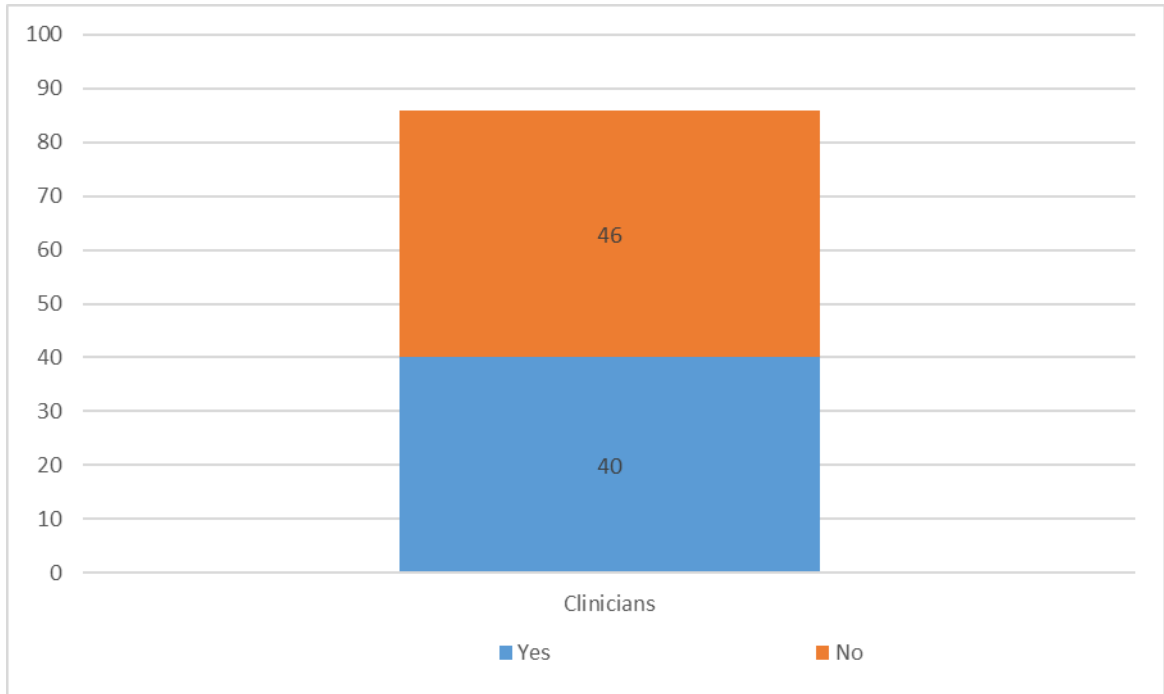
	<b>Students</b>
<b>Not Sure</b>	1
<b>Knowledge</b>	2
<b>Nutrition/hydration</b>	3
<b>Safety</b>	9
<b>Education</b>	10
<b>Evaluation/treatment</b>	20

Clinicians were asked a parallel question regarding SLP duties. Responses were collected from 83 clinicians (see Table 5) Most responses fell in the general category of “diagnosis and treatment.”

**Table 5. What are your main duties when working with infants who have feeding and/or swallowing disorders?**

	<b>Clinicians</b>
<b>Understand complexities</b>	1
<b>Development</b>	1
<b>Outpatient</b>	1
<b>Manage feeding plan</b>	2
<b>Support nutrition/hydration</b>	2
<b>I don't work with them currently</b>	2
<b>Collaboration</b>	4
<b>Education</b>	6
<b>Food readiness/acceptance</b>	6
<b>Safety</b>	7
<b>Diagnosis and treatment</b>	52

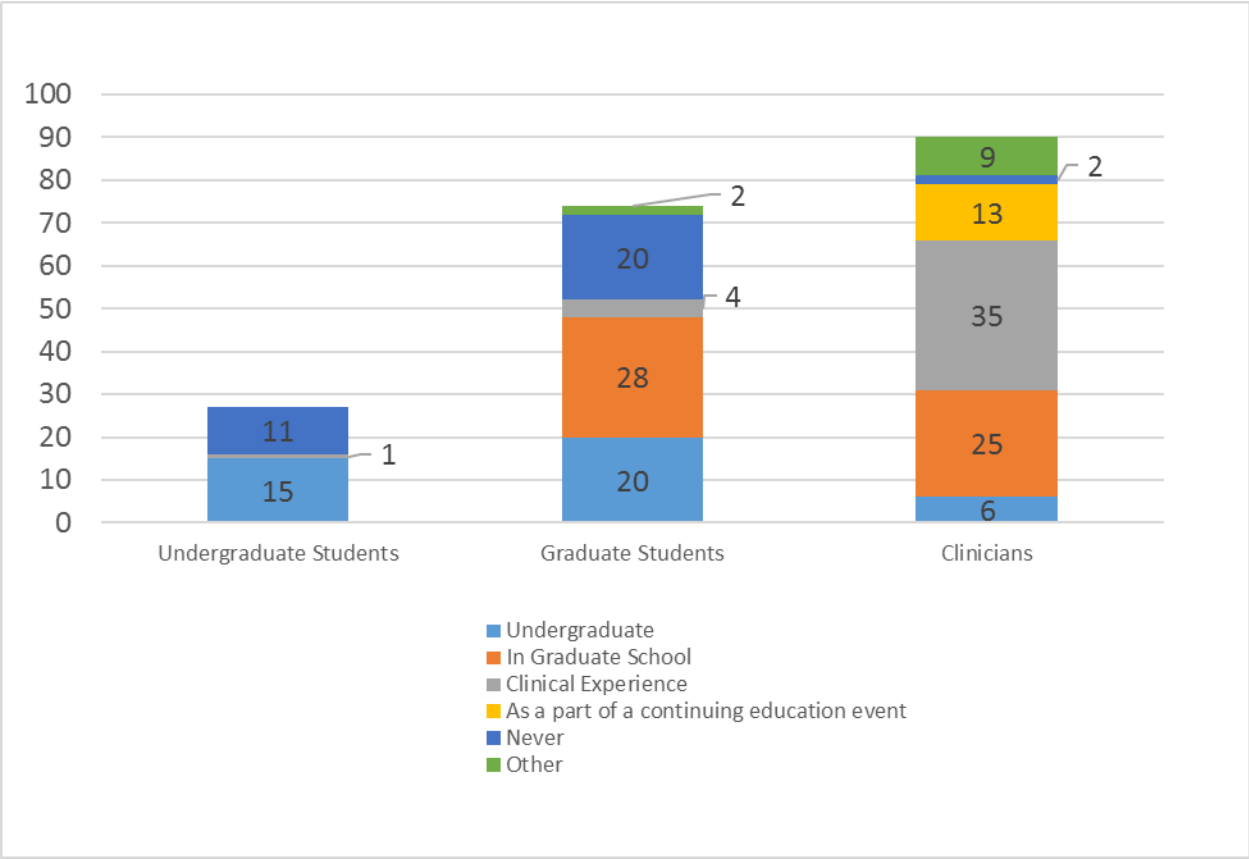
Nearly half of clinician respondents reported having duties that they did not feel qualified to do when starting to work with infants with feeding and/or swallowing disorders (see Figure 5). This question was excluded from the student survey, as the students have not yet been independently responsible for the patients.



**Figure 5 When you began working with infants with feeding and swallowing disorders did you have responsibilities that you did not feel qualified to do?**

### **3.2.2 Question 2: Where did they learn**

There is extreme variability in where participants report learning about infant feeding and/or swallowing disorders (see Figure 6).

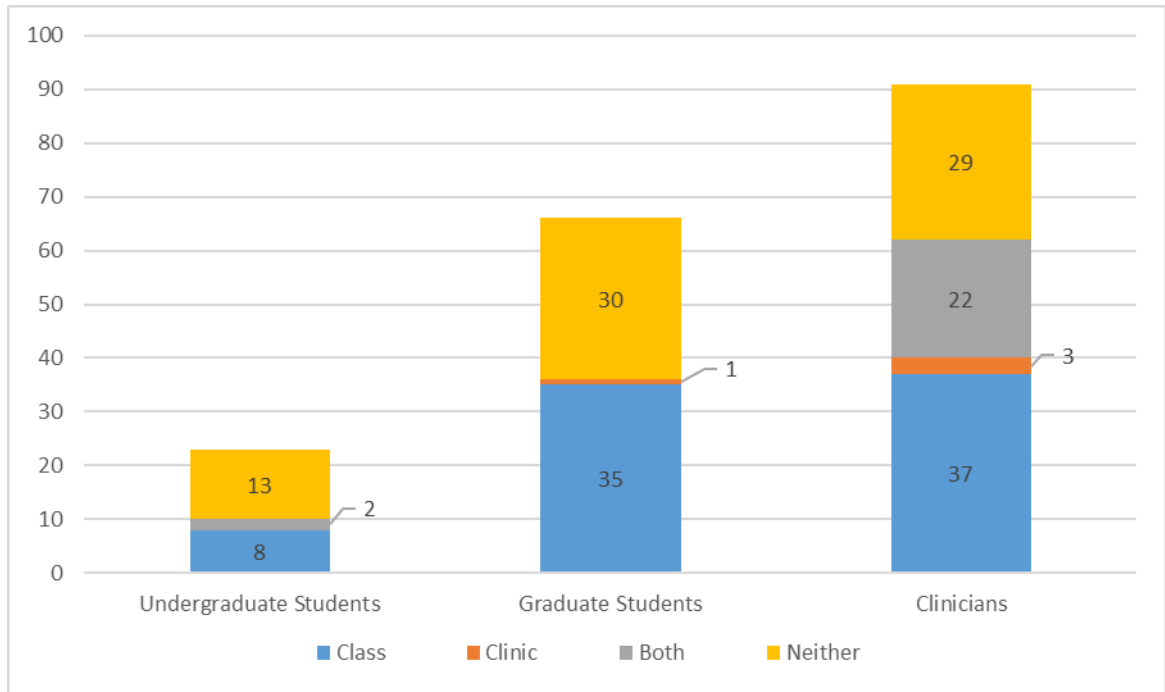


**Figure 6 When did students and clinicians learn about infant feeding and/or swallowing disorders?**

Undergraduate and graduate students reported similar class and clinic experiences regarding infant feeding and/or swallowing disorders. The clinician group was the only group where every option was selected. The clinician responses also encompassed “clinic” to a much higher degree than the other groups (see Figure 7).

