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Evaluation and treatment of feeding challenges in pediatric populations using the OT feeding outcome tool

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BOSTON UNIVERSITY
SARGENT COLLEGE OF HEALTH AND REHABILITATION SCIENCES

Doctoral Project

**EVALUATION AND TREATMENT OF FEEDING CHALLENGES IN
PEDIATRIC POPULATIONS USING THE OT FEEDING OUTCOME TOOL**

by

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B.A., Seton Hall University, 2015

Submitted in partial fulfillment of the
requirements for the degree of
Doctor of Occupational Therapy

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“In someone else’s eyes, you have changed a world.”

- *Anonymous*

DEDICATION

This would not have been possible without the love and support of my family and friends throughout the years. Their own journeys have inspired me to look at all the opportunities life has to offer, and their faith has inspired me to take them. Thank you for helping me become a better version of myself, and for allowing me to serve others in the same pursuit. Grazie mille e vi voglio tanto bene per sempre.

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ABSTRACT

Introduction: This Capstone project provided preliminary data on the OT Feeding Outcome Tool and general data on outcomes of feeding interventions at Children's Specialized Hospital. The OT Feeding Outcome Tool is an internally developed and utilized tool to assess a wide range of pediatric feeding difficulties, regardless of diagnosis and intervention.

Theoretical Perspective: Sensory Integration and Behaviorism were the major theoretical frameworks.

Description of Doctoral Capstone: A literature review, focus groups, interviews, chart audits, an online questionnaire and clinical participation and observation provided quantitative and qualitative data on the current state of the literature, barriers to implementation and outcomes of children who have received feeding therapy at Children's Specialized Hospital.

Results: The majority of pediatric feeding assessments are based in behavioral theory and interventions and fail to capture the multi-faceted etiologies and intervention approaches that are seen in practice. Data analyses revealed children who receive feeding therapy at Children's Specialized Hospital, regardless of diagnosis or intervention, have

positive responses recorded by the OT Feeding Outcome Tool. Major barriers to tool implementation were logistical challenges, forgetting and lack of competency. Most effective education methods of the tool were discussion with colleagues, staff meeting and an education presentation.

Conclusion: There is a significant lack of feeding assessment tools for pediatric populations in the literature, and specifically a lack of evaluations that incorporate an occupational therapy and sensory integration lens. The OT Feeding Outcome Tool is a promising assessment tool for the evaluation of feeding difficulties in pediatric populations.

Keywords: Pediatric Feeding Difficulties, Pediatric Feeding Assessments, Pediatric Feeding Intervention, Clinician Compliance, Occupational Therapy Assessments

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LIST OF ABBREVIATIONS

AC.....	Atlantic County (Egg Harbor)
ASD.....	Autism Spectrum Disorder
BAY	Bayonne
BU.....	Boston University
CFT	Clifton
FTE	Feeding Team Evaluation
HAM.....	Hamilton
LOS.....	Length of Stay
MTN.....	Mountainside
NB.....	New Brunswick (Plum Street)
NBI.....	Newark Beth Israel
NFTE.....	Non Feeding Team Evaluation (Regular Occupational Therapy Evaluation)
OT	Occupational Therapy
SI.....	Sensory Integration
TRM.....	Toms River (Lakehurst Road)
TRS	Toms River (Stevens Road)
WRC	Warren County
YTD	Year to Date

CHAPTER ONE

Introduction

This chapter outlines the goals of this Capstone, scope of practice for occupational therapy in this context, and explains the nature of the feeding difficulties in children, which is a complex, multi-etiological problem that affects children and their caregivers regardless of diagnosis and parenting style. The theoretical perspectives and relation to the Occupational Therapy Practice Framework are discussed in detail. This chapter also includes a visual model of Sensory Integration and Behaviorism theories to further illustrate the similar yet unique mechanisms of action, responses and treatment options involved in this intricate challenge.

Capstone Goals

The focus of this Capstone was to address a multifaceted problem of evaluation and treatment of feeding difficulties in pediatric populations and low clinician compliance of an internal pediatric feeding evaluation tool, the OT Feeding Outcome Tool, at Children's Specialized Hospital. More specifically, this Capstone sought to: (1) explore what occupational therapy and sensory integration-specific approaches to evaluation are available in the current literature, (2) identify barriers to implementation of the OT Feeding Outcome Tool, (3) explore the differences in documentation rates based on different methods of evaluation and education, (4) determine the average length of stay of a child receiving feeding therapy on an outpatient basis at Children's Specialized Hospital, (5) determine the types of treatment most commonly employed to treat children with feeding difficulties, (6) determine outcomes by diagnosis and treatment and (7)

determine if there are differences in outcomes between children with an Autism Spectrum Diagnosis, children with motor challenges, and children with only a “feeding difficulties” diagnosis.

Scope of Practice

An understanding of an occupational therapist’s role in the evaluation and treatment of feeding challenges was first observed in order to design this Capstone project. The American Occupational Therapy Association’s official position on occupational therapy’s role in feeding challenges states that the profession provides a valuable and holistic perspective, due to our competency in evaluating and treating the underlying physiological, psychosocial, cultural and environmental factors that all affect a child’s ability to participate in the essential occupation of feeding. In fact, the Occupational Therapy Practice Framework (OTPF) clearly includes “swallowing/eating” and “feeding” as specific occupations under the “Activities of Daily Living” (ADLs) section (AOTA, 2014). AOTA has developed a specialty certification, as well as incorporated the evaluation and treatment of feeding difficulties in the scope of practice of a general occupational therapist, further solidifying the profession’s place in addressing these occupational needs (American Journal of Occupational Therapy, 2017).

Nature of the Problem

Feeding challenges in pediatric populations are a significant yet overlooked aspect of child growth and development, with nearly a quarter of all children being noted to have feeding difficulties within their first year of life (Marí-Bauset et al., 2014; Silverman,

2010; Bryant-Waugh et al., 2010; Gale et al., 2011; Petre & Nedelcu, 2017; Burrell et al., 2019). Going beyond just “picky eating”, these types of chronic feeding problems have been associated with severe short- and long-term complications, such as growth delays, malnutrition, failure to thrive, weight loss or obesity, developmental and psychological deficits, cognitive impairment, respiratory difficulties, sleep problems, poor academic achievement, social difficulties, language challenges, increased risk of developing disease later in life, hospitalization, invasive medical procedures such as placement of a feeding tube, blindness and even death (Sharp et al. 2010; Sharp et al., 2013; Sharp et al., 2011; Martini et al. 2018; Tauman et al., 2017; Marshall et al., 2015a; Howe & Wang, 2013; Petre & Nedelcu, 2017; Dempster et al., 2016; González & Stern, 2016; Marí-Bauset et al., 2014; Silverman, 2010; Johnson et al., 2015b; Johnson et al., 2014; Gale et al., 2011; Burrell et al., 2019).

These complications can also lead to increased caregiver stress and financial cost to families and health insurers; for example, some studies report a median cost of \$56,945.61 for a G tube placement and a mean cost of over \$40,000 per year for maintaining a G tube (Dempster et al., 2016). A study by Dempster et al. (2016) demonstrated that feeding interventions, and in this case, a behavioral-based one, is a more cost-effective treatment than a G tube and has potential cost-effectiveness in terms of prevention of G tube placement. Since parents and caregivers are the primary individuals who are engaging in feeding with their child, they are affected by the stress of unproductive feeding, lack of nutritional intake, possible hospitalization, and parent-child relationship strain (Dempster et al., 2016; Rahkonen et al., 2015; Marshall et al., 2015a;

Tauman et al., 2017; Seiverling et al., 2018b; Silverman, 2010; Johnson et al., 2015b; Adamson & Morawska, 2017; Levin et al., 2014, Laud et al., 2009, Seiverling et al., 2017; Sharp et al., 2014; Levin et al., 2014). This is also a societal-wide problem, because children who are unable to feed themselves independently, are at risk of aspirating, or are unable to receive sufficient nutrition through oral feeding. This may require additional services at home and school, homeschooling, or may end up disrupting their school time with more traumatic experiences of hospitalization, posing a major cost to society. These additional services, missing school time and hospitalization will all fall on private insurance and federal and state funding sources (Dempster et al., 2016; Rahkonen et al., 2015; Marshall et al., 2015a; Tauman et al., 2017; Martini et al., 2018). Given the potential impact on a child, their caregivers and society, it is essential to understand the etiology, treatments available and means of evaluation to provide best evidence-based practice.

Theoretical Perspectives

The theoretical lenses that informed this conceptual model of the problem is Sensory Integration Theory and Behaviorism, as explained in the visual model in Figure 1. Sensory Integration Theory postulates that the central nervous system (CNS) regulates the body's responses to sensory stimuli; thus, if an individual has an altered CNS, which may be impacted by congenital or environmental factors, this may lead to difficulties with sensory modulation that cause individuals to be over or under-responsive to sensory stimuli (Dunn, 2007; Addison et al., 2012; Engel-Yeger et al., 2016; Tauman et al., 2017; Anzalone & Lane, 2012; Lane et al., 2014; Twachtman-Reilly et al., 2008; Bröring et al.,

2017; Rahkonen et al., 2014). This over or under-responsiveness to these sensory stimuli may lead to inappropriate responses. This is due to the concept that sensory activities are a major component of the feeding process; therefore, individuals with altered CNS function (and thus, sensory challenges) may experience difficulty while participating in feeding due to displaying inappropriate responses to those sensory stimuli (Addison et al., 2012; Engel-Yeger et al., 2016; González & Stern, 2016; Tauman et al., 2017; Lane, 2012; Cornwell et al., 2010; Twachtman-Reilly et al., 2008; Clawson et al., 2007, Rahkonen et al., 2014; Bröring et al., 2017). Consequently, targeting intervention at the level of the CNS pathways that regulate the responses to sensory experiences should influence the way a client responds during feeding experiences (Twachtman-Reilly et al., 2008; Bröring et al., 2017).

Although feeding challenges may be a result of various factors in pediatric populations, sensory processing disorders often correlate with a wide range of diagnoses that tend to include difficulties with feeding (Clawson, 2007; Twachtman-Reilly et al., 2008, Rahkonen et al., 2014; Bröring et al., 2017). Although the overall result is poor feeding outcomes, the factors that lead to this issue must be parsed out in order to have an understanding of where to target intervention. Using the foundation of sensory integration theory, one can follow the development of how individuals may come to experience feeding challenges. The development of the CNS organizes how one experiences, regulates and responds to sensory stimuli, however, the CNS may not typically develop similarly in all children (Addison et al., 2012; Engel-Yeger et al., 2016; Tauman et al., 2017; Anzalone & Lane, 2012; Lane et al., 2014; Twachtman-Reilly et al., 2008; Bröring

et al., 2017). Atypical CNS development may be due to a wide range of diagnoses, such as autism, cerebral palsy, or congenital conditions (Clawson et al., 2007; Engel-Yeger et al., 2016, Twachtman-Reilly et al., 2008, Rahkonen et al., 2014, Cornwell et al., 2010; Bröring et al., 2017). These conditions are also often correlated with sensory processing disorders. The literature connecting the three (diagnosis, sensory processing disorder and feeding challenges) is recently emerging with moderate evidence supporting the idea that the three factors may be connected through similar or the same pathways in the CNS (Clawson et al., 2007; Engel-Yeger et al., 2016; Twachtman-Reilly, et al., 2008, Rahkonen et al., 2014; Bröring et al., 2017).

Atypical CNS development may also co-occur with negative or an inherent lack of prior natural developmental experiences (i.e., breast or bottle feeding may be delayed or not occur due to necessary medical interventions such as intubation and tube feeding). This may also moderate how the CNS continues to develop, as well as moderate how children experience sensory stimuli during feeding (Zehetgruber et al., 2014; Lane, 2012; Cornwell et al., 2010, Rahkonen et al., 2014; Bröring et al., 2017). Therefore, if there is a disruption in the “typical” organization of the CNS, either signaled through a diagnosis or environmental experiences, children will have a different perception of the sensory experiences they are exposed to during the feeding process (Addison et al., 2012; Engel-Yeger et al., 2016; González & Stern, 2016; Seiverling et al., 2018; Tauman et al., 2017; Anzalone & Lane, 2012; Lane et al., 2014; Rahkonen et al., 2014; Twachtman-Reilly et al., 2008; Bröring et al., 2017).

In order for children to receive proper nutrition, as well as partake in socially

acceptable meals, they will need to consume an assortment of foods across different food groups. However, these foods range in texture and taste, and are likely items that the child has never experienced before. Although the literature has shown that children with different diagnoses tend to respond differently to different types of food, the conclusion can be made that in general, novel foods, and the overall feeding process, inherently have varying sensory experiences (Clawson et al., 2007; Twachtman-Reilly et al., 2008, Cornwell et al., 2010; Addison et al., 2012; Zehetgruber et al., 2014; González & Stern, 2016; Engel-Yeger et al., 2016). These experiences are then interpreted by the child's central nervous system in different ways, depending on their brain structures (Clawson et al., 2007; Twachtman-Reilly et al., 2008; Cornwell et al., 2010; Addison et al., 2012).

These children may experience over or under responsiveness to sensory stimuli during feeding, which is regulated by their CNS, and therefore may display “inappropriate” reactions (Addison et al., 2012; Engel-Yeger et al., 2016; González & Stern, 2016; Tauman et al., 2017; Lane, 2012; Cornwell et al., 2010; Twachtman-Reilly et al., 2008). These responses are often negative, and lead to poor feeding outcomes and experiences (Addison et al., 2012; Engel-Yeger et al., 2016; González & Stern, 2016; Lane, 2012; Lane et al., 2014; Twachtman-Reilly et al., 2008; Clawson et al., 2007). These poor experiences may further contribute to the development of the CNS and may reinforce pre-existing neural pathways of over or under responsiveness, and thus inappropriate responses, to feeding (Addison et al., 2012; Engel-Yeger et al., 2016; Anzalone & Lane, 2012; Lane et al., 2014; Bröring et al., 2017, Cornwell et al., 2010).

Overall, the evidence supporting sensory integration theory is strong, although

evidence backing sensory integration theory as applied in feeding interventions is still growing. Sensory integration theory has been implemented in practice for decades and literature regarding interventions for children with feeding disorders has co-emerged with speech and language literature with some significance in the more recent years. Marshall et al. (2015) contests that there may be a lack of evidence in this area because it is a comparatively new area of practice for children with feeding challenges. In Howe & Wang's (2013) review of the current evidence, they found various studies with strong evidence for sensory stimulation, specifically oral, olfactory and tactile stimulation, producing positive results in shortened length of hospital stays and improvements in oral feeding performance, oral intake, and coordinated swallowing movements. Other current literature presents empirical findings and reviews that support the notion that interventions utilizing sensory integration theory show positive results in a variety of feeding outcomes (Twachtman-Reilly et al., 2008; Cornwell et al., 2010; Bröring et al., 2017; Fucile et al., 2011).