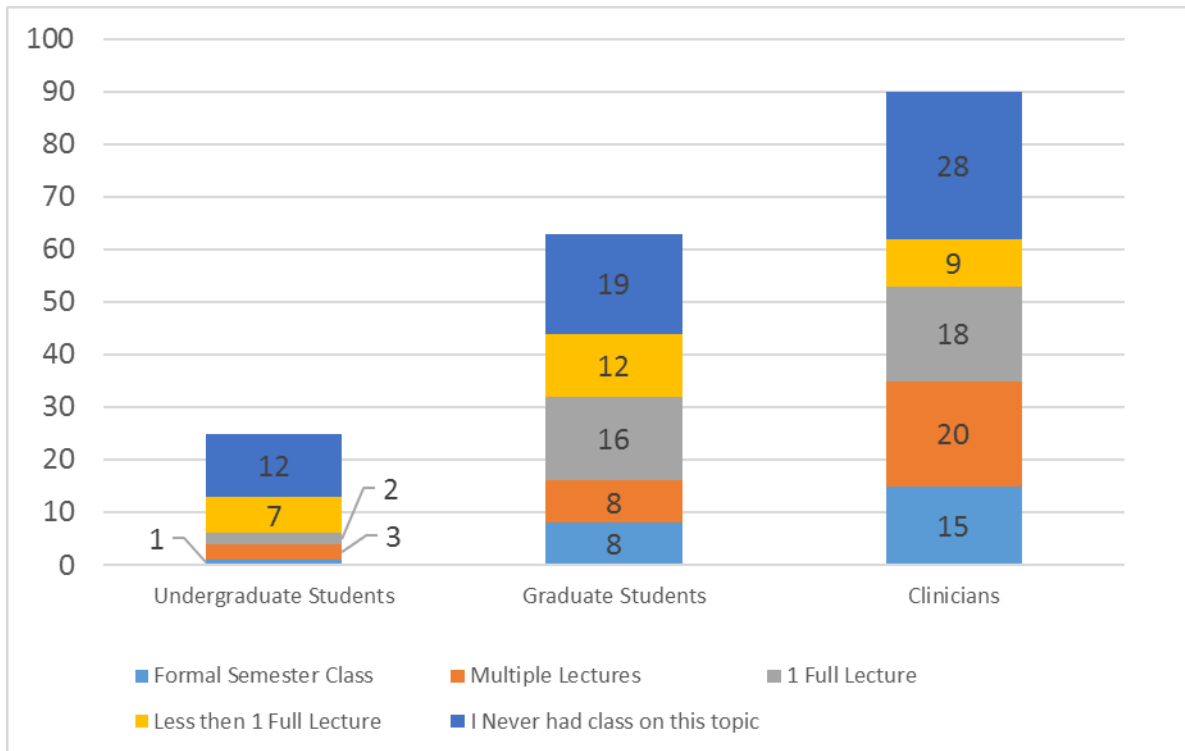
The neither class nor clinic option was chosen by the undergraduate and graduate students at a ratio similar to class, clinic, or both. This indicates nearly half of the students have never been introduced to infant feeding and/or swallowing disorders in class or clinic settings. Although the majority of clinicians report having either class, clinic, or both on this topic, close

to 1/3 of the participants report having neither class nor clinic time dedicated to infant feeding and/or swallowing disorders.



**Figure 7 While in school did you have any class or clinic time that specifically discussed infant feeding and/or swallowing disorders?**

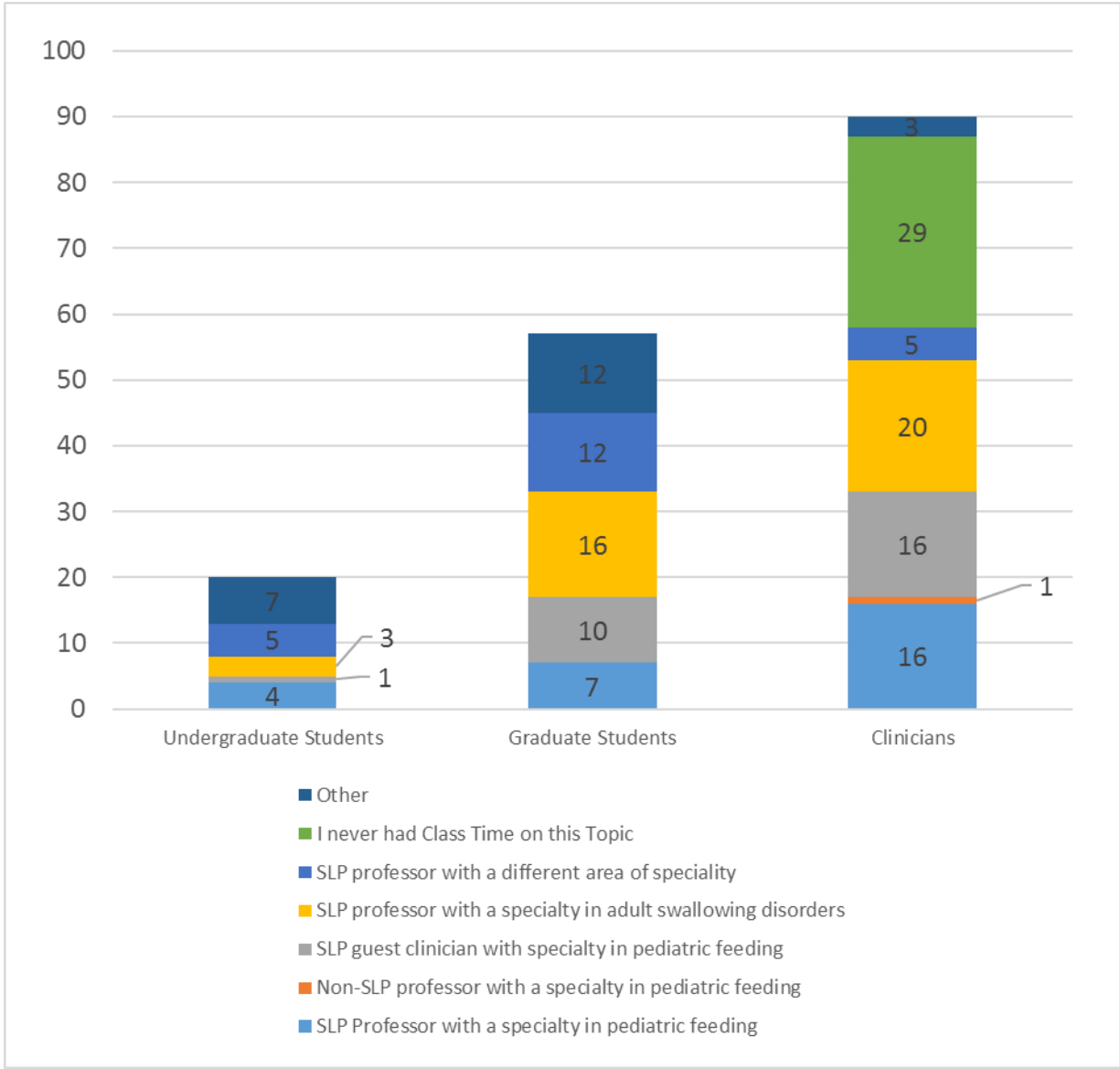
The amount of class time spent on infant feeding and/or swallowing disorders was extremely variable both between and within groups (see Figure 8). The most frequent response regardless of group was “I have never had class on this topic.”



**Figure 8 How much class time did you spend on infant feeding and swallowing?**

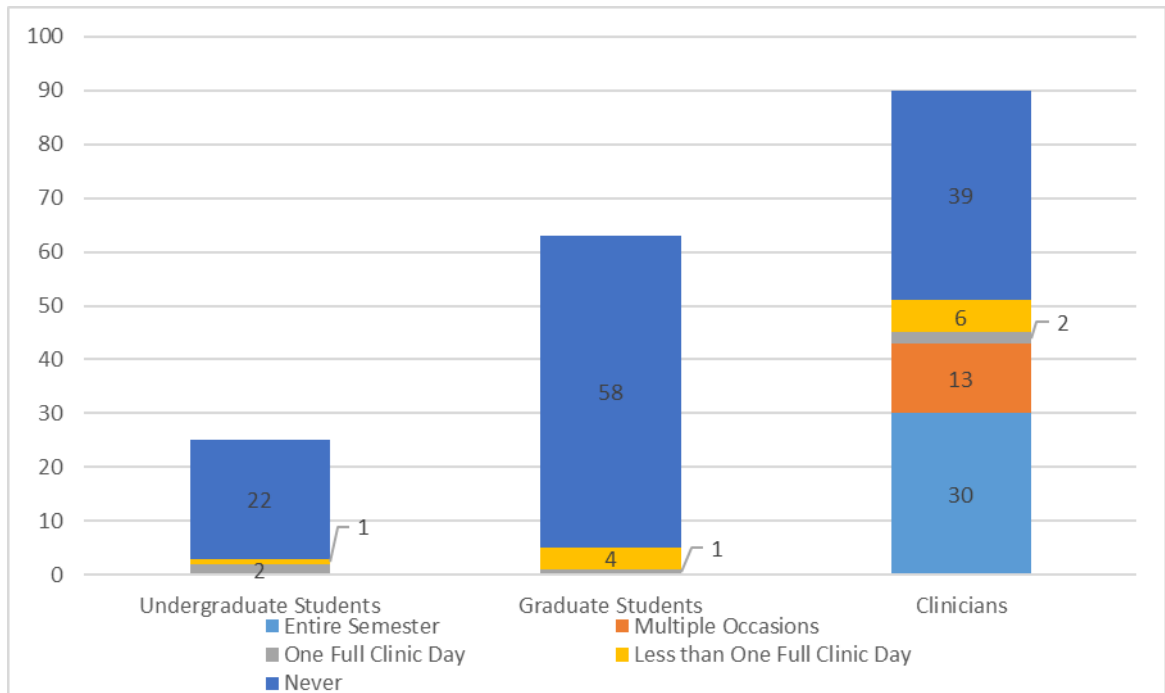
Figure 9 provides evidence that multiple professionals taught the participants about infant feeding and/or swallowing disorders in class. “I never had class time on this topic” was unintentionally excluded as an option from the student survey. It is notable that of the 19 students who chose “other,” 16 responded to the open-ended question with 13 noting that they have not yet had this topic in class.





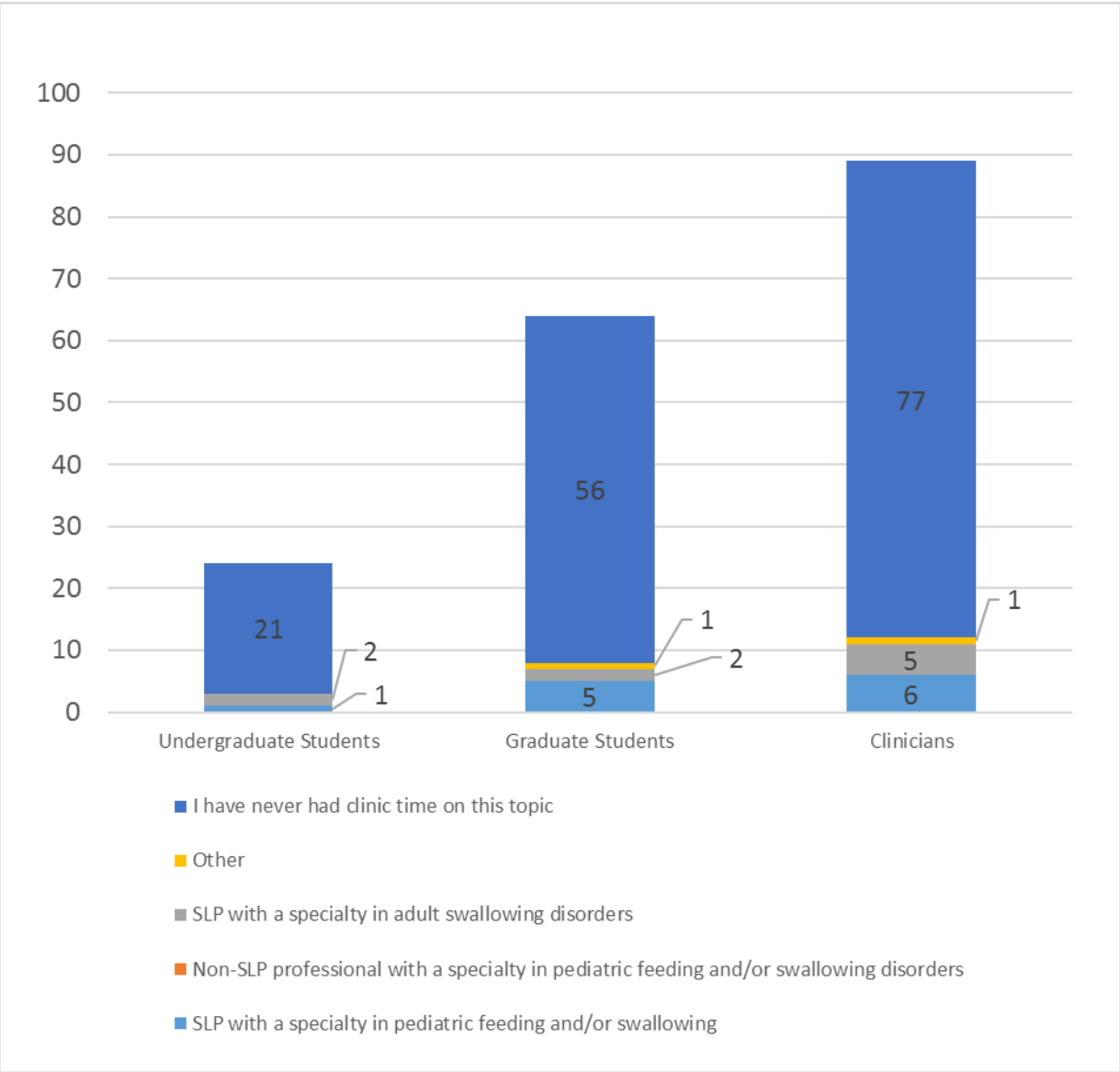
**Figure 9 Who taught you about infant feeding and swallowing in class?**

The majority of undergraduate and graduate students reported never having clinic time on the topic of infant feeding and/or swallowing disorders. Clinician responses include different amounts of clinical education time (see Figure 10).



**Figure 10 How much clinic time did you spend on infant feeding and swallowing?**

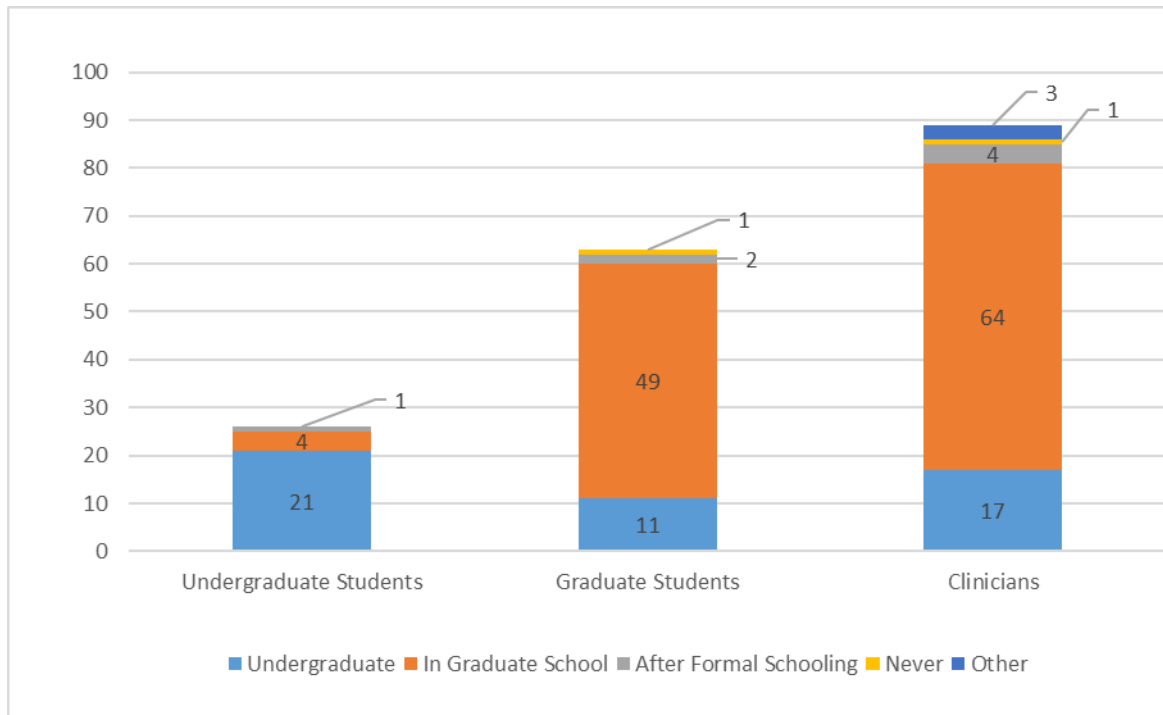
Most participants did not have anyone teach them about infant feeding and/or swallowing disorders in clinic, as they reported not having formal clinic education on this topic. Those who did were taught by a limited range of professionals, most often an SLP with a specialty in pediatric feeding and/or swallowing disorders (see Figure 11).



**Figure 11 Who taught you about infant feeding and swallowing in clinic?**

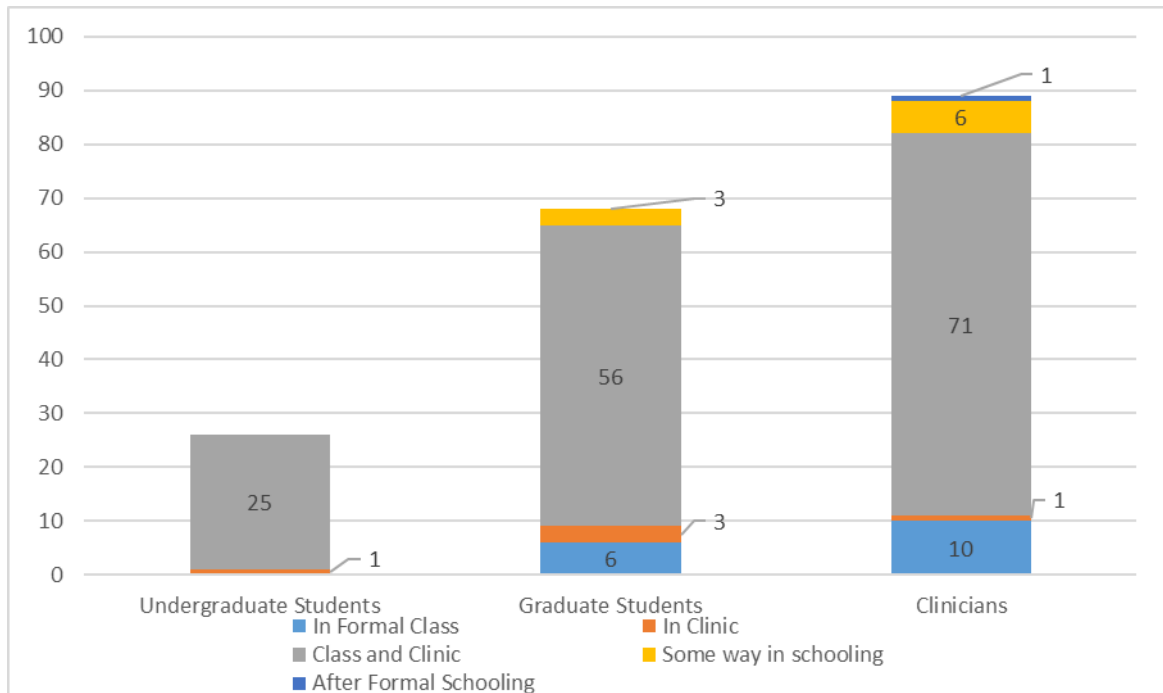
### 3.2.3 Question 3: When would they choose to learn

The majority of undergraduate students would choose to learn about infant feeding and/or swallowing disorders as a part of their undergraduate career (see Figure 12). Graduate students and clinicians overwhelmingly chose graduate school as their preferred timeline.



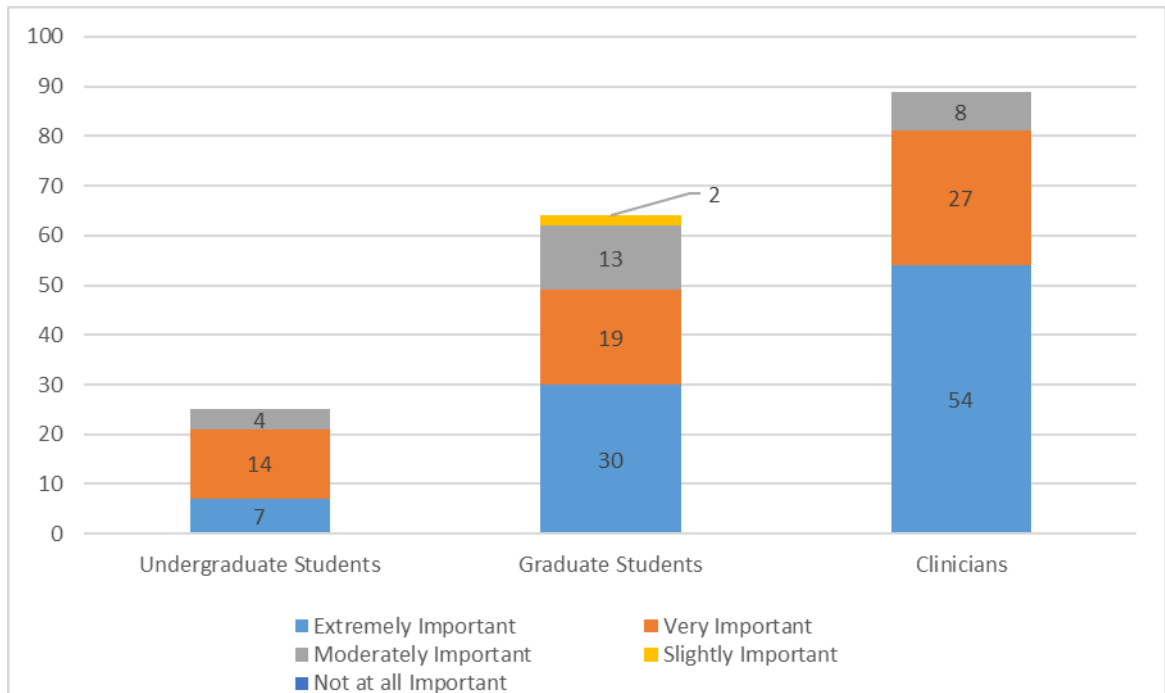
**Figure 12 When would SLP students and clinicians choose to learn about infant feeding and/or swallowing disorders?**

Regardless of age or experience level, most participants would choose to learn about infant feeding and/or swallowing disorders in both the classroom and clinic settings (see Figure 13).



**Figure 13 If this material is addressed in school, should it be in class and/or clinic?**

A follow-up question regarding importance was met with more uncertainty. The groups definitiveness increased with experience (see Figure 14). A larger proportion of clinicians than graduate students reported that the dedicated educational time is “extremely important.” Similarly, a larger proportion of graduate students than undergraduate students reported “extremely important.”



**Figure 14 How important is it to have class or clinic time dedicated to infant feeding and/or swallowing disorders?**

### 3.3 NARRATIVE COMMENTS

The following narrative comments are examples of quotations from survey respondents.

#### 3.3.1 Question 1: Perception of roles

An overwhelming majority of participants believe that SLPs should definitely work with infants who have feeding and/or swallowing disorders (see Figure 3).