In terms of the scope of this issue, work by Paterson & Peck (2011) and Tauman et al. (2017) found that sensory differences (i.e., challenges with auditory processing, tactile defensiveness, and overall sensory sensitivity and avoidance) had correlations with children with feeding disorders. Further expanding on the scope, Smith et al. (2005) reviewed evidence that claimed about 6-17% of all babies and 64-86% of children with “challenging behaviors” have tactile defensiveness. While Rahkonen et al. (2014) used neuroimaging records to report that extremely low gestational age (EGLA) infants who had structural cortical changes also had atypical sensory profiles. A review by Bröring et

al. (2017) included findings that looked at the relationship between specific brain structures/damage and sensory processing scores. This evidence supports the theoretical foundation that sensory integration dysfunction is at the core of many feeding challenges for this population.

However, there is conflicting evidence that not only contests the application of sensory integration theory for feeding challenges, but also offers an opposing framework as a possible answer. One significant piece of literature confronts sensory integration theory explaining feeding difficulties by ascertaining that there appears to be a missing piece, which is brought to light by the opposing proposition of behaviorism (Seiverling et al., 2018; Seiverling et al., 2017; Cornwell et al., 2010; Clawson et al., 2007; Addison et al., 2012; Peterson et al., 2016). This theory asserts that feeding difficulties are more likely due to behavioral challenges, which is also quite often seen in children with ASD and other developmental delays (Seiverling et al., 2018; Seiverling et al., 2017; Clawson et al., 2007). The conceptual foundation of this theory implies that feeding difficulties are attributed to learned behavior from prior experiences, which can then be unlearned or adjusted through responses that the practitioner or parent structures through behavior-based procedures (see Figure 1) (Allison et al., 2012; Gale et al., 2011; Levin et al., 2014; Silbaugh et al., 2018; Alaimo et al., 2018; Laud et al., 2009; Muldoon & Cosbey, 2018; Taylor et al., 2017; Najdowski et al., 2003; Seiverling et al., 2012; Sharp et al., 2014; Sharp et al., 2011; Kuschner et al., 2017; Seiverling et al., 2017; Wood et al., 2009; Tarbox et al., 2010; Levin et al., 2014).

Seiverling et al.'s (2018) review of the current literature claims that there is strong

empirical evidence to support behavioral interventions that involve modifying the environment, which in contrast to the sensory integration feeding literature, is lacking. Furthermore, Seiverling et al.'s (2018) study found that when behavioral interventions were implemented with and without pre-activity sensory integration techniques, children with ASD and feeding difficulties had similar outcomes whether or not they received the pre-activity sensory integration techniques, further threatening the evidence supporting sensory integration as a valid intervention for feeding challenges. This suggests that the adequacy of sensory integration theory alone may be insufficient for understanding the entire picture of feeding challenges.

Sensory Integration & Behaviorism Visual Model

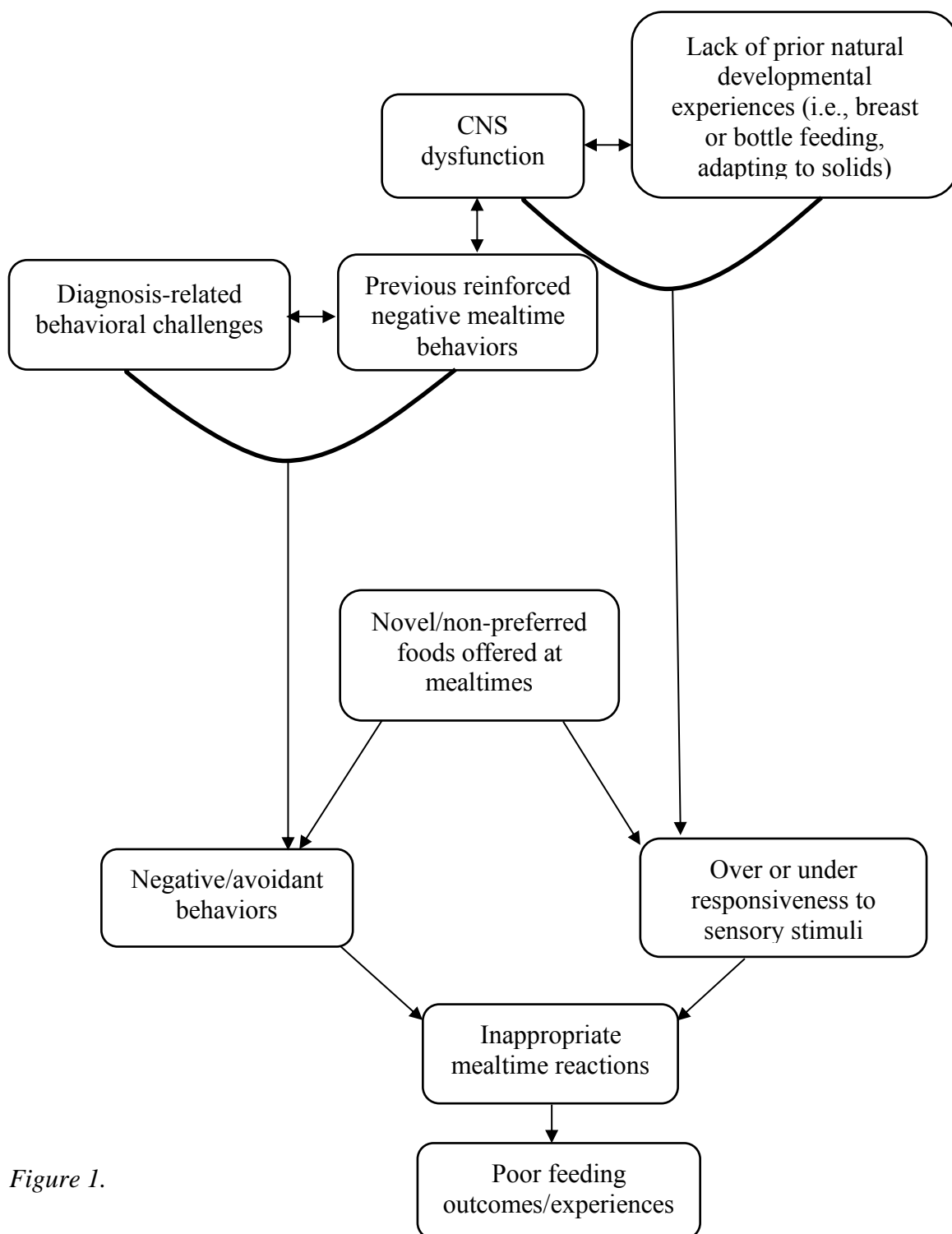


Figure 1.

CHAPTER TWO

Introduction

This chapter provides an evaluative summary of the current literature regarding the etiology, treatment and evaluation of feeding challenges in pediatric populations. It describes the strength and accuracy of the evidence, generalization to populations and settings, as well as effective features of outcome measures recommended for the development of future evaluation tools.

Etiology

Feeding challenges in the general pediatric population can derive from a number of causes, such as medical issues, anatomical and physiological differences, developmental delays, oral motor difficulties and behavioral problems (Dempster et al., 2016; González & Stern, 2016; Williams et al., 2010; Twachtman-Reilly et al., 2008; Tauman et al., 2017; Howe & Wang, 2013; Seiverling et al., 2018b; Silverman, 2010; Bryant-Waugh et al., 2010; Gale et al., 2011; Levin et al., 2014). In addition, it has been noted in the literature that there is a significant correlation between an ASD diagnosis and feeding challenges. It is currently estimated that up to 90% of children with ASD have some type of feeding disorder and up to 70% have a selective diet, indicating that children with ASD experience more feeding difficulties than their peers (Petre & Nedelcu, 2017; Williams & Seiverling, 2010; Seiverling et al., 2011a; Marí-Bauset et al., 2014; Twachtman-Reilly et al., 2008; Marshall et al., 2015a; Sharp et al., 2013; Seiverling et al., 2018b; Johnson et al., 2015a; Johnson et al., 2014). In fact, early diagnostic standards of ASD included “aberrant eating habits”, although this has since been nullified (Ahearn

et al., 2001). Despite this strong association, there is still debate about why this occurs; current research indicates possibilities such as medical conditions, lack of oral motor skills, behavioral challenges, anxiety, dysfunctional parent-child interactions, lack of environmental structure (i.e., unestablished hunger cycle), and sensory processing challenges (Johnson et al., 2015a; Petre & Nedelcu, 2017; González & Stern, 2016; Addison et al., 2012; Williams & Seiverling, 2010; Sharp et al., 2010; Seiverling et al., 2011a; Marí-Bauset et al., 2014; Twachtman-Reilly et al., 2008; Seiverling et al., 2018b; Johnson et al., 2014; Field et al., 2003; Bryant-Waugh et al., 2010; Burrell et al., 2019).

Types of Feeding Problems

In addition to varying etiology, children with an ASD diagnosis present with various types of feeding challenges, which typically do not include a specific diagnosis; rather, they fall under diagnoses of “Feeding Disorder of Infancy or Early Childhood” and/or “Feeding Difficulties and Mismanagement” which further complicates understanding the origin of each case since the variation in children meeting these non-specific criteria denote an assortment of etiologies (Sharp et al., 2010; Marí-Bauset et al., 2014; Petre & Nedelcu, 2017; Seiverling et al., 2018b; Bryant-Waugh et al., 2010; Williams et al., 2009). For example, there is food selectivity/sensitivity which is based on type, texture, brand, newness, temperature and color of foods; other feeding difficulty presentations include: food refusal (refusal to eat all or most foods), adipsia (failure to consume sufficient fluids), packing or retention of foods in the mouth, pica (eating of non-nutritive substances), rapid eating, oral-motor challenges, limited volumetric intake, vomiting/gagging, and negative mealtime behaviors (Williams & Seiverling, 2010; Sharp

et al., 2010; Sharp et al., 2013; Seiverling et al., 2011a; Marí-Bauset et al., 2014; Marí-Bauset et al., 2015; Twachtman-Reilly et al., 2008; Petre & Nedelcu, 2017; Seiverling et al., 2018b; Johnson et al., 2014; Field et al., 2003; Engel-Yeger et al., 2016; Bryant-Waugh et al., 2010; Gale et al., 2011). Since there is no one known and agreed upon cause or specific diagnostic guidelines for subsets of feeding challenges, research on intervention and evaluation is varied and often includes multiple components to parallel the multiple etiological pathways (Sharp et al., 2010; Bryant-Waugh et al., 2010; Williams et al., 2009; Gale et al., 2011).

Outcome Measures

Although individual studies lay claim that their outcome measure is psychometrically sound and available for use in a wide range of populations, article reviews and subsequent revisions reveal that there is a clear dearth of psychometrically sound and generalizable outcome tools to measure feeding challenges in children (Chatoor et al., 1997; Chatoor et al., 2018; Karlsson et al., 2013; Hodges et al., 2007; Berlin et al., 2010; Seiverling et al., 2011b; Hendy et al., 2014; Davies et al., 2007; Hendy et al., 2009; Allen et al., 2015; Seiverling et al., 2019; Williams & Seiverling, 2010; Sharp et al., 2013; Seiverling et al., 2016; Seiverling et al., 2010; Burrell et al., 2019; Levin et al., 2014; Williams et al., 2011; Heckathorn et al., 2016; Sanchez et al., 2015; Sharp et al., 2016; Jaafar et al., 2018).

To broaden the scope of this review, evaluation tools included a measure of some form of feeding challenge and needed to address a target population between and including infants to adolescents. According to the literature, the tools that are currently

utilized, many of which are being updated and reassessed, include: The Parent-Child Feeding Scale (Chatoor et al., 1997), The Parent-Child Play Scale (Chatoor et al., 2018), The Nursing Child Assessment Feeding Scale During Toddlerhood (NCAFS) (Hodges et al., 2007), The Parent Mealtime Action Scale (PMAS) (Hendy et al., 2009), The Brief Autism Mealtime Behaviors Inventory/in Children (BAMBI/BAMBIC) (Hendy et al., 2013; DeMand et al., 2015; Lukens & Linscheid, 2008., 2008; Seiverling et al., 2016), The Attribution for Child Eating Scale (PACES) (Hendy et al., 2014), The Swedish Eating Assessment for Autism Spectrum Disorders (SWEAA) (Karlsson et al., 2013), About Your Child's Eating Scale (AYCE) (Davies et al., 2007; Hendy et al., 2018), The Behavioral Pediatric Feeding Assessment Scale (BPFAS) (Marshall et al., 2015b; Allen et al., 2015) The Pediatric Eating Assessment Tool PEDI-EAT (Thoyre et al., 2014), The Mealtime Behavior Questionnaire (MBQ) (Berlin et al., 2010), The Screening Tool of Feeding Problems applied to children (STEP-CHILD) (Seiverling et al., 2011b), Meals in Our Household (Anderson et al., 2012), The Neonatal Oral-Motor Assessment Scale (NOMAS) (Howe et al., 2007), The Karaduman Chewing Performance Scale (KCPS) (Serel et al., 2016), The Sensory Eating Problems Scale (SEPS) (Seiverling et al., 2019), an unnamed 4-item report of texture problems (Seiverling et al., 2011a), The Child Mealtime Feeding Behavior Questionnaire (CMFBQ) (Ainuki & Akamatsu, 2013), The Eating Profile (Nadon et al., 2011), and the Pediatric Assessment Scale for Severe Feeding Problems (PASSFP) (Crist et al., 2004).

Administration, Population and Setting

The tools are split between a majority of caregiver report (Thoyre et al., 2014;; Berlin et al., 2010; Seiverling et al., 2011b; Hendy et al., 2014; Lukens & Linscheid, 2008; DeMand et al., 2015; Hendy et al., 2009; Allen et al., 2015; Seiverling et al., 2019; Seiverling et al., 2011c; Williams et al., 2011; Hendy et al., 2013; Seiverling et al., 2016; Davies et al., 2007; Marshall et al., 2015; Anderson et al., 2012; Seiverling et al., 2011a; Ainuki & Akamatsu, 2013; Nadon et al., 2011; Crist et al., 2004), and direct observation by 1 or more clinician(s) (Hodges et al., 2007; Chatoor et al., 1997; Chatoor et al., 2018; Serel et al., 2016; Howe et al., 2007). Caregiver report is likely utilized more frequently due to the notion that parents are more familiar with their child in the natural feeding environment, and therefore may report a more accurate score of the child's abilities (Nadon et al., 2011). Although objective data via direct clinician assessment is seen as a "gold standard" by some, it is not always feasible and an ecologically accurate method of data collection. Therefore, a combination of caregiver and clinician observation as part of an assessment may be more suitable; however, this is nonexistent in the current literature (Sanchez et al., 2015; Jafaar et al., 2015; Burrell et al., 2019). One report (SWEAA) is through direct client report, however this is based on a population of adolescents and young adults with a diagnosis of ASD who are able to access and complete a web-based survey (Karlsson et al., 2013). Of these reports, three assessments, the SWEAA, MBQ and BAMBI can be web-based (Karlsson et al., 2013; Lukens & Linscheid, 2008; Berlin et al., 2010), the remainder require pencil and paper methods. Reviews suggest that while a combination of both self/caregiver-report and direct observation would be ideal, it

would be time consuming and not always feasible (Seiverling et al., 2011a; Sharp et al., 2013; Seiverling et al., 2016; Seiverling et al., 2010; Burrell et al., 2019; Sharp et al., 2016; Heckathorn et al., 2016).