**Definitely yes:**

*“We deal with adult swallowing & entire courses dedicated to this. Why not infants as well?” - Student*

*“We are uniquely educated and trained in not only swallowing specific anatomy and physiology, but also in (hopefully) ethical analysis, human development, principles of diagnosis/treatment, counseling, etc. I have not encountered another discipline that takes a similar perspective with the same [...] skills when working with pediatric dysphagia.” - Clinician*

**Probably yes:**

*“Swallowing is in the scope of SLP practice.” - Student*

*“Only if you have been trained.” - Clinician*

**Might or might not:**

*“Need proper training and some experience with feeding/swallowing in pediatrics FIRST.”- Clinician*

Undergraduate students were less certain about the degree to which the SLP is important to the infant feeding and/or swallowing team. The majority of graduate student and clinician respondents reported that the SLP is extremely important to the infant feeding and/or swallowing team (see Figure 4).

**Extremely important:**

*“An SLP is extremely important because they have the knowledge needed to properly aid an infant who has a feeding and/or swallowing disorder.” - Student*

*“An SLP comes to the team with information about infant development and communication. We also come with a focus on helping the infant with “quality vs quantity” and*

*can educate other on subtle signs and difficulties/cues that the infant is demonstrating.” - Clinician*

**Very important:**

*“We are very familiar with the mechanisms involved in the action of swallowing so our input would be of great help.” - Student*

*“If trained – can be a detriment if not – knowledge of head and neck anatomy.” - Clinician*

**Moderately important:**

*“If the SLP has knowledge about it then they can be as asset to the team.” - Student*

Students reported variable perceptions of the role of the SLP when working with infants who have feeding and/or swallowing disorders.

*“SLPs have many responsibilities when working with infants with feeding and/or swallowing disorders. Some of these include identifying whether or not the infant has structural/functional abnormalities, where the complication lies, and ethical treatment plans that are supported by evidence-based practice.” - Student*

*“Working on proper swallowing techniques.” - Student*

Many clinician responses centered around evaluation and treatment, education, and management of feeding disorder or diet.

*“Educating caregivers on positioning, managing flow rate (via nipple type or otherwise), coordinating with pediatrician and or GI doctor, educating caregivers on s/s of distress during feedings, etc.” - Clinician*

*“Skilled assessment of the infant's feeding and swallowing, making appropriate recommendations in line with the infant's readiness for feeding and the family's priorities,*



*Supporting [sic] family/caregivers around safe and pleasurable feeding experiences with their infant, collaborating with other medical professionals on the team.” - Clinician*

Nearly half of clinician respondents reported having duties that they did not feel qualified to do when starting to work with infants with feeding and/or swallowing disorders (see Figure 5).

*“Everything! I spent a year in continuing education courses, self study, and pater nearing for co-Evals and treatment with an experienced clinician before I felt competent to see patients independently in the critical care setting.” - Clinician*

*“Yes and no, I felt competent but knew I could learn more and get more experience and knew there were other SLPs who had more training and experience but everyone starts somewhere.” - Clinician*

### **3.3.2 Question 2: Where did they learn**

There is extreme variability in where participants report learning about infant feeding and/or swallowing disorders (see Figure 6).

No open-ended responses were received from the students.

*“In my first years of working for a private practice and then again in early intervention.”*  
- Clinician

A variety of different professionals who taught the students and clinicians about infant feeding and/or swallowing disorders in class were reported.

*“Specification in articulation and fluency,” “fluency,” “voice, child language disorders,” “school based/doc student,” “adult neurogenic communication disorders,” “voice*

*disorders,” “had dysphagia and acute care specialty not specified to infants,” and “Anatomy and Physiology of the Head, Neck, and Thorax professor.” - Students*

*“Adult dysphagia,” “early intervention,” “cleft palate specialist,” “infant development/communication disorders,” and “specialty in pediatric language with some experience with peds dysphagia.”- Clinicians*

A more limited range of professionals were reported as teaching infant feeding and/or swallowing disorders in clinic. No open-ended responses were received from the students.

*“OT” - Clinician*

### **3.3.3 Question 3: When would they choose to learn**

Regardless of experience level, most participants reported that they would choose to learn about infant feeding and/or swallowing disorders in both the classroom and clinic settings (see Figure 13). When asked more specifically what they wish they had learned, the following responses were collected.

*“I wish I had learned about the topic in general because I feel it is very important for any SLP that hopes to work with young children.” - Student*

*“Everything, I have no knowledge of infant feeding and/or swallowing disorders. If I learned anything in undergrad, it was minimal enough for me to forget all I learned.” - Student*

*“What to look for and how it is treated as well as the SLP scope of practice in this situation.” - Student*

*“Everything” - Clinician*

*“It's paramount that any graduate course on the topic of infant feeding and swallowing stresses the inherent risks of working with that population, and that it takes significant continuing education and hands-on training by a proficient and/or expert clinician in that area to assist with becoming competent to work with such a delicate and high-risk population. Although this was stressed to me as a graduate student, now that I practice in that setting, I have students come to me from other graduate programs where that risk is not stressed, and students believe that a course on the topic makes them safe and semi-competent to work with that population, which is a major concern.” - Clinician*

## **4.0 DISCUSSION**

This is the first study that we know of to investigate the perception of the role of the SLP in infant feeding and/or swallowing disorders. Undergraduate students, graduate students, and certified clinicians have different knowledge regarding the roles of SLPs who work with infants who have feeding and/or swallowing disorders. Differences between the groups extend to different educational opportunities and opinions about where education should be provided. These differences in opinion highlight the need for more robust formal educational opportunities because they are related to differences in knowledge. There is also a need for post-educational opportunities, centered on on-the-job training.

### **4.1 RESEARCH QUESTION 1**

*What do undergraduate students, graduate students, and certified clinicians think about the SLPs as members of infant feeding and swallowing teams?*

The vast majority of students and clinicians agreed that a team based approach is extremely important to care for infants with feeding and/or swallowing disorders. This is a positive finding because interdisciplinary and team-based approaches are so important when working with this

fragile population. The medical fragility combined with a family who is in distress may require various professionals to provide the most comprehensive care. Since all three participant groups reported the importance of a team-based approach, we can delve into responses regarding the role of the SLP.

The makeup of this specialist team varied slightly but the SLP was deemed a crucial member. The pattern of responses followed roughly the same trajectory regardless of groups, with SLP, pediatrician, registered dietitian, ENT, lactation consultant, nurse, and occupational therapist being reported as important the majority of the time. There were discrepancies between the student and clinician groups in terms of reported importance of the registered dietitian and lactation consultant. These differences may be a result of less exposure in the student group. Many students may not have been exposed to the different professionals, and may have chosen differently if given the chance to observe an infant feeding and/or swallowing team. Regardless, the SLP was chosen 100% of the time by students and in 99% of responses from clinicians. This finding provides further evidence for the importance of the SLP as a member of the infant feeding and/or swallowing team, as viewed by SLPs.

The participants believe that SLPs definitely have a role with infants who have feeding and/or swallowing disorders. This result is consistent regardless of experience. When asked about the importance of the SLP to the infant feeding and/or swallowing team, the differences in response are explained as a function of experience. Undergraduate students believe that SLPs are important, but are unsure about the degree of that importance. Graduate students and clinicians are more likely to respond that the SLP is definitely important to the team. This difference could also be explained by education. The undergraduate students, who have not yet been introduced to this information are not confident in the importance of the SLP. The graduate students and

clinicians are in agreement that this profession “definitely” does have a role with infants who have feeding and/or swallowing disorders.

An interesting finding from this study is that the level of detail included among the responses varied with experience when regarding descriptions of the role of the SLP. The nature of the SLP role consistently included education, evaluation and treatment, and feeding and diet management. The undergraduate and graduate students were less likely to provide detailed descriptions of the duties. They could express the basic idea behind the role of the SLP, but the clinicians were much more specific in their responses. This was expected. The lack of education and experience for students is logical when compared to their experienced counterparts.

When beginning their position, nearly half of the clinician participants felt unqualified to perform duties specific to their job. This is notable. Education was lacking for these clinicians, which led to feelings of insecurity with job duties. Although many professionals may experience insecurity when beginning their career, it is important to analyze the educational opportunities that these clinicians reported.

## **4.2 RESEARCH QUESTION 2**

*Where do undergraduate students, graduate students, and certified clinicians report learning about the role of the SLP in infant feeding and swallowing disorders?*

Reports varied between and within groups as to when participants learned about infants who have feeding and/or swallowing disorders. Approximately half of the undergraduate respondents

reported learning about infant feeding and/or swallowing disorders as part of the curriculum of an undergraduate class. This is compared to the approximately one-quarter of the graduate students and one-fifteenth of the clinicians. It is interesting that so many undergraduate students reported learning about this topic in an undergraduate class when compared to the other groups responses. This may indicate positive recent changes in curriculum to include infant feeding and/or swallowing disorder in the undergraduate curriculum. It may also indicate bias from the undergraduate programs that were invited to participate in this study. Perhaps the invited programs have an unusually high percentage of class time dedicated to infant feeding and/or swallowing disorders. This finding may be different if other undergraduate programs were invited to participate.

Between the graduate student and clinician groups, the number of participants who reported learning about infant feeding and/or swallowing disorders during graduate school are comparable and relatively static between groups. The participants' responses indicate that less than a third of them were introduced to infant feeding and/or swallowing disorders during a graduate level class. This potentially indicates a lack of change in graduate school curriculum since the time that clinicians were graduate students.

The amount of formal class time that was reported was low across the board. More clinicians reported taking a full-semester class than undergraduate students and graduate students combined. This may reflect the specific knowledge that the clinicians were seeking during their formal education: if you know that you are interested in infant feeding and/or swallowing disorders, you may seek out that information more readily. Undergraduate and graduate students without a reported interest in infant feeding and/or swallowing may not seek out these elective courses in the same way. There is nothing inherently concerning about this until it becomes a

question of accessibility. If the undergraduate and graduate students would have chosen a full-semester class, but the class was not available, then the educational discrepancies are substantial.

Out of the participants who reported having formal class time focused on infant feeding and/or swallowing disorders, there were notable differences regarding who was teaching these courses. Proportionally, many more current students are being taught about infant feeding and/or swallowing disorders by a professor with a different area of specialty when compared to what is reported from certified clinicians. This finding may be a result of clinicians who forgot who taught their course. It also may reflect changes in academic makeup. Motivating students to pursue a Ph.D. is difficult and the number of students pursuing a higher degree is decreasing, leading to fewer qualified professors (ASHA, 2015). More professors may be teaching classes outside of their area of expertise due to smaller faculties.

Many participants responded that they were taught in class by a professor who has a specialty in adult swallowing disorders. While there are many similarities between adult and pediatric clients, there are discrepancies in anatomy, as well as in assessment and treatment protocols. This again may point to the fact that professors are being asked to teach outside of their area of expertise – even if the areas are related.

There were opportunities for undergraduate students, graduate students, and clinicians to learn in class from a professor or guest clinician with an expertise in infant feeding and/or swallowing disorders. These findings are important as they point to the idea that experts in pediatric feeding are available – to some extent- to teach these courses.

The fact that so few current undergraduate students and graduate students were exposed to infant feeding and/or swallowing disorder as a part of their clinical experience may explain further differences in opinion between student and clinician groups. Over one-third of clinicians



reported learning about infants who have feeding and/or swallowing disorders during their clinical education. Clinical experience is necessary to gain competency in any area of speech-language pathology. Without this experience, the knowledge is purely theoretical. The fact that so few students had any clinical experience in this area creates the potential for unqualified clinicians. Even if these students received some level of formal clinical education, they will not be competent to safely provide services to the infant population. In fact, the formal clinical education at the level of an undergraduate student may provide a false sense of competency.

The majority of undergraduate students, graduate students, and clinicians reported never having clinic time on infant feeding and/or swallowing disorders. The only group of participants where “an entire semester clinic” was reported was the certified clinicians group, with 30 respondents choosing that option. Similarly to class time, this finding may reflect the fact that interested professionals sought out specific clinical opportunities. The problems again arise if these clinical opportunities are not available. Nearly half of the clinicians reported never having clinic time with infants who have feeding and/or swallowing disorders. Without the time to observe competent clinicians and trial assessment or intervention techniques in a controlled environment, developing competency may be limited. Class time is not enough for this population, and it is important to note that a large proportion of certified clinicians who responded to this survey had neither class nor clinic.

Of the respondents who did have clinic time on infant feeding and/or swallowing disorders, many reported learned from a clinician with a specialty in either adult or pediatric feeding or swallowing. It is still distressing that the majority of respondents note never having clinic time on this topic. However, it is positive that those who did have clinic time learned from an SLP who practices either with adults or with pediatrics who have feeding and swallowing

disorders. There is a noted discrepancy in the responses from clinicians. It was reported that 51 had at least some clinic time (see Figure 10), but only 12 report who taught them in clinic (see Figure 11). The reason for this discrepancy is unclear. Perhaps some clinicians do not remember who taught them, or maybe they taught themselves as part of their on-the-job training. These responses are contextualized with information regarding when the participants would choose to learn about infant feeding and/or swallowing disorders.

### 4.3 RESEARCH QUESTION 3

*When would undergraduate students, graduate students, and certified clinicians choose to learn about infant feeding and swallowing disorders?*

It is clear that students want education about infants who have feeding and/or swallowing disorders. The undergraduate students would choose to learn about infant feeding and swallowing disorders during their undergraduate education. Many undergraduate programs are intense and require electives, including personal expression and biological science. A fully dedicated course in the undergraduate curriculum may not be possible. Presenting this topic area as part of an introductory course is much more realistic.

The graduate students and current clinicians want this education as a part of their formal graduate schooling. These results prove that students are interested in this topic and would choose to be introduced to it as a part of their educational programming. The students surveyed

reported no vested interest in infant feeding and/or swallowing disorders and their results are even more important. Regardless of personal interests, the students want this education.

The majority of participants report that infant feeding and/or swallowing disorders should be addressed as a part of formal education. Notably, only one clinician chose “after formal schooling.” The researchers thought that more clinicians would believe that this specialized area should be addressed after formal education. This finding importantly shows that clinicians acknowledge the specialized knowledge needed to provide clinical services in this area. A strong academic and clinical basis is necessary for this skilled service.

There was a slight range across participants about how important they believe it is to have class and/or clinic time dedicated to infant feeding and/or swallowing disorders. This finding is somewhat inconsistent with the above finding that most participants believed the material should be addressed in class and clinic. Participants were conclusive in their report that material should be addressed in formal schooling, however, the degree of importance fluctuated.

#### **4.4 IMPORTANCE OF INDIVIDUALIZATION**

Regardless of the research question, the idea of individualization was recurrent. Providing access to a team that will provide the best care to each individual infant and their family is important. Not every family will have a goal to breastfeed. In this case, providing the family with a lactation consultant may be inappropriate. A child with a feeding and/or swallowing disorder that is related to a cardiac problem may not need a pulmonologist. Flexibility in the team-based approach is necessary in order to provide individualized and appropriate care.

Individualized educational opportunities may also be beneficial. Undergraduate students who know that they are interested in the medical setting may find it worthwhile to consider attending a graduate program where a medical “track” is set from the beginning. For example, the University of Washington allows incoming graduate students to choose a CoreSLP or a MedSLP track. The CoreSLP program “enables you to enter a variety of clinical practice areas and settings including early childhood programs, schools, outpatient clinics, private practices, skilled nursing facilities, and hospitals” (University of Washington, 2017a). The MedSLP track will provide “focused, advanced course of study that prepares you for work as a SLP in medical settings such as hospitals and rehabilitation centers” (University of Washington, 2017b). There are definite pros and cons to this type of graduate education. The ability to choose your own educational path may provide unique opportunities for more specialized and individualized courses. It may also decrease the amount of general speech-language knowledge that the student will graduate with. If more SLP graduate programs continue on this path, it will provide different educational opportunities and different challenges.

#### **4.5 RECOMMENDATIONS FOR FURTHER STUDY**

The participants in this study represented a variety of individuals with different educational experience and levels of expertise in the field of speech-language pathology. One avenue for further study would be to repeat this survey with different professionals. Occupational therapists, registered dietitians, and physicians may have different opinions regarding the role of the SLP, and/or their own role, for infants with feeding and/or swallowing disorders. Comparisons

between the opinions of different professionals would be interesting when considering the team-based approach to infant feeding and/or swallowing disorders.

This study attempted to gather results outside of the medical model via invitations to special interest group 16 (school-based issues). Although no responses were gathered from SIG 16 in this study, it would be helpful to compare opinions of professionals who operate and treat within the educational model to those who work within the medical model. It may also be interesting to present the survey to different populations such as SLP students from a wider variety of programs, or to clinicians with other areas of expertise and experience.

## **5.0 CONCLUSION**

Infant feeding and swallowing disorders result from complex medical conditions that require intervention from a team of highly skilled professionals due to the complexity of the issues. The makeup of these teams differs widely from clinic to clinic. The role of the SLP as a member of this team remains undefined. Trained SLPs can bring specific knowledge to the team regarding assessment, intervention, and education for families and coworkers. The training that is provided for SLPs who wish to work in this highly specialized area is inconsistent and dependent upon available academic resources.

### **5.1 SUMMARY**

Undergraduate students, graduate students, and certified clinicians were asked to share their beliefs about the role of the SLP in infant feeding and/or swallowing disorders. A survey was developed in order to understand what these participant groups think about the role of the SLP in infant feeding and/or swallowing disorders, when the participants learned about the topic, and when they would choose to learn about it. The data that was gathered was discussed in relation to the nature of responses and prevalent themes.

## 5.2 LIMITATIONS

A major limitation for any survey is that people self-select to participate. Some of the opinions reported in this study may have been the extremes: undergraduate students who are more willing to learn about infant feeding and/or swallowing disorders than their peers, or clinicians who feel strongly about providing this education to advance the field. It is possible that the participants in the study selected the answers that they believed the researchers wanted to hear. Since this was the first study of its kind, it is important to recognize that the language used in questions may have held an unintentional bias, such as a bias towards positive responses.

Certain questions were inconsistent. There was one situation where different Likert scales on comparative questions between student and clinicians were noted. A “not yet” option was unintentionally omitted on student question 17, resulting in inconsistencies between the parallel versions of the survey. The reported narrative comments represent only a small portion of those that were received, and were intended to highlight trends and contradictions in thought. This research does not encompass every thought that the participants have on the topic, nor does it claim to.

Finally, there were inconsistencies in number of responses throughout the survey. Many participants did not complete the entire survey. Others opted not to share narrative comments in the open-ended sections. This affects the magnitude of the results, and the ability to generalize to the population of SLPs as a whole.

### **5.3 EDUCATIONAL SIGNIFICANCE**

This study highlighted that regardless of experience, speech-language pathology students and clinicians believe that SLPs do have a role on an infant feeding and/or swallowing team. The detail of this role centers on a need for knowledge of assessment, intervention, and management for these infants. Formal education is varied and inconsistent in this area. In order to help speech-language pathology students gain this knowledge, we need formal education on this topic. Students and clinicians both want this education as a combination of class and clinic experiences.

As this study was the first of its kind describing perceptions of the role of the SLP in infant feeding and/or swallowing disorders, further research must be conducted in order to conclude what details and information these classes should consist of. Without implementing curriculum changes that include formal educational opportunities for students interested in infant feeding and/or swallowing disorders, we are doing the field a disservice. Students are potentially entering positions without the critical knowledge necessary to provide meaningful and competent care. It is important that these opportunities become available.

#### **5.3.1 An educational caveat**

The reported differences in education leading to differences in opinion is expected. It is also potentially dangerous. When there is a basic perception about the role of the SLP, such as “evaluation and treatment,” there is a danger that the medical fragility and necessary specialized knowledge are not understood. When students do not have an appreciation for the complexities of this population, it may lead to approaching the education differently. It is not enough to learn



the anatomy and physiology. The counseling and education of staff and caregivers is especially important for this population (Lefton-Greif et al., 2014). There are many factors influencing quality of life for the caregivers, including difficulties with parent-child bonding or generalized worries about feeding difficulties. Without the knowledge of appropriate client-clinician interactions, the understanding of anatomy or physiology may be useless.

Parents may experience sincere and appropriate reactions to the news that their child has a feeding and/or swallowing disorder. Anger, guilt, and denial are all reactions that a caregiver may have when they hear the news (Luterman, 2004). The ability to counsel and coach parents through bad news is not only something that the SLP *should* be knowledgeable about, but it is a skill discussed in the speech-language pathology scope of practice. “The role of the SLP in the counseling process includes interactions related to emotional reactions, thoughts, feelings, and behaviors that result from living with the communication disorder, feeding and swallowing disorder, or related disorders” (ASHA, 2016, p. 8). If the SLP does not understand the importance of this aspect of the SLP’s role, he/she is missing a great deal. Knowing the importance of an appropriate client-clinician relationship requires knowledge that surpasses content knowledge and reaches the emotional level (Egan, 2007a).

Further, simply knowing that you should counsel is not enough to do so skillfully. Understanding the concepts of appropriate counseling and being able to implement them are skills requiring constant practice (Egan, 2007b). Counseling skills must also be included in the role of an SLP for the clinician to truly help clients and their families. It is important to remember the role that the SLP has in counseling when considering the role with infants who have feeding and/or swallowing disorders.

## 5.4 CLINICAL SIGNIFICANCE

Those who participated in this survey reported a definite understanding of the importance of team-based care for infants with feeding and/or swallowing disorders. They report that the SLP has a role on this team and that it is important to provide clinical education and hands-on experiences to students.

There is a caveat to providing formal education – presumed competence. Graduate students may feel more competent in an area that they have had formal class or clinic time on. However, this presumed competence may discourage the student from continued education or on-the-job training. Even though this survey noted that students want this education as a part of formal schooling, creating a generation of clinicians who assume their own competency based on a few courses is detrimental to the progress of the field. It is our duty to provide education to all areas encompassed under the diverse scope of practice, but it is also essential to educate students to this caveat.

A narrative comment from a clinician discusses this caveat: “It's paramount that any graduate course on the topic of infant feeding and swallowing stresses the inherent risks of working with that population, and that it takes significant continuing education and hands-on training by a proficient and/or expert clinician in that area to assist with becoming competent to work with such a delicate and high-risk population. Although this was stressed to me as a graduate student, now that I practice in that setting, I have students come to me from other graduate programs where that risk is not stressed, and students believe that a course on the topic makes them safe and semi-competent to work with that population, which is a major concern.”

This comment touches on many important factors to consider when thinking about potential changes to the undergraduate or graduate curriculum. First, learning from someone who is an expert is essential to gaining competency in the field. Recognizing the fragile nature of these patients, and the risks that are associated with them is something that must be discussed as a part of formal education.