While these reports do not state what type of practitioner is able to administer these assessments, it is clear that they are not specific to occupational therapy. The Eating Profile, Sensory Eating Problems Scale, Neonatal Oral-Motor Assessment Scale and 4-item unnamed texture problems measure are the only measures that were explicitly developed with an occupational therapist and/or utilized sensory integration as an occupational therapy-specific theoretical approach (Nadon et al., 2011; Seiverling et al., 2019; Howe et al., 2007; Seiverling et al., 2011a).

In terms of population, these assessments have been tested with infants and toddlers (Chatoor et al., 1997; Chatoor et al., 2018; Hodges et al., 2007; Howe et al., 2007; Serel et al., 2016; Crist et al., 2004), preschool and elementary school age children (Hendy et al., 2009; Williams et al., 2011; Marshall et al., 2015; Allen et al., 2015; Berlin et al., 2010; Anderson et al., 2012; Ainuki & Akamatsu, 2013; Nadon et al., 2011) and even adolescents (Karlsson et al., 2013; Davies et al., 2007). Assessments available for the widest population range include the BAMBI/C with an age range of 1.5 to 17 years, PACES from 7 months to 18 years, PEDI-EAT from 1 month to 10 years, and the STEP-CHILD from 2 years to 18 years (Seiverling et al., 2016; Lukens et al., 2008; DeMand et al., 2015; Hendy et al., 2014; Thoyre et al., 2014; Seiverling et al., 2011b). The Sensory Eating Problems Scale and the 4-item texture problem measure recommend use for children 1 to 2 years and older, with no age limit. However, assessments of their

psychometric properties were conducted only on children with a mean age of ~4 to 5 years; therefore, these measures may not be valid for older children (Seiverling et al., 2011a; Seiverling et al., 2019). Validation of these assessments with children with disorders other than feeding challenges has also been mixed. Only a few studies included only typically developing children with feeding challenges (Chatoor et al., 1997; Chatoor et al., 2018; Hodges et al., 2007; Berlin et al., 2010) or children with a diagnosis of ASD (Karlsson et al., 2013). The majority of measures have included children who are typically developing and have a diagnosis of ASD and/or other developmental or neurological condition, thus widening the range of applicable populations (Hendy et al., 2009; Williams et al., 2011; Hendy et al., 2013; Seiverling et al., 2016; Lukens et al., 2008; DeMand et al., 2015; Hendy et al., 2014; Davies et al., 2007; Marshall et al., 2015; Allen et al., 2015; Thoyre et al., 2014; Seiverling et al., 2011b; Anderson et al., 2012; Howe et al., 2007; Serel et al., 2016; Seiverling et al., 2019). Since most participants in these studies have included a mixed diagnosis population, likely a new feeding outcome measure would require similar populations to be validated on, in order to increase external validity and generalizability.

The majority of feeding assessments have been assessed for use in an outpatient hospital or clinic (Chatoor et al., 1997; Hodges et al., 2007; Hendy et al., 2009; Williams et al., 2011; Hendy et al., 2014; Marshall et al., 2015; Allen et al., 2015; Thoyre et al., 2014; Seiverling et al., 2011b; Serel et al., 2016; Seiverling et al., 2019; Seiverling et al., 2011a; Nadon et al., 2011; Crist et al., 2004), and community-based settings (Karlsson et al., 2013; Davies et al., 2007; Anderson et al., 2012; Ainuki & Akamatsu, 2013). The

NOMAS is the only measure recommended strictly for inpatient (Howe et al., 2007), and three can be interchanged between inpatient, outpatient and/or community-based settings (Chatoor et al., 1997; Hendy et al., 2013; Seiverling et al., 2016; Lukens et al., 2008; DeMand et al., 2015; Berlin et al., 2010). Overall, there is a wide variation in the pediatric feeding literature regarding methods of administration, applicable practitioners and recommended populations and settings; therefore, selecting an available tool that is acceptable for an individual client may prove to be challenging. An assessment validated for use with varied age ranges, diagnosis types, settings and that incorporates caregiver and clinician perspectives is a necessity for the current pediatric feeding literature (Jafaar et al., 2018; Sanchez et al., 2015; Seiverling et al., 2010; Sharp et al., 2016; Heckathorn et al., 2016; Burrell et al., 2019).

Sensory/Oral Motor Based Assessments

Out of the aforementioned twenty-one measures, only five address outcomes related to a sensory integration theoretical lens, the Eating Profile (Nadon et al., 2011), the Pediatric Assessment Scale for Severe Feeding Problems (PASSFP) (Crist et al., 2004) the Screening Tool of Feeding Problems applied to children (STEP-Child) (Seiverling et al., 2011b), the Sensory Eating Problems Scale (SEPS) (Seiverling et al., 2019) and an unnamed four-item measure of texture problems (Seiverling et al., 2011a).

The Eating Profile is a modified and translated version of an internal clinical instrument, originally used in France, and is an eleven domain, 145-item parent questionnaire for children ages 3-12 years old with a diagnosis of ASD or Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS). The domains include

dietary history, child health, family dietary history, mealtime behaviors (specific to oral-motor skills), food preferences (specific to texture, type and presentation), autonomy (specific to utensil use and assistance requirements for independence in eating), behaviors outside of mealtimes, parent behavioral strategies, the child's communication abilities and socio-economic factors of the family. Face validity was established with parents, five occupational therapists, and an adult with autism who works as a consultant in the field; however no other psychometric properties of this assessment were studied (Nadon et al., 2011).

The Pediatric Assessment Scale for Severe Feeding Problems (PASSFP) is a 15-item parent-report measure for children four months and up with a range of medical complexities (cerebral palsy, GERD, CF, etc.), who are totally or partially tube fed or receive all their nutrition orally. The PASSFP includes oral sensory questions regarding gagging/vomiting, acceptance for brushing the child's teeth, washing the child's face, pocketing foods and liquids and a question with three options for temperature and six options for textures of foods the child accepts. The PASSFP has acceptable internal validity ($p < .001$), reliability ($\alpha = .92$), and test-retest reliability ($p < .001$), however, criterion and convergent validity were not assessed (Crist et al., 2004).

The STEP-CHILD is a 15-item screening tool with cutoff scores for use in outpatient clinics for children who are typically developing, have a diagnosis of ASD and/or other special needs, and are between 2 to 18 years old. Five of the six STEP-CHILD domains (chewing problems, food selectivity, rapid eating, food refusal and stealing food) were positively correlated to the four-item texture problems measure and

the Child Eating Behavior Questionnaire (CEBQ) ($p=.000$), indicating good convergent validity. The domains of “chewing problems”, “rapid eating” and “food selectivity” were positively correlated to the subscales of the Parent Mealtime Action Scale (PMAS) signifying good criterion validity ($p=.000-.003$). However, the mean Cronbach’s alpha across all six subscales was .62, denoting less than acceptable internal reliability (Seiverling et al., 2011b).

This unnamed 4-item measure of texture problems is a caregiver report, has been assessed in a hospital-based feeding clinic, with children ages 12 months and older and who are typically developing and have a diagnosis of ASD and other special needs. This measure poses four binary yes/no questions to determine if a child has difficulty eating specific textures, which were selected based on a factor analysis that loaded onto the categories of “ground/ lumpy”, “cut-up/chunky”, “dry/crispy” and “regularly textured meats”. Results from an earlier study of the psychometric properties of this assessment indicate that the measure of texture problems has acceptable convergent validity for parental concerns using the PMAS and significant correlations with weight, diet variety and mealtime behavior using the BAMBIC and the Child Eating Behavior Questionnaire (CEMBQ); however, internal consistency was reported to be low ($\alpha=.69$) (Seiverling et al., 2011a).

The SEPS is a 22-item caregiver report, assessed in various feeding clinics, and is for children aged 24 months and older and who are typically developing or have a diagnosis of ASD. The SEPS is the only measure that is explicitly derived from occupational therapists working in feeding programs and Dunn’s Oral Sensory

Processing subscale of the Children's Sensory Profile – 2. The present study of the SEPS was to identify specific domains of oral sensitivity children show during feeding. The SEPS showed acceptable internal consistency ($\alpha > .70$), goodness-of-fit, test-retest reliability and convergent validity with the Oral Sensory Processing subscale of the Child Sensory Profile – 2; items were also significantly correlated with mealtime behavior problems using the BAMBIC (Seiverling et al., 2019).

The STEP-CHILD and the PASSFP are the only assessments in the current literature that includes a question of functional independence. The STEP-CHILD includes a single broad question regarding if a child “cannot independently feed”, listed under the “chewing problems” domain (Seiverling et al., 2011b). The PASSFP includes questions specific to utensil use, seating and assistance required for independent feeding. However, responses are trichotomous with “yes”, “no”, or “in part” (Nadon et al., 2011). Although the PASSFP does not explicitly ask about feeding independence, it does include a question about if a child requires “special modifications” for feeding, which may be referring to adaptive equipment (Crist et al., 2008).

Despite the widespread use of sensory integration techniques to address feeding challenges in pediatrics, the lack of evaluation tools that measure sensory-based variables highlights the need for a valid and reliable assessment that incorporates measure of sensory-based challenges and identifies use of modified and/or adaptive equipment (Nadon et al., 2011; Seiverling et al., 2011a; Seiverling et al., 2011b; Seiverling et al., 2019; Crist et al., 2004; Sanchez et al., 2015).

Sensory Components of Behavioral Assessments

Most of these measures include an evaluation of the child's and/or parents' behaviors and interactions, during and sometimes outside of meals (Chatoor et al., 2018), due to the significant amount of literature regarding behavioral interventions for children with feeding challenges (Thoyre et al., 2014; Chatoor et al., 1997; Chatoor et al., 2018; Hodges et al., 2007; Berlin et al., 2010; Seiverling et al., 2011b; Davies et al., 2007; Lukens & Linscheid, 2008; Hendy et al., 2009; Allen et al., 2015; Seiverling et al., 2016; Burrell et al., 2019; Seiverling et al., 2010; Sharp et al., 2016; Jafaar et al., 2018; Heckathorn et al., 2016; Sanchez et al., 2015).

However, some behaviorally-based outcome measures are not only restricted to mealtime behaviors; a few also measure constructs typically included in sensory-based assessments such as food type, texture, self-feeding skills and considers modifications and adaptations. The Parent Mealtime Action Scale (PMAS) includes a food frequency measure, but only for fruits, vegetables and snack foods. To avoid parents over reporting consumption of foods, responses were capped at the number of servings ranging from 0-6 for snack foods and 0-12 for fruits and vegetables (Hendy et al., 2009; Williams et al., 2011). Although the BAMBIC includes a construct for limited variety, it does not record type and texture of food; rather, abstract questions for likes/dislikes and willingness to try new foods were validated against a food list of 86 common foods. Results ($p=0.000$) indicated acceptable convergent validity (Seiverling et al., 2016; Hendy et al., 2013; Lukens et al., 2008; DeMand et al., 2015). The Parent Attribution for Child Eating Scale (PACES) includes only one question pertaining to self-feeding skills, but as part of an

Oral Motor Problems section with a low loading factor score of .68 (Hendy et al., 2014). Food texture and variety were significantly correlated to the Permissive Parenting, Oral Problems and Vomiting sections ($p < .001$) (Hendy et al., 2014). Overall, while the majority of behavioral-based assessments provide information on parent-child interactions and behavior, they lack the sensory and fine motor constructs that are a critical component to understanding the full picture of a child's feeding difficulties (Allen et al., 2015; Burrell et al., 2019; Heckathorn et al., 2016; Sharp et al., 2016).

Current Literature

Reviews have mixed interpretations about the available instruments; there is division between the PEDI-EAT, BPFAS, BAMBI/C and PMAS having acceptable psychometric properties and feasibility (Jaafar et al., 2019; Sharp et al., 2016; Allen et al., 2015; Seiverling et al., 2010; Burrell et al., 2019; Sanchez et al., 2015; Heckathorn et al., 2016). The BPFAS is currently considered an acceptable caregiver report instrument, developed specifically for children with an ASD diagnosis, but adequate for a wide age range (9mo-18yo) and diagnoses, however, it only captures a child's behavior during mealtime, does not report on inter- and intra-rater reliability and has inconsistent concurrent validity (Jafaar et al., 2018; Sanchez et al., 2015; Burrell et al., 2019). It has good clinical applicability as it has a short administration time, is readily available for use, and uses a generally simple scoring system (Jafaar et al., 2018; Sanchez et al., 2015). The BAMBI/C and PMAS are considered acceptable assessment tools only for observable behavior related to feeding challenges at mealtimes; however neither included clinical cutoff scores and have variable psychometric properties (Seiverling et al., 2010;

Sharp et al., 2016; Burrell et al., 2019). However, as reported by multiple reviews, concerns regarding independent validation, standardized interpretation of results and generalizability during development significantly hinder the legitimacy of these assessments (Heckathorn et al., 2015; Burrell et al., 2019; Sanchez et al., 2015; Jafaar et al., 2018; Seiverling et al., 2010; Sharp et al., 2016).

Most assessments identified in the current review are no more than two pages in length and require a maximum of 16 minutes to administer (Sanchez et al., 2015). Overall, there is a clear lack of psychometrically sound outcome measures that are suitable for a wide age range of children, diagnoses, settings and that measure various theoretical concepts (Jafaar et al., 2018; Seiverling et al., 2010; Sharp et al., 2016; Heckathorn et al., 2016; Burrell et al., 2019; Sanchez et al., 2015). Since questionnaires regarding behavioral concerns are typically separate from sensorimotor-based feeding evaluation tools, a measure that integrates both would be valuable to feeding therapy practitioners, as an assessment that measures multiple domains can then guide a mixed approached intervention (Sanchez et al., 2015; Sharp et al., 2016; Burrell et al., 2019; Heckathorn et al., 2016). There is a significant need for assessments in other languages, that include a manualized administration guide, and that can incorporate caregiver report and clinician observation for a holistic approach (Jafaar et al., 2018; Sanchez et al., 2015; Seiverling et al., 2010; Allen et al., 2015; Burrell et al., 2019; Heckathorn et al., 2016; Sharp et al., 2016).

This gap in the evidence and the varying population, settings and etiology of feeding challenges, underpins the significant need for an evidenced-based feeding

outcome tool that encompasses the multi-faceted, etiological constructs of feeding challenges, for a wide variety of the pediatric population in several settings (Jafaar et al., 2018; Sanchez et al., 2015; Allen et al., 2015; Burrell et al., 2015; Heckathorn et al., 2016; Sharp et al., 2016).

A lack of feeding assessments has severely limited the literature base regarding pediatric feeding interventions and outcomes, resulting in inaccurate identification and unsuccessful treatments of these difficulties (Allen et al., 2015; Heckathorn et al., 2016; Sharp et al., 2016). Therefore, there is a significant need for a psychometrically sound, generalizable and clinically feasible feeding assessment to provide a foundation for expanding research in evaluation, diagnosis, prevention and treatment of feeding challenges in pediatric populations (Hodges et al., 2007; Howe et al., 2007; Jafaar et al., 2018; Sanchez et al., 2015; Sharp et al., 2016; Burrell et al., 2019; Heckathorn et al., 2016; Seiverling et al., 2010; Allen et al., 2015).

CHAPTER THREE

Introduction

This chapter describes the Capstone project, including specific methods of delivery, key features, role of personnel and the intended recipients and outcomes within the context of the existing literature and hospital system. Potential barriers and solutions for broader implementation of this project are discussed.

Proposed Program

This Capstone project sought to provide preliminary information on the OT Feeding Outcome Tool at Children's Specialized Hospital, in order to create a foundation for later validation. The overall problem is there are a lack of occupational therapy-specific feeding outcome measures, therefore this new evaluation tool was created to address this gap (Chatoor et al, 1997; Chatoor et al., 2018; Karlsson et al., 2013; Hodges et al., 2007; Berlin et al., 2010; Seiverling et al., 2011b; Hendy et al., 2014; Davies et al., 2007; Hendy et al., 2009; Allen et al., 2015; Seiverling et al., 2019; Williams & Seiverling, 2010; Sharp et al., 2013; Seiverling et al., 2016; Seiverling et al., 2010; Burrell et al., 2019; Levin et al., 2014; Williams et al., 2011). Specifically, the problem was a lack of implementation of the assessment, leading to a shortage of data which impeded progress to validating the measure. Therefore, this Capstone project determined barriers to implementation and correlations between documentation outcomes, methods of evaluation and education.

An additional problem was it is currently undetermined how the population being treated at Children's was doing in terms of meeting outcomes for feeding challenges.

Since there are few intervention options and no “gold standard” for treating children with ASD and feeding challenges, it was essential to understand what interventions practitioners are implementing and what the subsequent outcomes are in order to note if these interventions were effective and if the OT Feeding Outcome Tool was able to identify change (Williams et al., 2010; Gale et al., 2011; Seiverling et al., 2018a; Tang et al., 2011; Sharp et al., 2010; Howe & Wang, 2013; Williams & Seiverling, 2010; Burrell et al., 2019). This project therefore assessed what a child with feeding difficulties average length of stay was for feeding therapy, what was the most common treatment utilized, what were the outcomes by treatment and diagnosis and to determine differences in outcomes between children with an Autism Spectrum Disorder diagnosis, motor challenges and a diagnosis of only feeding difficulties. This Capstone also addressed the utility of the OT Feeding Outcome Tool by providing qualitative data on clinician confidence, average administration time and recommended additions and changes to improve feasibility and usage.

Methods of Delivery

Literature Review

A literature review was conducted to provide current information on feeding outcome measures in comparison to the OT Feeding Outcome Tool. This provided background information regarding the current state of the literature, including etiology and diagnoses, theoretical approaches, intervention options and assessments. The result of this review strongly identifies the need for an occupational therapy-specific evaluation tool that is able to pick up on the dynamic etiology, specifically ones that fall under

Sensory Integration, is available for a wide range of populations, settings and diagnoses, and assesses the nuances of feeding, such as independence in self-feeding and type and texture of food. This review also asserts the necessity and importance of improving clinician implementation and thus data collection, in order to further progress the validation process of the OT Feeding Outcome Tool and add a critical evaluation measure to the literature.

Focus Groups

Focus groups involving all OT clinicians and supervisors were conducted to provide crucial, first-person accounts and information about the current use of, barriers to implementation, and solutions for increased application of the OT Feeding Outcome Tool. As well as, intervention choices for children with feeding difficulties. The questions were generated, edited and finalized using information from prior education tools and discussions with site mentor, Joanne Hunt, and other supervisory staff involved in the development and education process of the OT Feeding Outcome Tool.

Information was collected via site visits with scheduled focus group times, held during the typical weekly staff meeting time and web communication (video interface and email). Each group was provided with a copy of the OT Feeding Outcome Tool to review and guided through both structured questions and informal discussion, in order to ascertain precise information about the tool while allowing for organic conversation.

All groups were initiated with dialogue about the goals of this Capstone and focus group and assured complete anonymity in all responses; this was done to focus the discourse for maximum benefit of the clinician's time, instill trust to encourage authentic

feedback, and to inspire clinicians to generate, share and actualize their own personal strategies for improved assessment use. Qualitative data was gathered via typed transcription during the groups, which was later organized according to site and coded for specific information (i.e., methods and barriers to implementation, confidence scales, common intervention practices, solutions for improved usage and recommendations for changes in formatting, directions, food list and scoring). Please refer to the appendix for focus group questions.

Questionnaire

Prior to site visits, an online survey, created using www.SoGoSurvey.com with detailed instructions and information about the Capstone project was emailed to all occupational therapy clinicians who worked at that site. Participants were encouraged to complete the questionnaire during the focus group time, in order to ensure completion, spark ideas, and provide real-time answers to questions they had. This 19-question, 4-minute online, anonymous survey included multiple choice and short answer responses. Questions were generated, edited and finalized using information from prior education tools and discussions with site mentor, Joanne Hunt, and other supervisory staff involved in the development and education process of the OT Feeding Outcome Tool. Questions were specific to demographics (primary work site, age, years of experience working at Children's Specialized Hospital, years of experience in practice, full time versus per diem status, and current position), administration of the tool (reporting on how often and when they administer the assessment, and if not administering, a short answer of barriers and possible solutions), perceptions of tool accuracy, methods of education (including

identifying position of personnel who communicated the education), identification of most useful education methods, measurements of value of data collection/outcome measures in research and practice, and identification of interventions/theoretical approaches used for children with feeding challenges, and for children specifically with an ASD diagnosis. Results were generated and coded from SoGoSurvey.com and stored on an Excel file for later analyses. Please refer to the appendix for survey questions.

Observations

Observation of feeding team evaluations, general evaluations where feeding was a concern and feeding therapy was observed at various sites, in order to gain a deeper understanding of methods of implementation of the OT Feeding Outcome Tool during evaluation and intervention. This provided fundamental insight into the questions of how the tool was being used and what treatments were utilized across multiple sites, as well as personalized accounts from clinicians about their perspectives of the assessment tool.

Participation in Evaluation

Active participation in Feeding Team Evaluations where the OT Feeding Outcome Tool is typically first used allowed for an expanded perspective and understanding of the implementation of this tool, as well as information regarding the evaluation process for children with feeding challenges. Feeding Team Evaluations consisted of an occupational therapist, speech-language pathologist, and nutritionist; a psychologist was included only if the child was over 2 years of age. The purpose of the evaluation was to evaluate and recommend services based on the child's functional impairment and scope of practice of each clinician. The OT Feeding Outcome Tool was

most commonly used during this evaluation, offering insight into its use relative to regular, non-feeding focused evaluations.

Active participation in Autism Team Evaluations was also included. This team evaluation included an occupational therapist, speech-language pathologist and psychologist, evaluating pre-school and school age children with a suspected ASD diagnosis and included an evaluation and recommendation of services based on each clinician's scope of practice and the child's needs. This experience offered valuable insight into a wide range of parental concerns regarding functional challenges children with an ASD diagnosis face.

Participation and Observation in Feeding Related Meetings

Participation in monthly in-person and video conferenced Feeding Team Work Group meetings across sites provided an administrative perspective on improving institution-wide outcomes and assessment use. Observing in a lecture series for parents of children with feeding challenges offered an understanding of family-centered framework and provided opportunities to further appreciate the caregivers' perspective in the evaluation and treatment of this population.

Interviews

Informal interviews with clinicians and supervisors at various sites within the Children's Specialized Hospital Network delivered qualitative data on the clinician and administrative perspective on the current method implementation of the OT Feeding Outcome Tool, prior education, current interventions used, barriers and potential solutions to improve tool use and site-specific cultural and logistical challenges and

supports. This data was recorded and integrated into the qualitative data reports from the focus groups for streamlined material.

Chart Audit

A chart audit via Children's Specialized Hospital multi-site EMR system and previous quarterly data automatically pulled into Excel sheets provided critical data for analyses of average length of stay, documentation rates, diagnoses, treatment type and outcomes. Data was manually coded and deidentified to use for analyses specific to site and evaluation type (Feeding Team Evaluation sites versus Non-Feeding Team Evaluation sites).

Data Analysis

Analyses of quantitative and qualitative data from the questionnaire, focus group, interviews and chart audits utilizing Excel, XlStat and SPSS generated reports on average length of stay by site and evaluation type, outcomes by methods of evaluation, site, diagnosis and intervention. Visual and manual analyses were conducted for reports on percentage of correct documentation rates by site, evaluation type and methods of education. As per request of Children's Specialized Hospital, average and year to date reports on outcomes by evaluation type and site and documentation rates by evaluation type and site were completed. In addition, analyses of confidence level in utilizing the OT Feeding Outcome Tool by method of education was conducted, as well as multiple analyses on value in data collection, administration of assessment and preferred education methods by demographics (age, years in practice, years at Children's Specialized Hospital, etc.). Data from all 2018 quarters and quarter 1 and 2 from 2019 were utilized

in these analyses.

Final Report/Presentations

The information gathered from this Capstone was disseminated via in-person and video conferenced presentations at the Boston University Sargent College Campus and Children's Specialized Hospital Mountainside site, with opportunities for members of the public, affiliated professors, staff and clinicians to view. A final report of this Capstone project has been submitted to both site and academic mentors, as well as the Boston University Library. A formalized report of data analyses, list of recommendations for improving assessment use and the tool itself will also be provided to Joanne Hunt, site mentor at Children's Specialized Hospital, Mountainside.

Personnel

My mentors, Joanne Hunt and Jennifer Kaldenberg have provided support and information in terms of guiding activities, assisting in the set-up of interviews and focus groups, meetings with professionals across sites, scheduling, logistical support, poster and final report editing, and data analyses. Children's Specialized Hospital Project Manager, Kristen Naples, has been a part of the Capstone team by providing critical support for collecting and running multiple data analyses. My clinical supervisor and mentor, Kimberly Baglieri, provided support and guidance for the advanced clinical practice portion of this Capstone experience. Practitioners and supervisors from other Children's Specialized Hospital sites have also been invaluable in scheduling and providing information on observation of Feeding Team Evaluations, regular evaluations, feeding treatments, focus groups and interviews.

Intended Recipients

My site mentor, Joanne Hunt, and other OT practitioners throughout the Children's Specialized Hospital network are the short-term intended recipients. The preliminary information on the utility, barriers and solutions to implementation and methods of education will be used to increase application of the OT Feeding Outcome Tool and thus further the progress of validating it. This will also offer insight into the correlation between treatment options and outcomes of children with feeding challenges. Long-term intended recipients include general pediatric OT practitioners involved in treating feeding challenges, the children and caregivers themselves, and the literature base of feeding challenges.

Intended Outcomes

The overall intended outcome of this Capstone project was to provide preliminary information regarding the utility of the OT Feeding Outcome Tool, increase implementation of the tool across Children's Specialized Hospital sites to improve data quantity, and provide information on average length of stay, documentation rates and outcomes by treatment and diagnosis, and provide an analysis of institution wide year to date information. By building this foundation for a future feeding outcome assessment, this will enhance the field in terms of providing evidenced-based evaluation and treatment for children with feeding challenges and their caregivers.

Barriers & Breakthroughs

The most critical potential barrier is a continued low data count resulting from clinician non-compliance in applying the OT Feeding Outcome Tool; however, it is the

expectation that this Capstone project has provided solutions towards increasing its use and thus improving data quantity. These solutions included a list of recommendations for a re-education program, re-formatting the tool to make it more clinician and caregiver friendly and provided suggestions for additional foods and guidelines for a more comprehensive assessment. Since Children's Specialized Hospital is a network of sites across the state of New Jersey, it can be anticipated that managing education across these various locations may be a challenge. However, specific recommendations for useful re-education have been correlated by site, which will improve clinician use by accommodating to each site's cultural, social and structural needs and restrictions. This Capstone has also offered information about methods to expand outcome use by systematizing its application and revealing gaps in clinician's and supervisor's knowledge of the assessment and its proper administration.

Although a higher data count is still necessary for the validation process of the OT Feeding Outcome Tool to begin, the literature review and current data analyses provided in this final report will offer a foundation for future articles regarding this assessment.

CHAPTER FOUR

Introduction

This chapter describes the evaluation plan at the individual and program level, methods of project outcomes, research design, participants and statistical and manual data analyses with interpretations. Findings are presented in written and visual formats. Methods of delivery, outcomes, evaluation and implications are included in a visual logic model.

Evaluation Plan & Outcomes

This Capstone was evaluated through a literature review, formal reports of recommendations regarding education and improvements to the assessment tool, academic and site mentor meetings, a final report submission to academic and site mentors, the Boston University Library, and presentations at Boston University and Children's Specialized Hospital, Mountainside.

An evaluation of the evidence regarding the utility of this measure within the larger context of the current research was presented within the literature review, provided to site and academic mentors and in fulfillment of the final report. This offered options of other measures to validate this tool from and insight into the validation process specific to feeding challenges in pediatric populations.

Data was collected through chart audits, observations, interviews, focus groups, questionnaires and Excel log of data from 2018 and 2019. These methods provided information regarding the length of stay, outcomes (self-feeding, advancing texture, advancing foods and mealtime participation) by diagnosis, treatment, evaluation type and

site, documentation rates by evaluation type and site, and year to date information on outcomes and documentation rates. Barriers and solutions to clinician compliance were assessed as well. Additional information regarding correlations between demographics and tool administration, perspective on tool accuracy, value data collection, etc. was collected and provided in a formal report to the site mentor for administrative use. Data analyses were conducted within the last 3 weeks of this project, due to restrictions on receiving 2nd quarter data for 2019 and completing all site visits for focus groups and questionnaires. Statistical analyses using Excel, XIStat and SPSS, as well as visual analyses were conducted to provide quantitative analyses. A formal report of the qualitative data was created using Excel and Microsoft Word programs.

Completion and success of this Capstone can be evaluated through long-term measures as well. This project aims at improving staff implementation of the OT Feeding Outcome Tool, in order to provide sufficient data volume, and provide preliminary data and a literature review to build the foundation for future validation procedures to begin. This Capstone began during what is considered Children's Specialized Hospital 2nd quarter data of 2019. Further evaluation of this Capstone can be conducted by analyzing the 3rd and 4th quarterly data (Q1 and Q2) for post implementation of recommendations included in the Capstone project, to determine if there was an increase in documentation rates due to education provided. Future articles utilizing this literature review may be viewed as an extension of this Capstone project. By laying the groundwork for a necessary tool to assist with evaluation of children with feeding challenges, this Capstone will guide future research to provide evidenced-based tools and interventions.

Research Design

Documentation rates and outcomes were analyzed using a case-control, retrospective study design. Focus groups, interviews and questionnaire provided qualitative and quantitative data for visual and statistical analyses.

Participants

35 therapists responded via email survey (n=35), 39 therapists participated in the focus groups, and data from 76 clients (n=76) were used for qualitative and quantitative data analyses.

Data Analysis & Interpretations

Average Administration Time

Average administration time was calculated using quantitative data from focus groups across sites. Across all sites, the total average time of administration (excluding caregivers whose primary language was a language other than English) was 11 minutes.