This study set out to determine if educational or curriculum changes should be made. To ignore the caution that continuing education and hand-on training is imperative for the expert clinician would be contradictory to the purpose of this study. By providing the appropriate education, and appropriate cautions, we hope to inspire a new generation of SLPs who are confident and competent in their role as a member of the infant feeding and/or swallowing team.

## APPENDIX A: SURVEY FOR STUDENTS

Q1 This is a reminder that all responses will be recorded anonymously. Thank you for participating in this survey.

Q2 What gender do you identify with?

- Male (1)
- Female (2)
- Other (5) \_\_\_\_\_

Q3 Select your age

Q4 Select your year in school

- Freshman (1)
- Sophomore (2)
- Junior (3)
- Senior (4)
- Post-baccalaureate (5)
- First year graduate student (8)
- Second year graduate student (9)
- Recent graduate (before begin clinical fellowship) (11)
- Other (12)

Q5 Where is the undergraduate institution you attend[ed] located? (Click on the circle in the upper left corner of the picture to select your region - clicking on the picture will enlarge the photo)

- West (1)
- Midwest (2)
- Southwest (3)
- South (4)
- Northeast (5)
- Outside of the United States (please specify) (6) \_\_\_\_\_

Q6 What speech-pathology degree(s) does your undergraduate institution offer?

- Undergrad prerequisites only (1)
- Masters only (2)
- Both undergraduate and graduate programs (3)

Q7 Where is the graduate school you attend[ed] located? (Click on the circle in the upper left corner of the picture to select your region - clicking on the picture will enlarge the photo)

- West (1)
- Midwest (2)
- Southwest (3)
- South (4)
- Northeast (5)
- Outside of the United States (please specify) (6) \_\_\_\_\_
- I have not started graduate school yet (7)

Q8 What type of degree are you currently seeking?

- Bachelor of Arts (1)
- Bachelor of Science (2)
- Bachelor of Philosophy- or other comparable degree requiring research (please specify area of research) (3) \_\_\_\_\_
- Master's of Arts (5)
- Master's of Science (if research is required please specify area of research) (6)  
\_\_\_\_\_
- Clinical Doctorate (7)
- PhD (8)
- Other (please specify) (4) \_\_\_\_\_

Q9 Are you planning on pursuing a Master's degree in speech and language pathology?

- Yes (1)
- Yes; but I need to finish the prerequisite requirements (6)
- No (2)
- Unsure (3)

Q10 Are you a national NSSLHA member?

- Yes (1)
- No (2)
- Unsure (3)

Q11 Are you a member of any ASHA special interest groups?

- Yes (please specify) (1) \_\_\_\_\_
- No (2)

Q12 What is your specific area of interest, if any? (i.e. adult acute care, school SLP)

Q13 How do you rank your level of clinical competency as it relates to infant feeding and swallowing disorders?

- Novice: no experience in situations in which they are expected to perform (1)
- Advanced beginner: knowledge is developing, efficient and skillful in parts of practice (2)
- Competent: demonstrates efficiency, is coordinated and has confidence in his/her actions (3)
- Proficient: perceives situations in terms of the long term goal. Learns from experience and can recognize when normal course does not take place. (4)
- Expert: operates from an understanding of the total situation. Performance is flexible and highly proficient. (5)

Q14 For the purpose of this study, infancy is defined as the first two years of life. When did you learn about infant feeding and/or swallowing disorders? (select all that apply)

- Undergraduate (2)
- In graduate school (3)
- Clinical experience (4)
- I haven't learned about this yet (5)
- Other (please specify) (6)

Q15 Have you had any class or clinic time that specifically discussed infant feeding and/or swallowing disorders?

- Class (1)
- Clinic (2)
- Both (3)
- Neither (4)

Q16 How much class time have you spent on infant feeding and swallowing? (Please specify estimated time)

- Formal Semester Class (1) \_\_\_\_\_
- Multiple lectures (2) \_\_\_\_\_
- 1 full lecture (3) \_\_\_\_\_
- Less than 1 full lecture (4) \_\_\_\_\_
- I never had class time on this topic. (5)

Q17 Who taught you about infant feeding and swallowing in class?

- SLP professor with a specialty in pediatric feeding and/or swallowing disorders (1)
- Non-SLP professor with a specialty in pediatric feeding and/or swallowing disorders (2)
- SLP guest clinician with specialty in pediatric feeding and/or swallowing disorders (3)
- SLP professor with a specialty in adult swallowing disorders (4)
- SLP professor with a different area of specialty (please specify) (5) \_\_\_\_\_
- Other (please specify) (6) \_\_\_\_\_

Q18 How much clinic (including internship/externship) time did you spend on infant feeding and swallowing (please specify estimated time)

- Entire semester (1) \_\_\_\_\_
- Multiple occasions (2) \_\_\_\_\_
- One full clinic day (3) \_\_\_\_\_
- Less than 1 full clinic day (4) \_\_\_\_\_
- I have never had clinic time on this topic (5)

Q19 Who taught you about infant feeding and swallowing in clinic?

- SLP with a specialty in pediatric feeding and/or swallowing disorders (1)
- Non-SLP professional with a specialty in pediatric feeding and/or swallowing disorders (who?) (2) \_\_\_\_\_
- SLP with a specialty in adult swallowing disorders (3)
- Other (4) \_\_\_\_\_
- I have never had clinic time on this topic? (5)



Q20 In which type of setting(s) have you had clinic experience? (select all that apply)

- Pediatric inpatient (1)
- Pediatric outpatient (2)
- School (3)
- Private practice (4)
- Adult rehab (5)
- Adult acute care (6)
- Extended/Residential care (7)
- Early intervention (8)
- Specialized Clinic (9)
- Other (please specify) (10) \_\_\_\_\_
- I've never had clinical experience (11)

Q21 When do you think you will learn about infant feeding and/or swallowing disorders?

- Later in undergrad (1)
- In graduate school (2)
- In clinical practice (5)
- Never (4)

Q22 When would you choose to learn about infant feeding and/or swallowing disorders?

- Undergraduate (1)
- In graduate school (2)
- After formal schooling e.g. continuing education event/on the job training (3)
- Never (4)
- Other (5) \_\_\_\_\_

Q23 If this material is addressed in school, should it be in class and/or clinic?

- In formal class (1)
- In clinic (2)
- Class and clinic (3)
- This material should be addressed in some way in schooling (4)
- This material should be addressed after formal schooling (5)

Q24 How important is it to have class or clinic time dedicated to infant feeding and/or swallowing disorders?

- Extremely important (1)
- Very important (2)
- Moderately important (3)
- Slightly important (4)
- Not at all important (5)

Q25 What do you wish you would've learned about infant feeding and/or swallowing disorders before this point in your education?

Q26 Infants with feeding and/or swallowing disorders should be cared for by a team

- Strongly Agree (1)
- Agree (2)
- Somewhat agree (3)
- Neither agree nor disagree (4)
- Somewhat disagree (5)
- Disagree (6)
- Strongly disagree (7)

Q27 Who should be working with infants with feeding and/or swallowing disorders?

(select all that apply)

- Pediatrician (1)
- ENT (10)
- Behavioral psychologist (2)
- Occupational therapist (3)
- Registered dietitian (4)
- Lactation consultant (5)
- Nurse (6)
- Social worker (7)
- Speech-language pathology (8)
- Other (please specify) (9) \_\_\_\_\_

Q28 Do you think that SLPs should work with infants who have feeding and/or swallowing disorders? Why or why not?

- Definitely yes (1) \_\_\_\_\_
- Probably yes (2) \_\_\_\_\_
- Might or might not (3) \_\_\_\_\_
- Probably not (4) \_\_\_\_\_
- Definitely not (5) \_\_\_\_\_

Q29 How important is an SLP to the infant feeding and/or swallowing team? Why?

- Extremely important (1) \_\_\_\_\_
- Very important (2) \_\_\_\_\_
- Moderately important (3) \_\_\_\_\_
- Slightly important (4) \_\_\_\_\_
- Not at all important (5) \_\_\_\_\_

Q30 What are some responsibilities that you think an SLP may have when working with infants with feeding and/or swallowing disorders?

## APPENDIX B: SURVEY FOR LICENSED CLINICIANS

Q1 This is a reminder that all responses will be recorded anonymously. Thank you for participating in this survey.

Q2 What gender do you identify with?

- Male (1)
- Female (2)
- Other (5) \_\_\_\_\_

Q3 Select your age

Q4 When did you finish graduate school? (years ago)

Q5 Where did you attend graduate school?

- West (1)
- Midwest (2)
- Southwest (3)
- South (4)
- Northeast (5)
- Outside of the United States (please specify) (6) \_\_\_\_\_

Q6 What is the most advanced degree you have received?

- Master's of Arts (1)
- Master's of Science (2)
- Master's of Education (5)
- Master's of Business Administration (6)
- Clinical doctorate in CSD (3)
- PhD. in CSD (please specify area of research) (4) \_\_\_\_\_
- Other (please specify degree) (7) \_\_\_\_\_

Q7 Do you hold ASHA certification?

- Yes (1)
- No (2)

Q8 Are you a member of an ASHA special interest group (SIG)?

- SIG 13 (1)
- SIG 16 (2)
- Both SIG 13 and SIG 16 (3)
- Another SIG (4)
- No (5)

Q9 What type of setting(s) have you worked in the past? For how long?

	Less than 5 years (1)	Between 6 and 10 years (2)	Between 11 and 20 years (3)	Between 21 and 30 years (4)	More than 31 years (5)
Pediatric inpatient (1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pediatric outpatient (2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School (3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Private practice (4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adult rehab (5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adult acute care (6)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Extended/Residential Care (7)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Early Intervention (9)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Specialized Clinic (10)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify) (8)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q10 What type of setting(s) do you currently work in? For how long?

	Less than 5 years (1)	Between 6 and 10 years (2)	Between 11 and 20 years (3)	Between 21 and 30 years (4)	More than 31 years (5)
Pediatric inpatient (1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pediatric outpatient (2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School (3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Private practice (4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adult rehab (5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adult acute care (6)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Extended/Residential Care (7)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Early Intervention (9)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Specialized Clinic (10)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify) (8)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q11 Where do you currently work?

- West (1)
- Midwest (2)
- Southwest (3)
- South (4)
- Northeast (5)
- Outside of the United States (please specify) (6) \_\_\_\_\_

Q12 What is your specific area of interest, if any? (i.e. adult acute care, school SLP)

Q13 On average, how many new patients with feeding and swallowing disorders do you see per week?

Q14 For the purpose of this study, infancy is defined as the first two years of life. What percent of your time is spent with infant feeding and swallowing disorders?

Q15 How do you rank your level of clinical competency as it relates to infant feeding and swallowing disorders? (Benner, P. (1984). From novice to expert: Excellence and power in clinical nursing practice. Menlo Park: Addison-Wesley, pp. 13-34.)

- Novice: no experience in situations in which they are expected to perform (1)
- Advanced beginner: knowledge is developing, efficient and skillful in parts of practice (2)
- Competent: demonstrates efficiency, is coordinated and has confidence in his/her actions (3)
- Proficient: perceives situations in terms of the long term goal. Learns from experience and can recognize when normal course does not take place. (4)
- Expert: operates from an understanding of the total situation. Performance is flexible and highly proficient. (5)

Q16 When did you learn about infant feeding and/or swallowing disorders?

- Undergraduate (1)
- In graduate school (2)
- Clinical experience (including internship/externship) (7)
- As a part of continuing education event (4)
- Never (5)
- Other (please specify) (6) \_\_\_\_\_



Q17 While in school did you have any class or clinic time that specifically discussed infant feeding and/or swallowing disorders?

- Class (1)
- Clinic (2)
- Both (3)
- Neither (4)

Q18 How much class time did you spend on infant feeding and swallowing? (please specify estimated time)

- Formal semester class (1) \_\_\_\_\_
- Multiple lectures (2) \_\_\_\_\_
- 1 full lecture (3) \_\_\_\_\_
- Less than 1 full lecture (4) \_\_\_\_\_
- I never had class time on this topic (5)

Q19 Who taught you about infant feeding and swallowing in class?

- SLP professor with a specialty in pediatric feeding and/or swallowing disorders (1)
- Non-SLP professor with a specialty in pediatric feeding and/or swallowing disorders (2)
- SLP guest clinician with specialty in pediatric feeding and/or swallowing disorders (3)
- SLP professor with a specialty in adult swallowing disorders (4)
- SLP professor with a different area of specialty (please specify) (5) \_\_\_\_\_
- Other (please specify) (6) \_\_\_\_\_
- I never had class time on this topic (7)

Q20 How much clinic (including internship/externship) time did you spend on infant feeding and swallowing? (please specify estimated time)

- Entire semester (1) \_\_\_\_\_
- Multiple occasions (2) \_\_\_\_\_
- One full clinic day (3) \_\_\_\_\_
- Less than 1 full clinic day (4) \_\_\_\_\_
- I never had clinic time on this topic (5)

Q21 Who taught you about infant feeding and swallowing in clinic?

- SLP with a specialty in pediatric feeding and/or swallowing disorders (1)
- Non-SLP professional with a specialty in pediatric feeding and/or swallowing disorders (who?) (2) \_\_\_\_\_
- SLP with a specialty in adult swallowing disorders (4)
- Other (please specify) (6) \_\_\_\_\_
- I never had clinic time on this topic (7)

Q22 When do you wish you had learned about infant feeding and/or swallowing disorders?

- Undergraduate (1)
- In graduate school (2)
- After formal schooling e.g. continuing education event (3)
- Never (4)
- Other (please specify) (5) \_\_\_\_\_

Q23 If this material is addressed in school, should it be in class and/or clinic?

- In formal class (1)
- In clinic (2)
- Class and clinic (3)
- This material should be addressed in some way in schooling (5)
- This material should be addressed after formal schooling (4)

Q24 How important is it to have class, clinic, or continuing education time dedicated to infant feeding and/or swallowing disorders?

- Extremely important (1)
- Very important (2)
- Moderately important (3)
- Slightly important (4)
- Not at all important (5)

Q25 What do you wish you would have learned about infant feeding and/or swallowing disorders before you entered current (or most recent) infant feeding/swallowing position?

Q26 Infants with feeding and/or swallowing disorders should be cared for by a team

- Strongly Agree (1)
- Agree (2)
- Neither agree nor disagree (4)
- Disagree (6)
- Strongly disagree (7)

Q27 Who should be working with infants with feeding and/or swallowing disorders?

(select all that apply)

- Pediatrician (1)
- ENT (10)
- Behavioral psychologist (2)
- Occupational therapist (3)
- Registered dietitian (4)
- Lactation consultant (5)
- Nurse (6)
- Social worker (7)
- Speech-language pathology (8)
- Other (please specify) (9) \_\_\_\_\_

Q28 Do you think that SLPs should work with infants who have feeding and/or swallowing disorders? Why or why not?

- Definitely yes (1) \_\_\_\_\_
- Probably yes (2) \_\_\_\_\_
- Might or might not (3) \_\_\_\_\_
- Probably not (4) \_\_\_\_\_
- Definitely not (5) \_\_\_\_\_

Q29 How important is an SLP to the infant feeding and/or swallowing team? Why?

- Extremely important (1) \_\_\_\_\_
- Very important (2) \_\_\_\_\_
- Moderately important (3) \_\_\_\_\_
- Slightly important (4) \_\_\_\_\_
- Not at all important (5) \_\_\_\_\_

Q30 What are your main duties when working with infants who have feeding/swallowing disorders?

Q31 When you began working with infants with feeding and swallowing disorders did you have responsibilities that you did not feel qualified to do ?

- Yes (please specify) (1) \_\_\_\_\_
- No (2)

Q32 Is there anything that you are currently doing when working with infants with feeding and/or swallowing disorders that you do not feel qualified to do?

- Yes (please specify) (1) \_\_\_\_\_
- No (2)

Q33 Is there anything that you are NOT doing when working with infants with feeding and/or swallowing disorders that you feel you should be doing?

- Yes (please specify) (1) \_\_\_\_\_
- No (2)

Q34 Who is performing these duties if you are not?

## BIBLIOGRAPHY

- Ahuja, V., Yench, M., & Lassen, L. (1999). Head and neck manifestations of gastroesophageal reflux disease. *American Family Physician*, 60(3), 873-880, 885-876.
- ASHA. (2001). Roles of speech-language pathologists in swallowing and feeding disorders: technical report.
- ASHA. (2015). Trend Report 2010-2011 through 2014-2015.
- ASHA. (2016). Scope of practice in speech-language pathology [Scope of Practice]. Available from [www.asha.org/policy/](http://www.asha.org/policy/).
- ASHA. (2017). Feeding and Swallowing Disorders (Dysphagia) in Children Retrieved from <http://www.asha.org/public/speech/swallowing/Feeding-and-Swallowing-Disorders-in-Children/>
- Balgowan, R., Greer, L. C., & D'Auria, J. P. (2016). Infant Gastroesophageal Reflux Information on the World Wide Web. *Journal of Pediatric Health Care*, 30(2), 165-172. doi:<http://dx.doi.org/10.1016/j.pedhc.2015.11.004>
- Barratt, J., Ogle, Victoria. (2010). Recorded incidence and management of dysphagia in an outpatient paediatric neurodevelopmental clinic. *SAJCH*, 4(2), 38-41.
- Benner, P. E. (1984). *From novice to expert: excellence and power in clinical nursing practice*. Menlo Park, CA: Addison-Wesley Pub. Co., Nursing Division.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. doi:<http://dx.doi.org/10.1191/1478088706qp063oa>
- Braun, V., & Clarke, V. (2014). What can “thematic analysis” offer health and wellbeing researchers? 2014. doi:10.3402/qhw.v9.26152
- CDC. (2013). Breastfeeding Report Card. Atlanta, GA: Centers for Disease Control and Prevention.

- Chase, H. P., & Martin, H. P. (1970). Undernutrition and Child Development. *New England Journal of Medicine*, 282(17), 933-939. doi:10.1056/NEJM197004232821701
- Chernoff, R. (2002). Health Promotion for Older Women: Benefits of Nutrition and Exercise Programs. *Topics in Geriatric Rehabilitation*, 18(1), 59-67.
- Chun, L. A. (2012). *Maternal Dietary Restriction and the Effects of Postweaning Nutrition on Fetal Development, Insulin Signalling, Glucose Metabolism and Body Composition in C57BL/6J Mice*. (Master's of Science), University of Toronto.
- Cichero, J. A. Y., Nicholson, T. M., & September, C. (2013). Thickened Milk for the Management of Feeding and Swallowing Issues in Infants: A Call for Interdisciplinary Professional Guidelines. *Journal of Human Lactation*, 29(2), 132-135. doi:10.1177/0890334413480561
- Cormack, B. E., & Bloomfield, F. H. (2015). Early Nutrition for Preterm Babies: Small Changes Can Make a Big Difference. *Nutrition Today*, 50(5), 230-239.
- Cricco-Lizza, R. (2016). Infant Feeding Beliefs and Day-to-Day Feeding Practices of NICU Nurses. *Journal of Pediatric Nursing*, 31(2), e91-e98. doi:<http://dx.doi.org/10.1016/j.pedn.2015.10.012>
- Davies, W. H., Satter, E., Berlin, K. S., Sato, A. F., & et al. (2006). Reconceptualizing Feeding and Feeding Disorders in Interpersonal Context: The Case for a Relational Disorder. *Journal of Family Psychology*, 20(3), 409.
- de Bildt, A., Mulder, E. J., Van Lang, N. D. J., de With, S. A. J., Minderaa, R. B., Stahl, S. S., & Anderson, G. M. (2012). The visual rooting reflex in individuals with autism spectrum disorders and co-occurring intellectual disability. *Autism Research*, 5(1), 67-72. doi:10.1002/aur.225
- De Geer, B. (2004). "Don't say it's disgusting!" Comments on socio-moral behavior in Swedish families. *Journal of Pragmatics*, 36(9), 1705-1725. doi:<http://dx.doi.org/10.1016/j.pragma.2003.10.016>
- Delaney, A., & Arvedson, J. (2008). Development of Swallowing and Feeding: Prenatal through first year of life. *Developmental Disabilities Research Reviews*, 14, 105-117.
- Delzell, e. a. (1999). Laryngeal penetration: a predictor of aspiration in infants? *Pediatric Radiology*, 29, 762-765.
- Dixon, M., & Crawford, D. (2012). *Paediatric Intensive Care Nursing*. Somerset, GB: Wiley-Blackwell.

- Dore, M., Maragkoudakis, E., Fraley, K., Pedroni, A., Tadeu, V., Realdi, G., . . . Malaty, H. (2008). Diet, Lifestyle and Gender in Gastro-Esophageal Reflux Disease. *Digestive Diseases and Sciences*, 53(8), 2027-2032. doi:10.1007/s10620-007-0108-7
- Egan, G. (2007a). Chapter 1: Introduction to Helping *The skilled helper: a problem-management and opportunity-development approach to helping* (8th edition. ed.). Belmont, CA: Thomson Brooks/Cole.
- Egan, G. (2007b). Chapter 3: Overview of the Helping Model. *The skilled helper: a problem-management and opportunity-development approach to helping*. Belmont, CA: Thomson Brooks/Cole.
- Elad, D., Kozlovsky, P., Blum, O., Laine, A. F., Po, M. J., Botzer, E., . . . Ben Sira, L. (2014). Biomechanics of milk extraction during breast-feeding. *Proceedings of the National Academy of Sciences of the United States of America*, 111(14), 5230-5235. doi:10.1073/pnas.1319798111
- Fisher, T. F., & Dusick, A. (2014). Case study: caregiver perception of pediatric multidisciplinary feeding outpatient clinic. *Open Journal of Occupational Therapy*, 2.
- Fletcher, K. A., Barbara. (2005). The speech-language pathologist and the lactation consultant: the baby's feeding dream team. *ASHA Leader*, 10(2), 8.
- Girolami, P., Levey, Eric. (2012). Pediatric Feeding Disorders Continuum.
- Gisel, E. G. (1988). Chewing Cycles in 2- to 8-Year-Old Normal Children: A Developmental Profile. *American Journal of Occupational Therapy*, 42(1), 40-46. doi:10.5014/ajot.42.1.40
- Goldfield, E. C., Buonomo, C., Fletcher, K., Perez, J., Margetts, S., Hansen, A., . . . Wolff, P. H. (2010). Premature infant swallowing: Patterns of tongue-soft palate coordination based upon videofluoroscopy. *Infant Behavior and Development*, 33(2), 209-218. doi:<http://dx.doi.org/10.1016/j.infbeh.2009.10.001>
- Goldfield, E. C., Richardson, M. J., Lee, K. G., & Margetts, S. (2006). Coordination of Sucking, Swallowing, and Breathing and Oxygen Saturation During Early Infant Breast-feeding and Bottle-feeding. *Pediatr Res*, 60(4), 450-455.
- Goswami, M., Jangra, B., & Bhushan, U. (2016). Management of feeding Problem in a Patient with Cleft Lip/Palate. *International Journal of Clinical Pediatric Dentistry*, 9(2), 143-145. doi:10.5005/jp-journals-10005-1351
- Ha, S., Koh, K. S., Moon, H., Jung, S., & Oh, T. S. (2015). Clinical Outcomes of Primary Palatal Surgery in Children with Nonsyndromic Cleft Palate with and without Lip. *BioMed Research International*, 2015, 185459. doi:10.1155/2015/185459