Average Length of Stay by Site and Evaluation Type

Average length of stay was determined by recorded number of visits, obtained via EMR information extracted into Excel spreadsheets. Data on average length of stay was included 1) from 2018, 2019 Q1 and Q2 data 2) if all outcome measures (pre and post) were completed 3) if discharge reason included: outcomes met, obtained maximum benefit, skilled treatment not necessary, end/completion of episode of care/plan of care. This was done in order to ensure accuracy of what the average feeding therapy episode of care would entail and eliminate external factors, such as insurance issues, family move, behavioral challenge, non-compliance, and scheduling challenges, that are unrelated to a

child's treatment and outcomes. Average length of stay was 20.36 visits.

An analysis of average length of stay by site was conducted to determine if there were differences between the Children's Specialized Hospital sites (see Table 1 and Figure 2). A single ANOVA was conducted using data from 10 sites (n=290), revealing a statistical difference between sites ($p=0.02$) in terms of average length of stay. A linear regression with trendline indicated a positive slope by year ($R^2=0.166$), indicating a slight increase in average length of stay overtime. Further exploratory analyses were conducted on evaluation type (which is dependent by site), because it would provide more useful information regarding possible differences between sites.

An analysis between sites that have Feeding Team Evaluations (FTE) and do not have Feeding Team Evaluations (NFTE) was conducted to determine if there was a difference between average length of stay and type of evaluation offered (see Table 2, Table 3 and Figure 3). An initial F-test between average length of stay by date (2018, 2019 Q1 and 2019 Q2) and site was conducted to determine an assumption of variances. The analysis revealed an assumption of equal variances ($F_{Obs} < F_{Crit}$: $10.52 < 19$). A Two-Tailed Assuming Equal Variances t-Test was conducted to determine differences between type of site (FTE vs. NFTE) and average length of stay. Results indicated differences were not statistically significant ($p > .05$; $t_{Obs} < t_{Crit}$: $.84 < 2.77$) with 95% confidence interval. Considering families are able to receive services at any location of their choosing regardless of where the child was initially evaluated, these results may indicate that therapists are providing feeding interventions that produce outcomes within similar timeframes, regardless of which site the child was initially evaluated at.

Table 1 SUMMARY						
<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>		
AC	15	249	16.6	46.97143		
BAY	8	122	15.25	33.35714		
CFT	43	809	18.81395	165.6788		
HAM	57	1185	20.78947	103.812		
MTN	73	1384	18.9589	115.7066		
NB	16	264	16.5	53.6		
NBI	21	454	21.61905	92.04762		
TRM	48	1174	24.45833	448.1259		
TRS	7	241	34.42857	451.619		
WRC	2	21	10.5	24.5		
Total			20.36			
ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	3335.372	9	370.5969	2.142398	0.026253	1.913399
Within Groups	48435.05	280	172.9823			
Total	51770.42	289				

	<i>FTE</i>	<i>NFTE</i>
Mean	21.374	19.63667
Variance	11.64256	1.105686
Observations	3	3
df	2	2
F	10.52971	
P(F<=f) one-tail	0.086732	
F Critical one-tail	19	

	<i>FTE</i>	<i>NFTE</i>
Mean	21.374	19.63667
Variance	11.64256	1.105686
Observations	3	3
Pooled Variance	6.374122	
Hypothesized Mean Difference	0	
df	4	
t Stat	0.842789	
P(T<=t) one-tail	0.223396	
t Critical one-tail	2.131847	
P(T<=t) two-tail	0.446792	
t Critical two-tail	2.776445	

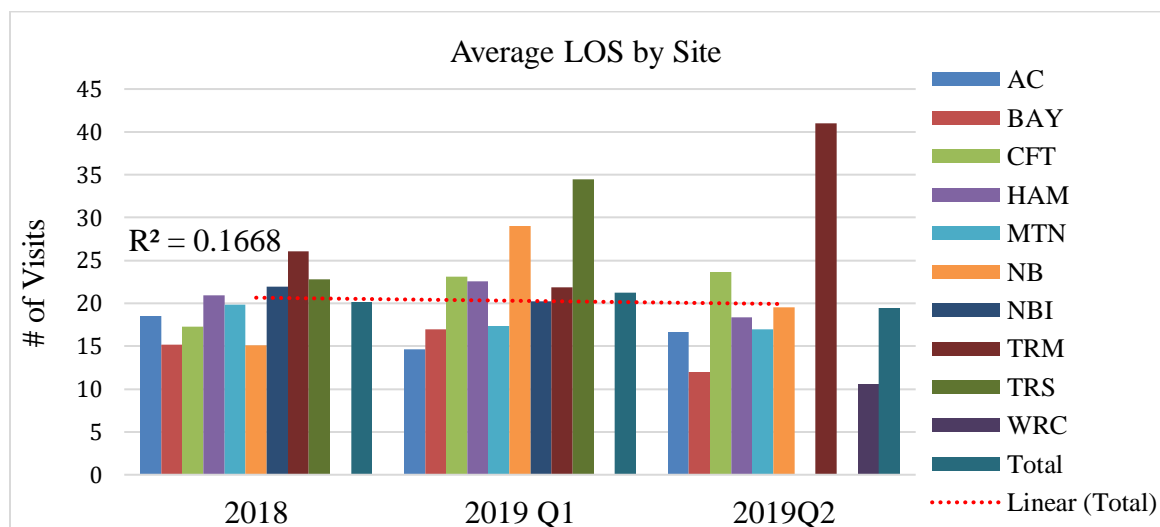


Figure 2.

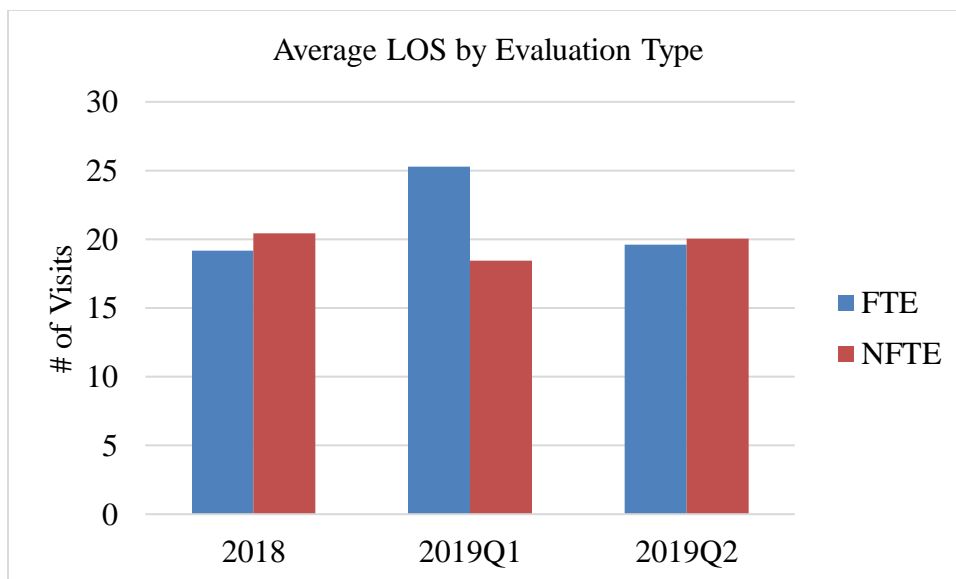


Figure 3.

Outcomes by Treatment & Diagnosis

The average total outcome score on the OT Feeding Outcome Tool was 10.65. The average total outcome score on the OT Feeding Outcome Tool for children with an ASD diagnosis was 9.5 points; these results indicate positive responses to treatment. Two One-Way ANOVAs and one Two-Way ANOVA were conducted to determine differences in outcomes by intervention type and diagnosis (n=76). One-Way ANOVAs revealed no statistically significant difference of outcomes by diagnosis (p=0.077) or by treatment (p=0.094). For meeting assumptions for a Two-Way ANOVA, data initially passed an assumption of normality using a Shapiro-Wilk Test of Normality (p=.970) but failed an assumption of homogeneity of variances using a Levene's Test of Equality of Error Variances (p=0.000). Despite 5 outliers in the data being removed (n=71), Levene's Test minimally failed (p=0.048). However, due to small sample size, removal of outliers and close p-value when rounded up (p=0.05), further statistical tests were run, although results are interpreted with caution. A Two-Way ANOVA revealed no statistically

significant correlation between outcomes by diagnosis and treatment type ($p=0.120$, $p=5.457$, $p=0.364$). (See Table 3 and Figure 4, Figure 5 & Figure 6)

Table 3								
Tests of Between-Subjects Effects								
Dependent Variable: Outcome								
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared		
	Noncent. Parameter	Observed Power						
Corrected Model	936.000a	12	78.000	1.373	.204	.215	16.476	.685
Intercept	1077.619	1	1077.619	18.969	.000	.240	18.969	.990
Diagnosis	463.369	2	231.684	4.078	.022	.120	8.156	.703
Treatment	310.029	4	77.507	1.364	.257	.083	5.457	.400
Diagnosis * Treatment	380.339	6	63.390	1.116	.364	.100	6.695	.406
Error	3408.657	60	56.811					
Total	7992.000	73						
Corrected Total	4344.658	72						
R Squared = .215 (Adjusted R Squared = .059)								
Computed using alpha = .05								

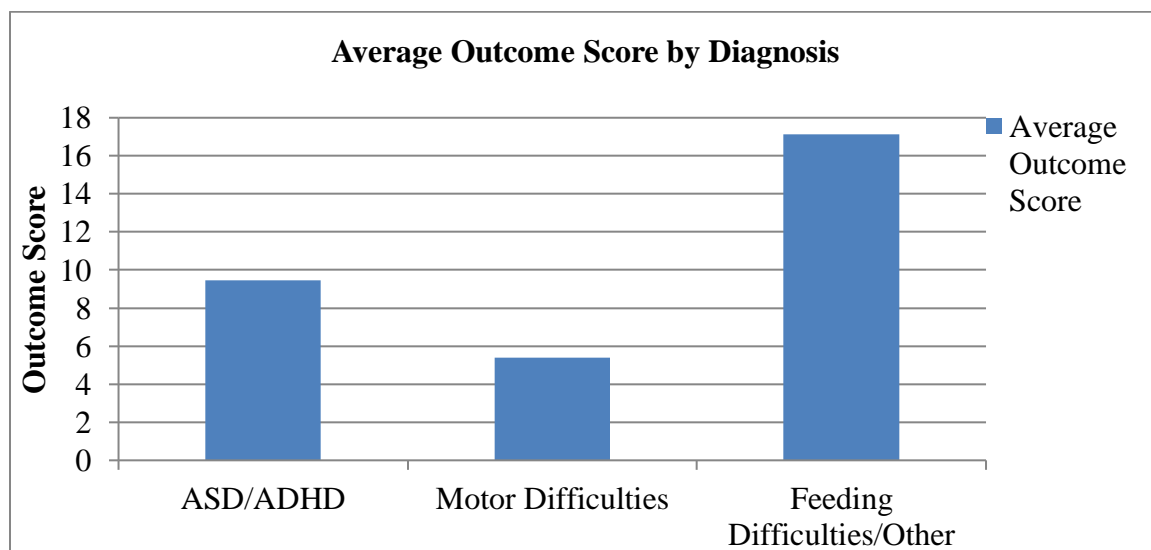


Figure 4.

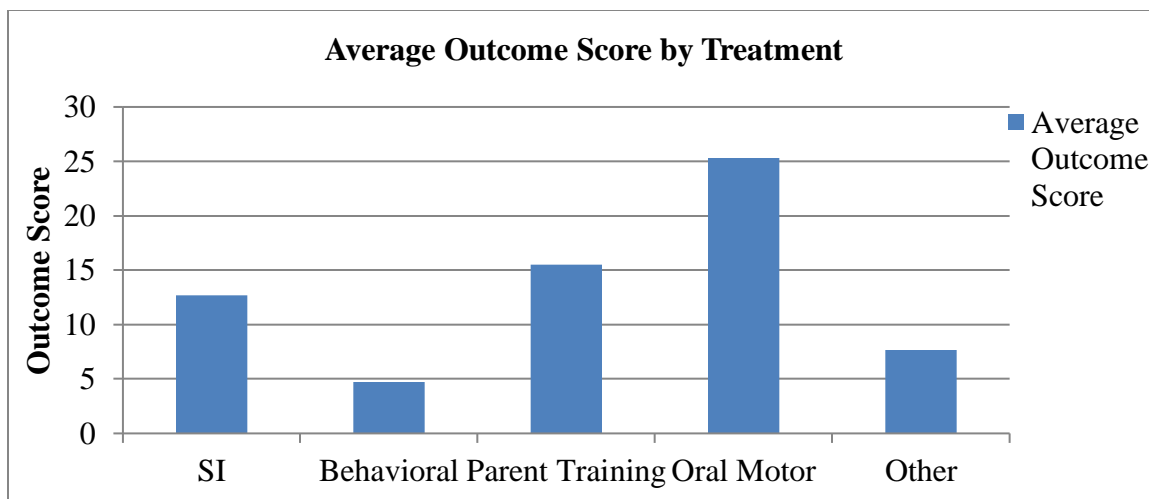


Figure 5.

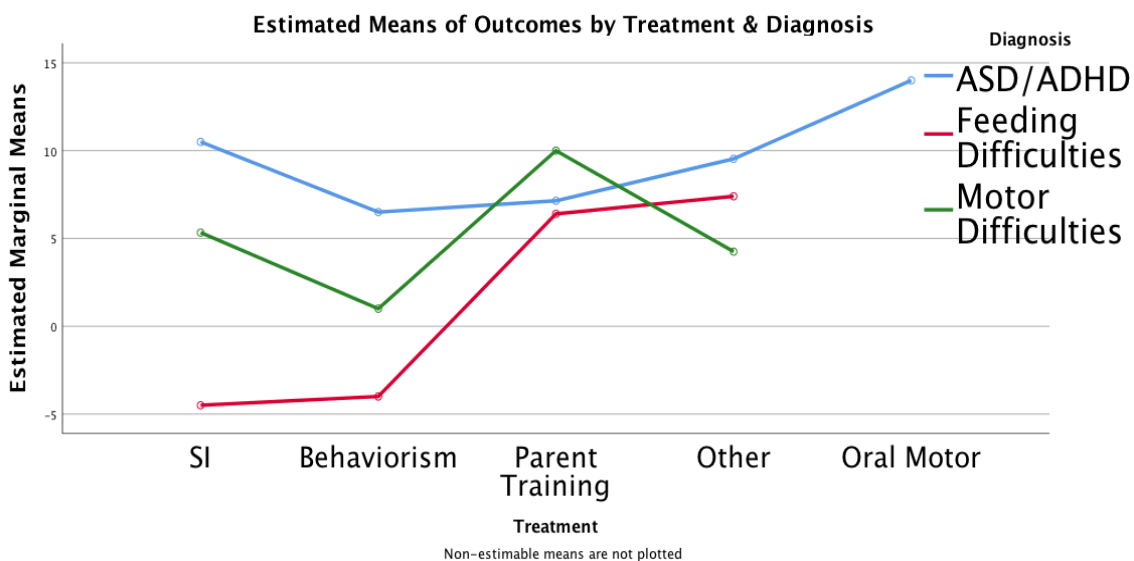


Figure 6.

Most Common Intervention Type for ASD Diagnosis

Quantitative results were recorded via coded responses from the online questionnaire (n=35). Sensory Integration interventions were most commonly reported. (See Figure 7)

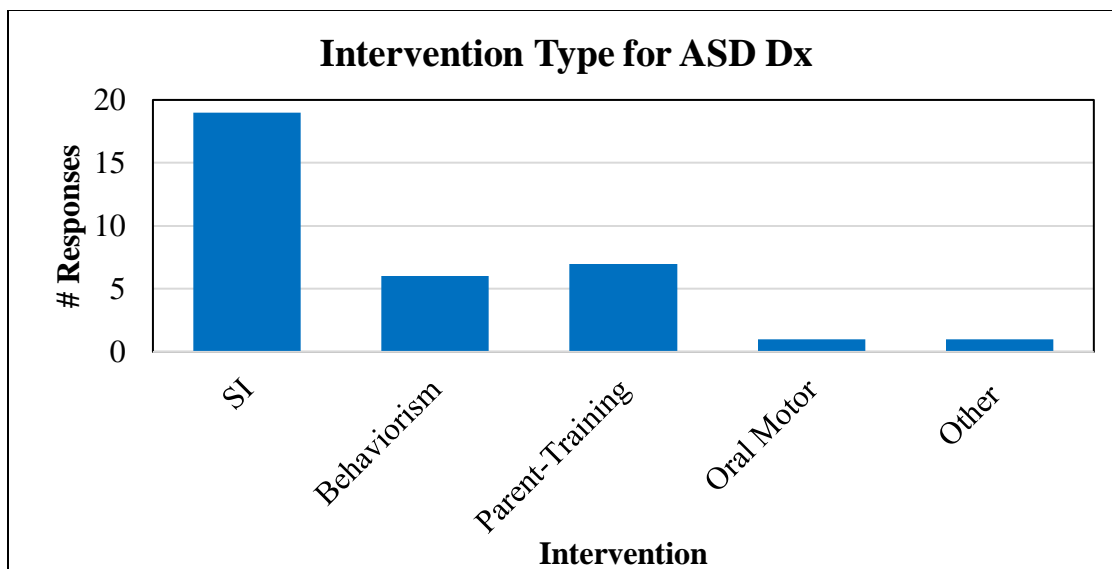


Figure 7.

Outcomes by Site and Year

A One-Way ANOVA was conducted to determine differences in outcomes by site. There were no statistical differences between sites ($p=0.427$). A year to date analysis revealed a 11.55 total point increase using the OT Feeding Outcome Tool between 2018 and combined quarterly data of 2019. (See Table 4 and Figure 8)

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
NBI	3	7	2.3333	1.3333
CFT	5	6	1.2	0.2
BAY	1	3	3	0
HAM	4	10	2.5	3.6667
MTN	11	17	1.5454	0.6727
TMR	2	5	2.5	0.5
TMS	5	10	2	1.5
EH	4	6	1.5	1

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	8.2774	7	1.1824	1.0401	0.4270	2.37377
Within Groups	30.6939	27	1.1368			
Total	38.9714					

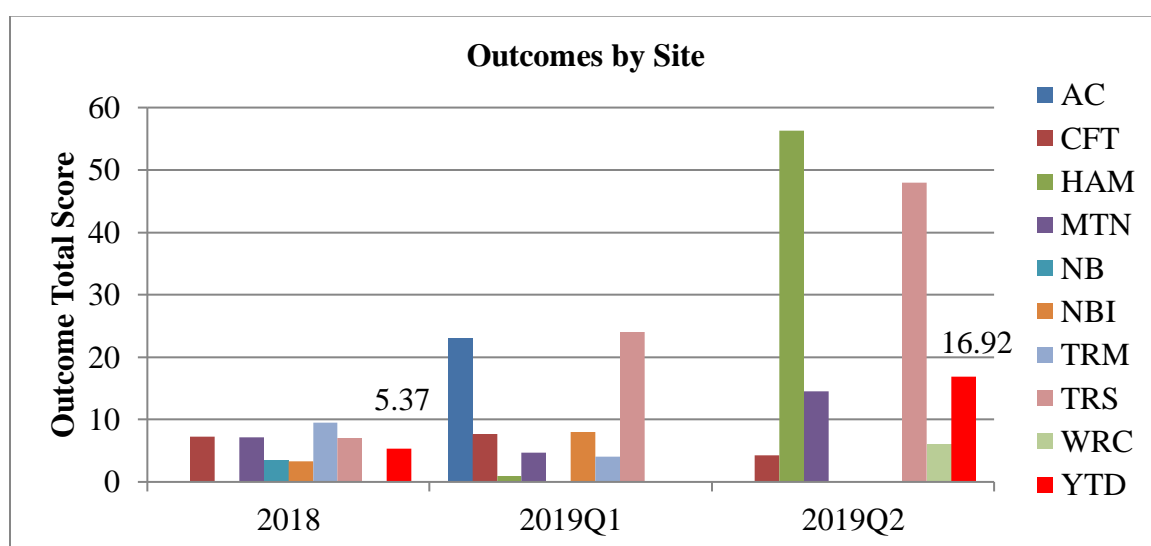


Figure 8.

Outcomes by Evaluation Type and Year

A Two Sample, two-tailed t-Test was conducted to determine differences in outcomes by evaluation type (FTE/NFTE). There were no statistical differences between evaluation type ($n=76$, $p=0.552$). However, a year to date analysis revealed a total point increase of 18.61 for FTE and 3.87 for NFTE between 2018 and combined quarterly data of 2019. This indicated that on average, children who were evaluated at a FTE site had higher outcomes scores than those who were evaluated at a NFTE site, between 2018 and 2019. (See Table 5 and Figure 9)

Table 5 t-Test: Two-Sample Assuming Unequal Variances		
	Variable 1	Variable 2
Mean	11.95	10.75
Variance	99.16	68.84333
Observations	5	4
Hypothesized Mean Difference	5	
df	7	
t Stat	-0.62435	
P(T<=t) one-tail	0.276096	
t Critical one-tail	1.894579	
P(T<=t) two-tail	0.552192	
t Critical two-tail	2.364624	

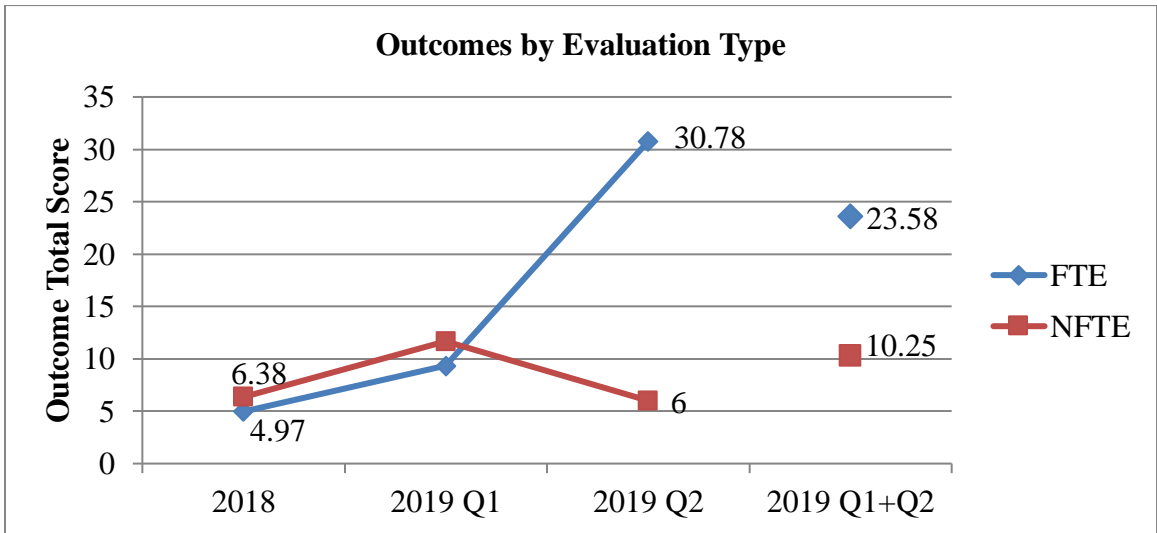


Figure 9.

Documentation Rates by Year

A year to date analysis revealed a 26% increase in completed documentation rates across all sites between 2018 and combined quarterly data of 2019. A linear regression trendline demonstrates a positive slope ($R^2=0.479$). (See Figure 10)

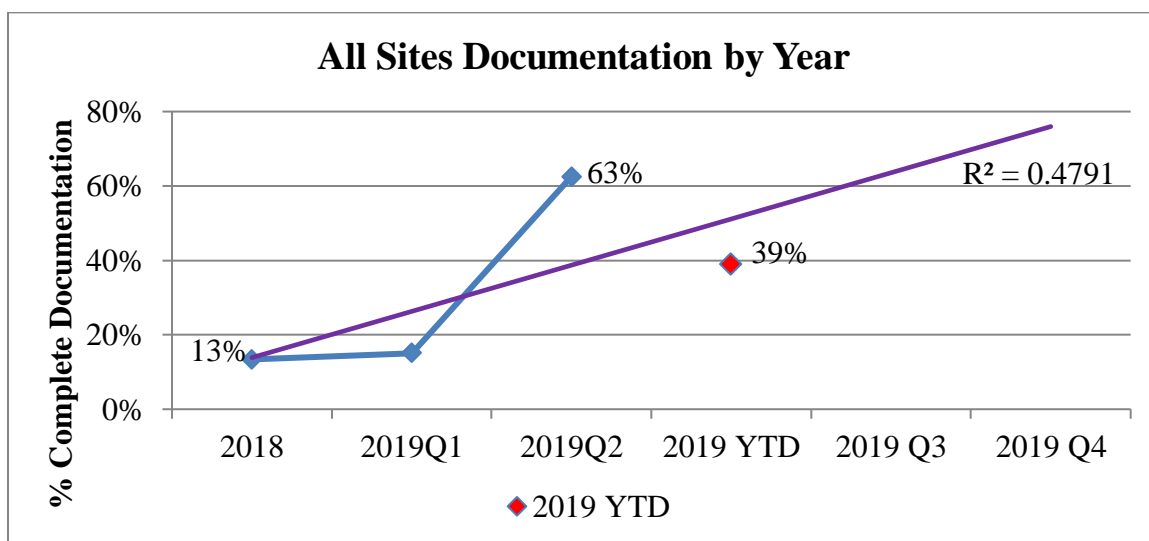


Figure 10.

Documentation Rates by Evaluation Type

A year to date analysis revealed a 21% increase for FTE and 32% increase for NFTE in completed documentation rates for evaluation type between 2018 and combined quarterly data of 2019. Linear regression trendlines (not pictures in graph due to space limitations) demonstrate a positive slope for both FTE ($R^2=0.476$) and NFTE ($R^2=0.513$). (See Figure 11)

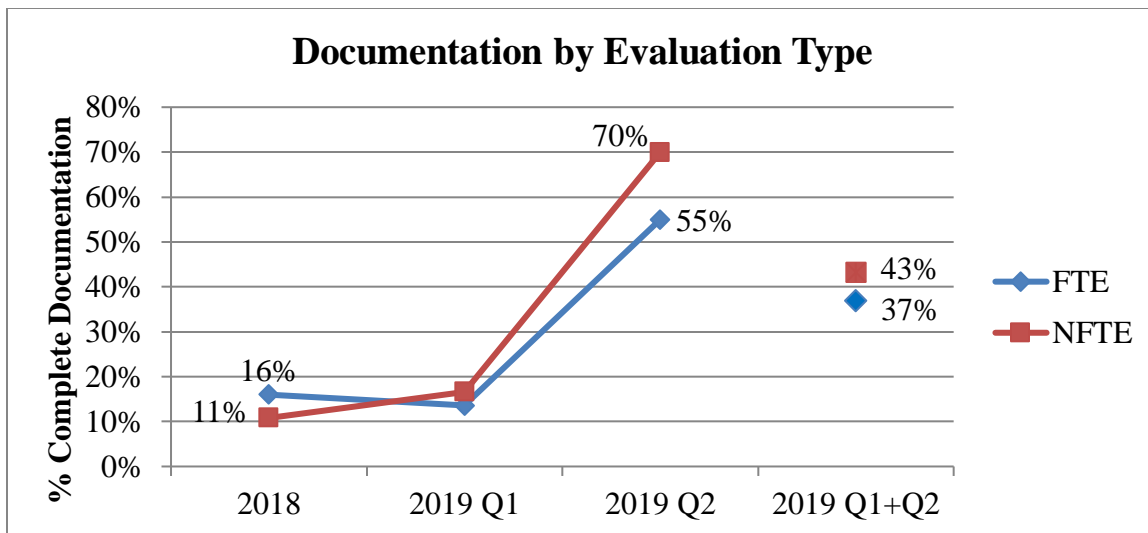


Figure 11.

Documentation Rates by Site

An analysis of documentation rates by site revealed a 50% increase in completed documentation rates across all sites from 2018 through 2019. Linear regression trendline indicates a positive slope for documentation rates across all sites ($R^2=1$). (See Figure 12)

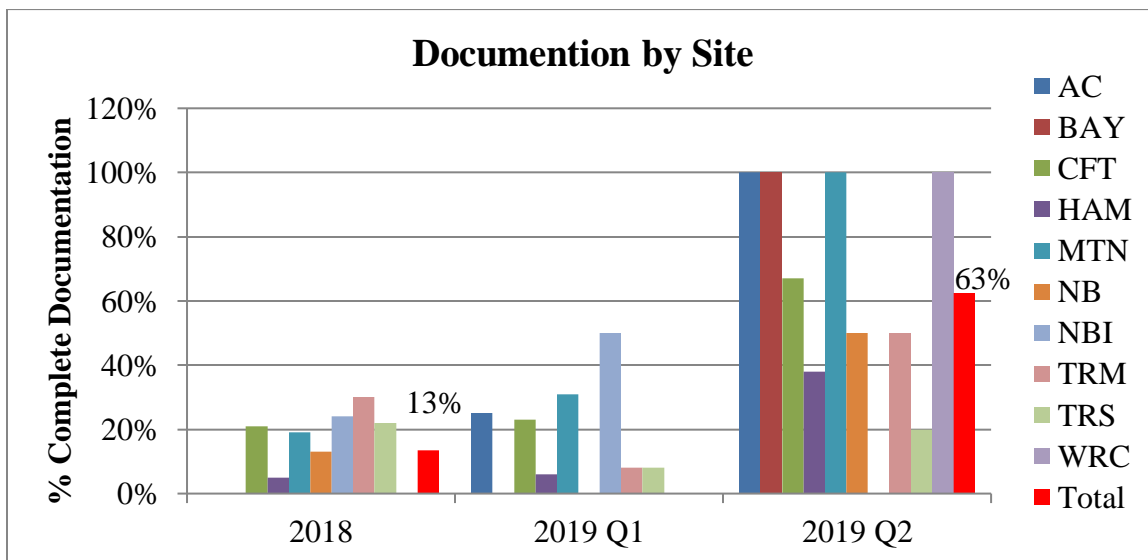


Figure 12.