- Hirschi, K. K., & Keen, C. L. (2000). Nutrition in embryonic and fetal development. *Nutrition*, 16(7–8), 495-499. doi:[http://dx.doi.org/10.1016/S0899-9007\(00\)00362-2](http://dx.doi.org/10.1016/S0899-9007(00)00362-2)
- Ho, C. (2013). Optimal duration of exclusive breastfeeding. *International Journal of Evidence-Based Healthcare*, 11(2), 140-141. doi:10.1111/1744-1609.12015
- Hyatt, M. A., Gardner, D. S., Sebert, S., Wilson, V., Davidson, N., Nigmatullina, Y., . . . Symonds, M. E. (2011). Suboptimal maternal nutrition, during early fetal liver development, promotes lipid accumulation in the liver of obese offspring. *Reproduction*, 141(1), 119-126. doi:10.1530/rep-10-0325
- Jackson, A., Maybee, J., Moran, M. K., Wolter-Warmerdam, K., & Hickey, F. (2016). Clinical Characteristics of Dysphagia in Children with Down Syndrome. *Dysphagia*, 31(5), 663-671. doi:10.1007/s00455-016-9725-7
- Kapil, U., & Bhavna, A. (2002). Adverse Effects of Poor Micronutrient Status During Childhood and Adolescence. *Nutrition Reviews*, 60, S84-S90. doi:10.1301/00296640260130803
- Lam, S., & Ruby, C. M. (2005). Impact of an interdisciplinary team on drug therapy outcomes in a geriatric clinic. *American Journal of Health-System Pharmacy*, 62(6), 626. doi:0620626.pdf
- Lau, C. (2016). Development of infant oral feeding skills: what do we know? *The American Journal of Clinical Nutrition*, 103(2), 616S-621S. doi:10.3945/ajcn.115.109603
- Le Reverend, B. J. D., Edelson, L. R., & Loret, C. (2013). Anatomical, functional, physiological and behavioural aspects of the development of mastication in early childhood. *British Journal of Nutrition*, 111, 403-414.
- Lefton-Greif, M. A., & Arvedson, J. C. (2007). Pediatric Feeding and Swallowing Disorders: State of Health, Population Trends, and Application of the International Classification of Functioning, Disability, and Health. *Semin Speech Lang*, 28(03), 161-165. doi:10.1055/s-2007-984722
- Lefton-Greif, M. A., & Arvedson, J. C. (2008). Schoolchildren With Dysphagia Associated With Medically Complex Conditions. *Language, Speech & Hearing Services in Schools*, 39(2), 237-248.
- Lefton-Greif, M. A., & Arvedson, J. C. (2016). Pediatric Feeding/Swallowing: Yesterday, Today, and Tomorrow. *Semin Speech Lang*, 37(04), 298-309. doi:10.1055/s-0036-1587702
- Lefton-Greif, M. A., Okelo, S. O., Wright, J. M., Collaco, J. M., McGrath-Morrow, S. A., & Eakin, M. N. (2014). Impact of Children's Feeding/Swallowing Problems: Validation of



- a New Caregiver Instrument. *Dysphagia*, 29(6), 671-677. doi:10.1007/s00455-014-9560-7
- Leitch, C. A. (2000). Growth, nutrition and energy expenditure in pediatric heart failure. *Progress in Pediatric Cardiology*, 11(3), 195-202. doi:10.1016/S1058-9813(00)00050-3
- Li, Q., Minagi, Y., Hori, K., Kondoh, J., Fujiwara, S., Tamine, K., . . . Ono, T. (2015). Coordination in oro-pharyngeal biomechanics during human swallowing. *Physiology & Behavior*, 147, 300-305. doi:<http://dx.doi.org/10.1016/j.physbeh.2015.05.004>
- Lindberg, N., & Berglund, A.-L. (2014). Mothers' experiences of feeding babies born with cleft lip and palate. *Scandinavian Journal of Caring Sciences*, 28(1), 66-73. doi:10.1111/scs.12048
- Luterman, D. (2004). Counseling Families of Children with Hearing Loss and Special Needs. *Volta Review*, 104(4), 215-220.
- Manikam, R. P., Jay A. (2000). Pediatric Feeding Disorders. *Journal of Clinical Gastroenterology*, 30(1), 34-46.
- Mathisen, B. A., Carey, L. B., & O'Brien, A. (2012). Incorporating speech-language pathology within Australian neonatal intensive care units. *Journal of Paediatrics and Child Health*, 48(9), 823-827. doi:10.1111/j.1440-1754.2012.02549.x
- Miller, R. M., & Groher, M. E. (1990). *Medical Speech Pathology*. Rockville, MD: Aspen Publishers.
- Nancarrow, S. A., Booth, A., Ariss, S., Smith, T., Enderby, P., & Roots, A. (2013). Ten principles of good interdisciplinary team work. *Human Resources for Health*, 11(1), 19. doi:10.1186/1478-4491-11-19
- Neu, J., & Douglas-Escobar, M. (2008). Gastrointestinal Development: Implications for Infant Feeding. In Duggan (Ed.), *Nutrition in Pediatrics* (Vol. 4th edition pp. 242-249). Ontario, Canada: BC Decker Inc.
- Newman, Keckley, Peterson, & Hamner. (2001). Swallowing function and medical diagnoses in infants suspected of dysphagia. *Pediatrics in Review*, 108(6), 1358.
- Newman, Keckley, C., Petersen, M. C., & Hamner, A. (2001). Swallowing Function and Medical Diagnoses in Infants Suspected of Dysphagia. *Pediatrics*, 108(6), e106-e106. doi:10.1542/peds.108.6.e106
- O'Neill, A. C., & Richter, G. T. (2013). Pharyngeal Dysphagia in Children with Down Syndrome. *Otolaryngology-Head and Neck Surgery*, 149(1), 146-150. doi:doi:10.1177/0194599813483445

- Ochs, E., & Shohet, M. (2006). The cultural structuring of mealtime socialization. *New Directions for Child & Adolescent Development*, 2006(111), 35-49. doi:10.1002/cad.153
- Parker, I. (2004). Criteria for qualitative research in psychology. *Qualitative Research in Psychology*, 1(2), 95-106. doi:<http://dx.doi.org/10.1191/1478088704qp010oa>
- Phalen, J. A. (2013). Managing Feeding Problems and Feeding Disorders. *Pediatrics in Review*, 34(12), 549-557.
- Prasse, J. E., & Kikano, G. E. (2009). An Overview of Pediatric Dysphagia. *Clinical Pediatrics*, 48(3), 247-251. doi:doi:10.1177/0009922808327323
- Richards, S. (2009). Recognising the role of a healthy diet and lifestyle. 37, 8-9.
- Rosenbeck JC, Robbins JA, Roecker EB, Coyle JL, & JL, W. (1996). A Penetration Aspiration Scale. *Dyphagia*, 11, 93-98.
- Sakalidis, V. S., & Geddes, D. T. (2016). Suck-Swallow-Breathe Dynamics in Breastfed Infants. *Journal of Human Lactation*, 32(2), 201-211.
- Sanders, T. (2013). *Nutrition and Development*. Somerset, GB: Wiley-Blackwell.
- Seubert, C., Fryling, M. J., Wallace, M. D., Jiminez, A. R., & Meier, A. E. (2014). Antecedent interventions for pediatric feeding problems. *Journal of Applied Behavior Analysis*, 47(2), 449-453. doi:10.1002/jaba.117
- Shaw, R. J., Garcia, M., Thorn, M., Farley, C. A., & Flanagan, G. (2003). Treatment of Feeding Disorders in Children with Down Syndrome. *Clinical Child Psychology and Psychiatry*, 8(1), 105-117. doi:10.1177/1359104503008001010
- Silberstein, D., Feldman, R., Gardner, J. M., Karmel, B. Z., Kuint, J., & Geva, R. (2009). The Mother-Infant Feeding Relationship Across the First Year and the Development of Feeding Difficulties in Low-Risk Premature Infants. *Infancy*, 14(5), 501-525. doi:10.1080/15250000903144173
- Silverman, A. H., & Tarbell, S. (2009). Feeding and Vomiting Problems in Pediatric Populations. In M. C. Roberts & R. G. Steele (Eds.), *Handbook of Pediatric Psychology: Fourth Edition* (pp. 429-446). New York, NY. : The Guilford Press.
- Simonmeier, V., Rodriguez, Melanie Domenech. (2007). Establishment of an Interdisciplinary Pediatric Oral-Motor-Sensory Feeding Clinic Team. *Infants and Young Children*, 20(4), 345-354.

- Smit, P.-B. (2014). Reaching for the Tree of Life: The Role of Eating, Drinking, Fasting, and Symbolic Foodstuffs in 4 Ezra. *Journal for the Study of Judaism*, 45(3), 366-387.
- Smith, A. S., Hourihane, J. O., Kenny, L. C., Kiely, M., Leahy-Warren, P., & Murray, D. M. (2016). Infant formula feeding practices in a prospective population based study. *BMC Pediatrics*, 16(1).
- University of Washington. (2017a). Master of Science (CoreSLP).
- University of Washington. (2017b). Master of Science (MedSLP).
- USDA. (2016a). Childhood Nutrition. *Healthy Children*.
- USDA. (2016b). MyPlate Daily Checklist. Retrieved from [https://choosemyplate-prod.azureedge.net/sites/default/files/myplate/checklists/MyPlateDailyChecklist\\_2000cal\\_s\\_Age14plus.pdf](https://choosemyplate-prod.azureedge.net/sites/default/files/myplate/checklists/MyPlateDailyChecklist_2000cal_s_Age14plus.pdf)
- Wambach, K. (2016). Breastfeeding and Human Lactation Chapter 3: Anatomy and Physiology of Lactation (5th ed.). Sudbury, MA: Jones & Bartlett Learning.
- Warde, A., & Martens, L. (2000). *Eating Out: Social Differentiation, Consumption and Pleasure*: Cambridge University Press.
- Wolf, L. S., & Glass, R. P. (1992). *Feeding and Swallowing Disorders in Infancy: Assessment and Management*: Therapy Skill Builders.
- Yardley, L. (2000). Dilemmas in Qualitative Health Research. *Psychology & Health*, 15(2), 215.
- Yoo, J. W., Seol, H., Kim, S. J., Yang, J. M., Ryu, W. S., Min, T. D., . . . Kim, S. (2014). Effects of hospitalist-directed interdisciplinary medicine floor service on hospital outcomes for seniors with acute medical illness. *Geriatrics & Gerontology International*, 14(1), 71-77. doi:10.1111/ggi.12056