Barriers to Implementation by Site

Barriers to implementation were coded into 5 categories: logistical, time, rapport, forgetting and lack of competency. Key words and phrases were associated with each nominal code, and points were based on qualitative data, specifically the number of times a code came up on both the questionnaire, focus groups and interview. Logistical represented challenges outside of the clinician's control, such as premature discharge, versions unavailable in other languages, goal not being addressed during episode of care, etc. Time referred to not having enough time to administer the assessment. Rapport was equated to clinicians not wanting to break the therapeutic relationship with caregivers by overwhelming them with more assessments, insisting on a discharge assessment if the parent refused to believe the child made progress, and clinicians not feeling confident enough in their rapport with caregivers to call to complete the assessment. Forgetting was simply a practitioner not remembering to evaluate the child, due to a number of reasons; no competency indicated a therapist was unsure of how or when to administer, how to score, how to tell if there was a true functional deficit due to lack of guidelines or having no education on the tool itself or treatment options. A visual pattern analysis revealed that the most common barriers to implementation by site are logistical, forgetting and lack of competency. (See Figure 13)

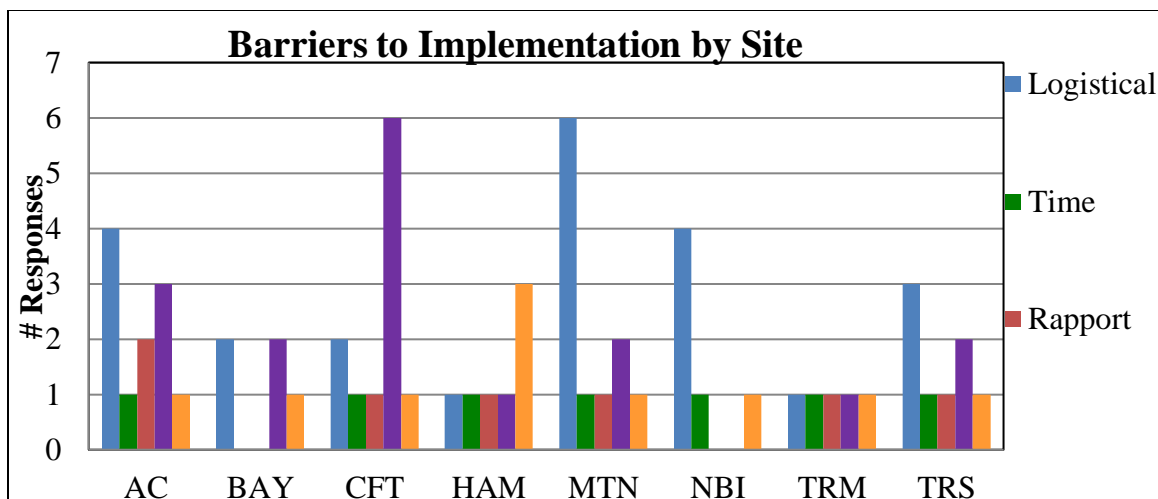


Figure 13.

Percentage of Documentation Rates by Site and Education

Table 6 provides a visual analysis comparing percentages of completed documentation and reported education methods. Participants were allowed multiple selections for an accurate reflection of multi-modal learning strategies that worked best for them, therefore, percentages of education reflect each participant providing more than one response. The top three most reported education methods were calculated and displayed in this table.

There was no apparent visual pattern of confidence of tool administration affecting rates of documentation. This may indicate that people may feel confident in how they administer, but not necessarily related to factors outside of their control, such as logistical challenges (i.e., premature discharge, time constraints, parent noncompliance) which is considered out of their control. (See Table 6, Figure 14 & Figure 15)

Site: Average % of Complete Documentation	Top three reported education methods by majority %
MTN: 50%	Discussion with Colleagues (82%), Staff Meetings (73%), Re-Education Presentation (73%)
AC: 42%	Discussion with Colleagues (75%), Staff Meetings (75%), Re-education Presentation, Initial Presentation (75%)
CFT: 37%	Staff Meetings (100%), Discussion with Colleagues (80%), Initial Presentation (60%)
BAY/WRC: 33%	Discussion with Colleagues (100%), Staff Meetings (100%), Re-education Presentation (100%)*
TRM: 29%	Discussion with Colleagues (100%), Staff Meeting (100%), Initial Presentation (100%), Department In-service (100%)
NBI: 25%	Staff Meeting (100%), Discussion with Colleagues (66%), 1:1 Meeting with Supervisor (66%)
NB: 21%	No reported data
TRS: 17%	Staff Meetings (100%), Initial Presentation (100%), Re-education Presentation (100%)
HAM: 16%	Discussion with Colleagues (75%), Staff Meetings (75%), Re-education Presentation (75%)

*Note only 1–2 participants responded from BAY/WRN and TRM sites, hence results of reported education should be interpreted with caution.

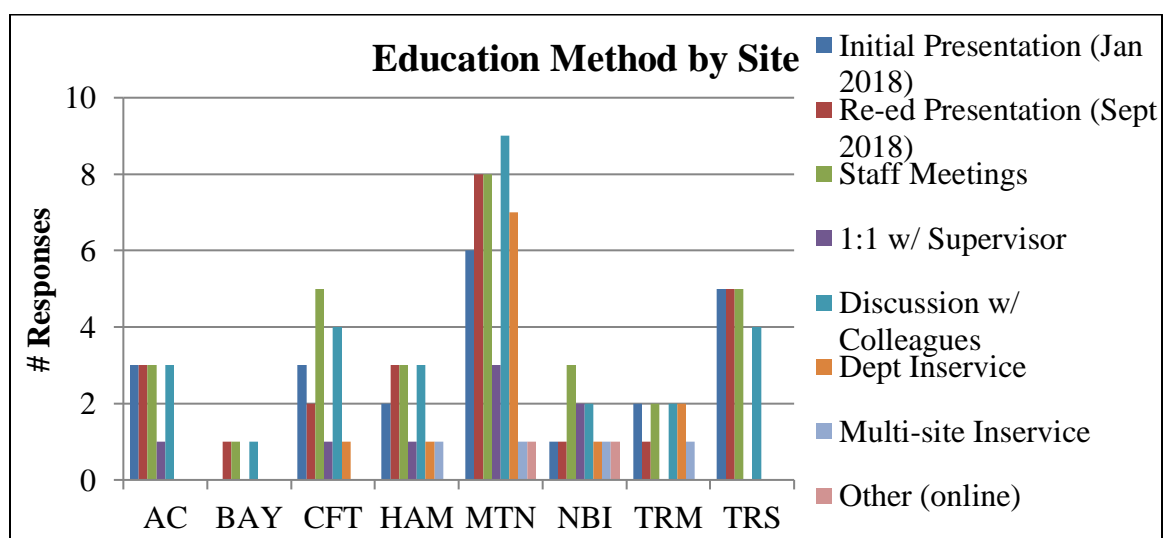


Figure 14.

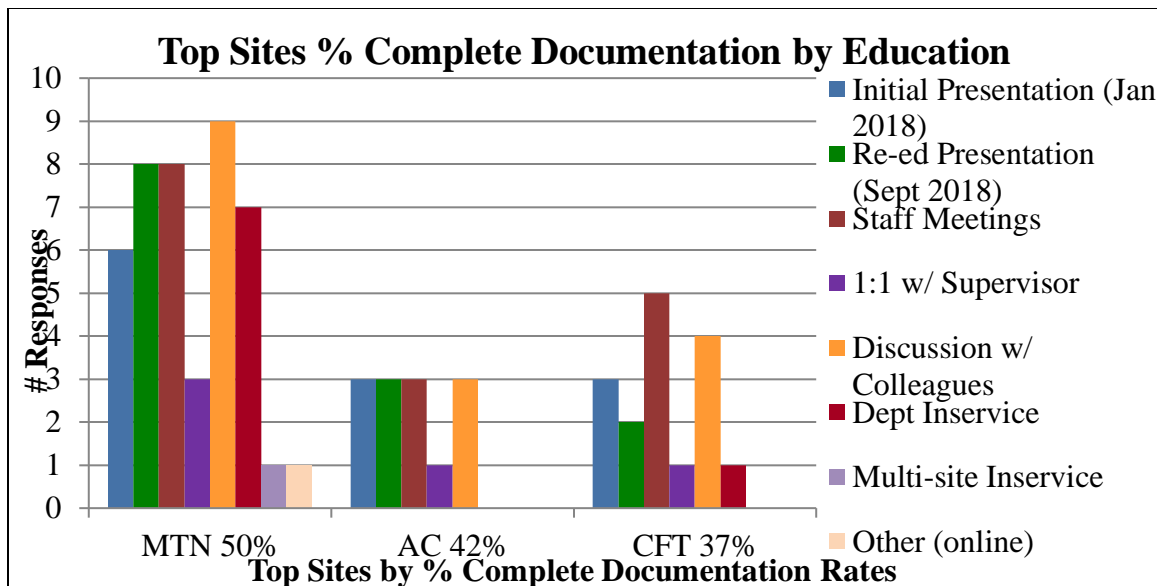


Figure 15.

Confidence Level by Site with Highest Rates of Documentation

A visual analysis revealed no clear pattern in average clinician’s confidence level and documentation rates. Confidence level was gathered via a focus group question asking therapists to rate their confidence in using the tool correctly and when necessary; scale rankings were 1=Not very confident, 2=Somewhat confident, 3=Generally confident and 4=Very confident. Levels were coded by number and averaged by site groupings. (See Figure 16)

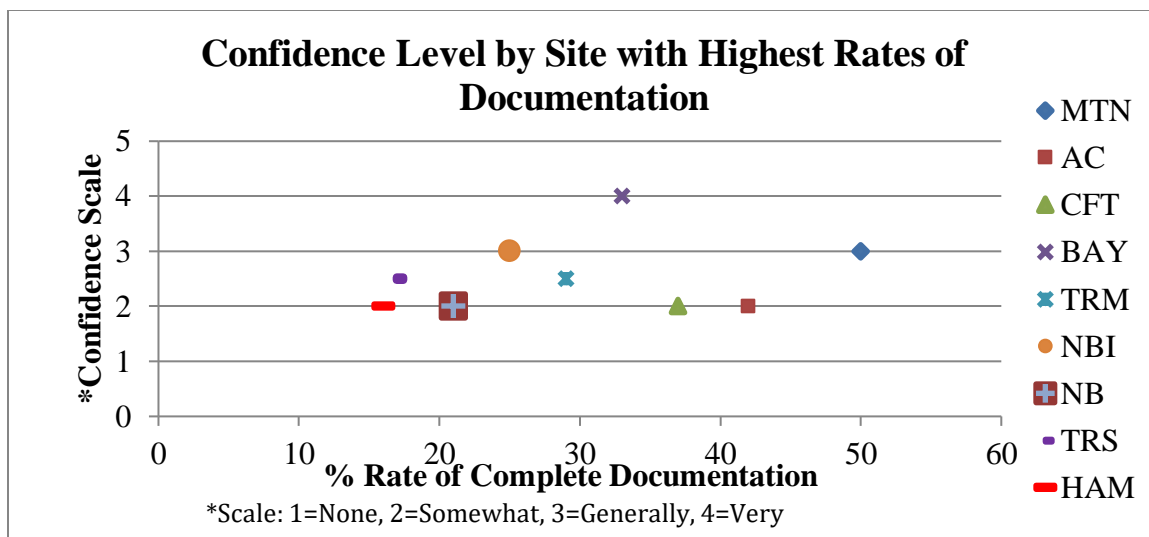


Figure 16.

Logic Model

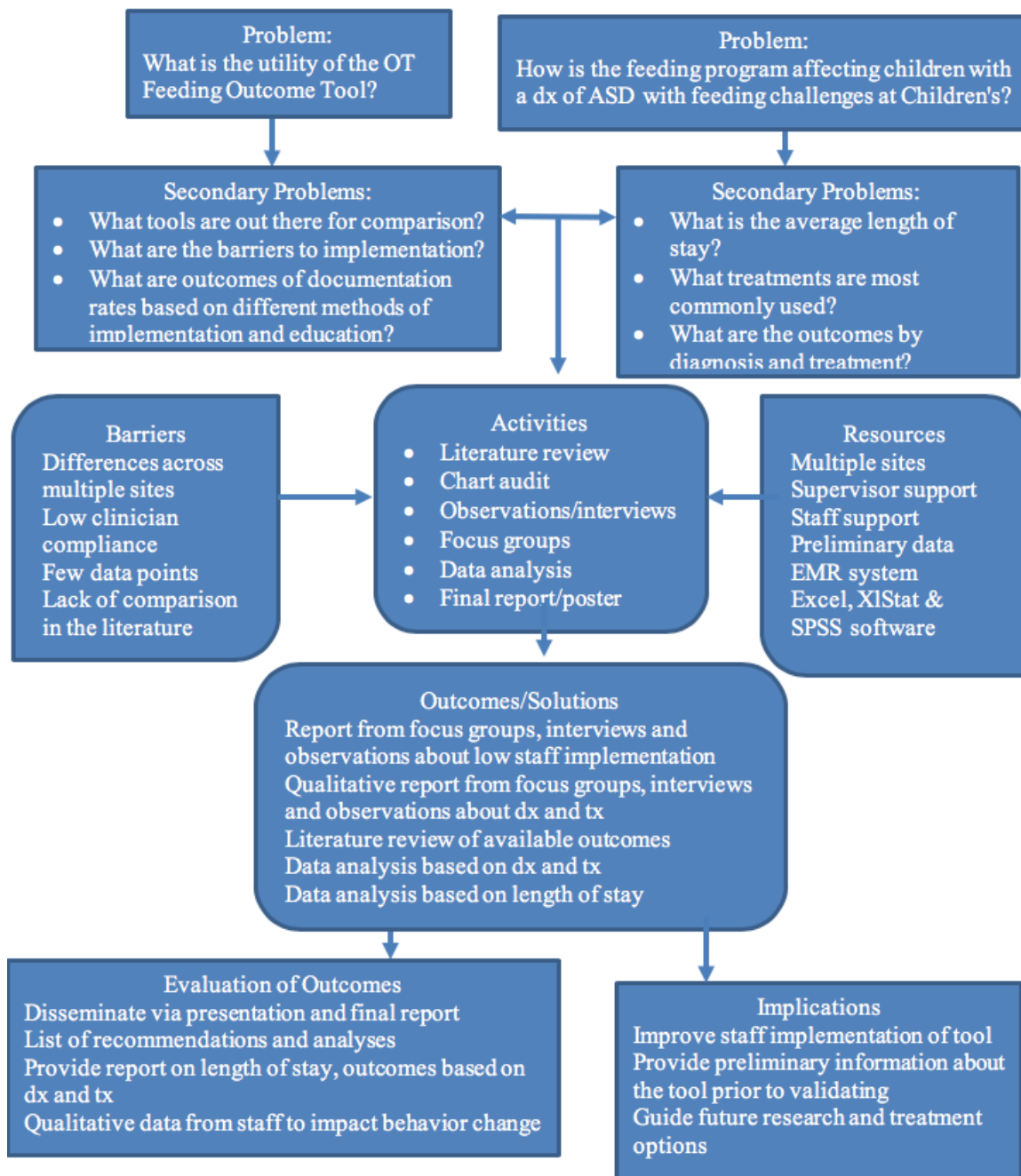


Figure 17.

CHAPTER FIVE

Introduction

This chapter discusses the dissemination plan for the translation of knowledge to other individuals, institutions, and the profession as a whole. It also identifies the key audiences who will receive information regarding this project.

Dissemination Plan

Information gathered during the course of this capstone was delivered via a final report, submitted to an academic mentor at Boston University and the site mentor from Children's Specialized Hospital. A formalized list of data analyses, including year to date information on outcomes and documentation rates from 2018 through the 2nd quarter of 2019, clinician demographic information correlated to perspectives on data collection and the OT Feeding Outcome Tool, literature review on current feeding assessments and recommendations for improving implementation rates of this assessment will be provided to the site mentor, Joanne Hunt. These documents will provide preliminary information about the utility of the OT Feeding Outcome Tool, how children who have been through feeding therapy at Children's Specialized Hospital are performing on this assessment, and projected outcomes and documentation rates; in addition, the literature review on other feeding evaluations and treatments will offer the groundwork for research on the validation process of the OT Feeding Outcome Tool. Since this type of assessment is lacking in the current literature, material to further progress its widespread use would be beneficial for the diagnosis, evaluation, treatment and prevention of feeding challenges in pediatric populations.

An academic poster presentation detailing the Capstone project and outcomes has been delivered in-person at Boston University on August 23rd, 2019, with academic mentors, professors and cohort present, as well as members of the public and a clinical supervisor viewing the presentation remotely. An additional presentation will be conducted at Children's Specialized Hospital, at the Mountainside location, during the Feeding Team Workgroup monthly meeting on September 10th, 2019. Clinical supervisors, site managers and all staff who are available at this time will be in attendance for this presentation and to receive the formalized report of recommendations. This poster will provide a general overview of the Capstone project, activities, theoretical framework, methods of evaluation and delivery, dissemination plan, data analyses and conclusions in an interactive format.

A final report will be submitted to the Boston University Library and the American Journal of Occupational Therapy to further disseminate this work for other health care providers, students and researchers who will benefit from this knowledge. The academic poster will be submitted and presented at the New Jersey Occupational Therapy Association annual conference in 2020 and at the annual American Occupational Therapy Association national conference in 2021. These contributions will add to small literature base on feeding challenges in pediatrics and further expand the research in this area.

Audiences

The primary audiences of this Capstone presentation include site and academic mentors, clinical supervisors, administration and staff at the Children's Specialized Hospital network, and professors and cohort in the Occupational Therapy Department of

Sargent College at Boston University. Secondary audiences include caregivers of children with feeding challenges, since this assessment tool will ultimately direct evaluation and treatment of this clientele. Clinicians who work with pediatric populations with feeding difficulties or are interested in the field, are also secondary audiences. Researchers, program administrators and other professionals who are seeking information on the evaluation and treatment of children with feeding difficulties will benefit from the literature review on current assessments and data analyses regarding outcomes using this tool. In addition, supervisors, administrators and other program managers who are seeking ways to increase clinician compliance or uniformity to an evaluation tool will find the conceptual methods of delivery and data analyses useful to apply to their own scenarios.

CHAPTER SIX

Introduction

This chapter concludes the final report and details the overall goals, results and future initiatives of this Capstone project.

Conclusion

This Capstone provided material on the current state of the pediatric feeding literature and preliminary data on the utility of the OT Feeding Outcome Tool, data analyses on outcomes of children who receive feeding therapy, such as average length of stay, most common intervention type and general point scores. This project presented statistical data on correlations between site, evaluation type, year, education and outcomes and documentation rates, as well as year to date information across hospital sites and outcomes by diagnosis and intervention type. It provided authentic clinician feedback on barriers to implementation, solutions, education, competency, value in data collection and perspective on this assessment, and correlations based on specific demographics, such as age, years in practice and position title. This project revealed barriers and potential resolutions to a problem of clinician noncompliance and data on clients that was previously unknown to staff and administration at Children's Specialized Hospital. This initial dataset can therefore establish a baseline of information to seek at each quarterly or yearly update, for an efficient review of multi-site operations.

Future Initiatives

Future initiatives relating to this project include a wide variety of activities to further improve upon the original concerns that were addressed during this Capstone.

One project would include the design and execution of a re-education program based on the recommendations in the formal report provided to administration at Children's Specialized Hospital, in order to effectively improve clinician implementation rates, uniform administration and competency in evaluation and treatment of children with feeding challenges. One possible project would be to integrate a colleague discussion or teaching meeting or protocol, in order to effectively educate staff on the tool based on the type of education that was reported to be most successful. Once the tool is being used at a higher frequency, the increase in data points would allow for the start of analysis of validity and reliability. Using the literature review provided in this final report, options for an assessment to compare to have already been identified and this document can either be directly added or reworked into future research articles.

Year to date and prediction analyses can provide administration with evidence for continued support of Feeding Team Workgroups, data analyses and time spent for the creation of re-education tools and reformatting the OT Feeding Outcome Tool. Therefore, another possible task could be to assist in the reformatting of the OT Feeding Outcome Tool based on clinician feedback, such as translating into other languages, adjust directions and arrangement, add additional foods and restructure scoring procedures. Conducting a caregiver focus group to seek supplementary data on ways to make the assessment more caregiver-friendly may also be an excellent opportunity to increase feasibility, decrease administration time and lessen caregiver and clinician burden.

Lastly, continued data analyses using a comparable assessment tool and on overall outcomes will be a significant, necessary project for the continued progress required to

validate the OT Feeding Outcome Tool. Due to the severe lack of pediatric feeding assessments in the current literature, a combination of this Capstone project and future initiatives will create the baseline of occupational therapy-specific, sensory integration included research on an evaluation tool of feeding difficulties in pediatric populations. This evidence can further not only the profession, but all health care providers working with this population, caregivers, and the children themselves to create a more efficient, systematic and accurate approach to the diagnosis, evaluation, treatment and prevention of feeding difficulties in pediatric populations.

APPENDIX

Executive Summary

The goals of this Capstone project were three-fold: 1) to determine what evaluation tools for assessing feeding skills were present in the literature, 2) what were the current outcomes of children receiving feeding treatment at Children's Specialized Hospital, and 3) why clinicians were failing to utilize the internal feeding assessment. In addition, it provided information regarding correlations between demographic data of clinicians and general research perspectives, information regarding education of the assessment tool by site, and recommendations to improve clinician tool use.

Data was collected via focus groups at each site, an online questionnaire, interviews, active participation in clinical treatment and evaluation and observation of Feeding Team Evaluations at the corresponding sites. The results indicated that the average length of stay was 20.36 visits which varied by site, from 10.50 visits to 26.08 visits. However, there was no difference between evaluation types (Feeding Team Evaluation sites versus Non-Feeding Team Evaluation sites) among sites. Average total outcome score on the OT Feeding Outcome Tool for children who have received feeding therapy at Children's Specialized Hospital was 10.65 points; the average total outcome score for children with an ASD diagnosis was 9.5 points; these results indicated positive responses to treatment. There was no statistically significant difference of outcomes by diagnosis and treatment. The most commonly used intervention approach, regardless of diagnosis was Sensory Integration.

In terms of client outcome scores, there were no statistically significant

differences in outcomes by site or evaluation type. However, year to date analyses revealed an 11.55 point score increase across all sites, which indicated positive increases. Year to date analyses revealed a 26% increase in documentation rates (correct use of the OT Feeding Outcome Tool) across all sites and an overall 50% increase in documentation rates between 2018 and 2019 Q2. The sites with the highest rates of documentation were Mountainside (50%), Egg Harbor (42%) and Clifton (37%). The most common barriers to implementation across sites were logistical challenges, clinicians forgetting to administer and lack of perceived competency. The most commonly reported means of education regarding the OT Feeding Outcome Tool in relation to the sites with the highest documentation rates, were discussions with colleagues, staff meetings and the re-education presentation. There was no apparent pattern of confidence level of tool administration affecting the rates of documentation. There was no statistical significant between a clinician's age and years in practice and value in data collection. Recommendations based on quantitative and qualitative data were provided to administration for improving clinician value in data collection, confidence level in administering the tool, and competency in accurate documentation.

The overall conclusion of this Capstone is that there is a significant need for a validated, occupational therapy and sensory integration incorporated, feeding assessment tool to assess a wide range of populations, diagnoses and settings and to encapsulate multiple etiologies and treatment approaches. Therefore, improving clinician competency and perspectives on the OT Feeding Outcome Tool will improve implementation and will allow for increased data collection. This will therefore progress the validation process

and provide an essential tool for the diagnosis, evaluation, prevention and treatment of pediatric feeding challenges.

Focus Group Template

Introduction: Communication to stakeholders

Read prior to the start of the focus group:

What this is: This Capstone project is on the treatment and evaluation of children with feeding challenges, specifically gathering preliminary information on the utility of the internal measure that is being used here, the OT Feeding Outcome Tool. I'm traveling to each of the Children's Specialized sites to conduct focus groups with OT practitioners who are involved in the evaluation and treatment of children with feeding challenges. The goal of this group is to gather information on the day to day logistics, specifically the current use of, barriers to implementation and potential solutions for increased uniform application of this measure. This will ultimately create a framework for describing the relationship between stakeholders, application and outcomes across various sites. With this information we can ensure that we are gathering more data and that the data we do have is accurate for:

1. Assessing the effectiveness of our OT services in treating children with feeding problems
2. Identifying areas in which we excel and weaker areas of intervention in order to improve outcomes with this population
3. Use in future studies for the validation of this tool

The stakeholders for this project include not only yourselves, your clients, their families, and administration, but the pediatric population and OT profession as a whole, as this will contribute to the literature base to provide a much needed evidenced-based evaluation tool. We are also hoping to understand how we can improve our communication between practitioners, sites and administration.

Focus group questions

Survey:

Is there anything from the survey you had questions on?

Administration:

Describe how you have been administering the tool.

- With caregivers?
- All children with a feeding goal?
- At evaluation/first treatment and discharge?

How often are you realistically administering the tool? This is in regards to when the tool is actually warranted, not in comparison to entire population. Can provide a percentage.

If not, why? (i.e. INTENT: forgetting, not convenient (physical location, time, etc.), language barrier, unsure of how to administer, too confusing for caregiver, not providing relevant information for treatment)

- Thoughts on solutions to these challenges – your own, your colleagues, or from examples you have heard or think of.

Do you collect all outcomes? Or just some? Which and why?

- Within each section (food list/self-feeding and mealtime activities), are you collecting all data?

How long does it take to administer?

- Is the time constraint a challenge? If so, how do you get around it?

Do you feel in general, clinicians are administering the tool in a uniform way? The way it was taught?

- What could improve uniformity? (Document, email, taught by supervisor, taught by colleagues, more instructions on measure, etc.)
- Anything you have found to be helpful in administering, maybe different from the way you were originally taught/trained?

Most challenging administration aspect?

Easiest administration aspect?

Do you believe this tool is accurately measuring outcomes?

- If not why?

Education:

How and by who were you taught to administer? (Initial PP, re-education PP, staff meetings, 1-on-1 meetings, colleagues) What was most useful to you?

Anything you are unsure of how to administer?

What method would work best for you to learn more and ask questions?

How confident are you in administering this tool in the way it was taught and as often as it needs to be administered? Why? What could improve confidence? 1-4 rating scale:
1=Not very confident 2=Somewhat confident 3=Generally confident 4=Very confident

What are your thoughts on data collection and outcome measures?

- Do you value it in practice? Why?
- Do you value it in research? Why?
- How much do you know about the OT Feeding Outcome Tool in regards to the development and validation process?

Treatment:

What type(s) of intervention for addressing feeding challenges do you most commonly use?

- What theoretical approach do you most commonly use when planning treatment?

What type(s) of intervention do you most commonly use for children with an ASD dx and feeding challenges?

Specific to the Tool Format:

Preface with reformatting will be taking place (larger font, more space for comments, etc.) but suggestions are always great.

Are there additional foods that have come up that aren't on the tool?

Frequent questions from caregivers, colleagues or yourselves?

Are any of the items confusing to you or commonly with caregivers?

Any redundant or unnecessary items?

Online Questionnaire Template

1. Please select your primary worksite:

- Mountainside
- Warren
- Newark
- Bayonne
- Clifton
- Egg Harbor
- Toms River (Lakehurst)
- Toms River (Stevens Road)
- Hamilton
- New Brunswick (Plum Street)

2. What is your age?

- <29
- 30-39
- 40-49
- >50

3. How many years of experience do you have working at Children's Specialized Hospital?

- 0-4
- 5-9

- 10-14
 - 15-19
 - 20+
4. How many years of experience do you have in practice?
- 0-4
 - 5-9
 - 10-14
 - 15-19
 - 20+
5. Do you work:
- Full time
 - Part time
 - Per Diem
6. What is your current position?
- Staff
 - Senior
 - Supervisor
 - Manager/site lead
7. Do you administer the OT Feeding Outcome Tool during evaluation or at first treat (if not done at eval) if there is a feeding goal (advancing texture, food repertoire, self-feeding or sitting for meals)? Please respond Yes, Sometimes or No. If Sometimes or No, indicate why not.
- Yes
 - No
 - Sometimes
8. If you responded Sometimes or No to Q7, please indicate why not.
9. Do you administer the OT Feeding Outcome Tool at discharge? Please respond Yes, Sometimes or No. If Sometimes or No, indicate why not.
- Yes
 - No
 - Sometimes

10. If you responded Sometimes or No to Q9, please indicate why not.
11. What would be helpful to improve your use of the OT Feeding Outcome Tool? (i.e., available printouts, continued education, continued reminders, further information regarding its importance, etc.)
12. Do you believe the OT Feeding Outcome Tool is accurately measuring outcomes?
- Not at all
 - Somewhat
 - Most likely
 - Definitely
13. How were you educated on use and administration of the OT Feeding Outcome Tool?
Please select all that apply.
- Initial presentation (January 2018)
 - Re-education presentation (September 2018)
 - Staff meetings
 - 1-on-1 meetings with supervisor
 - Discussion with colleagues
 - Department inservice
 - Multi-site inservice
 - Other (please specify)
14. What education tool was most useful to you?
- Initial presentation (January 2018)
 - Re-education presentation (September 2018)
 - Staff meetings
 - 1-on-1 meetings with supervisor
 - Discussion with colleagues
 - Department inservice
 - Multi-site inservice
 - Other (please specify)
15. Who provided the education? Please select all that apply.
- Supervisor
 - Senior
 - Site manager/lead
 - Colleague

- Other (please specify)

16. How do you best receive information about updates, policies and other work-related items?

- Staff meetings
- 1-on-1 meetings with supervisor
- Department inservices
- Multi-site inservices
- Email copy of documents/presentations
- Hard copy of documents/presentations
- Webinars
- Discussion with colleagues
- Other (please specify)

17. How much do you value data collection/outcome measures in practice?

- Do not value
- Somewhat value
- Moderately value
- Highly value

18. For children with a diagnosis of ASD (Autism Spectrum Disorder) and feeding challenges, what intervention types or theoretical approaches do you use? Please select all that apply.

- Sensory Integration
- Behaviorism
- Parent-training
- Oral Motor
- Other (please specify)

19. For children with a diagnosis of ASD (Autism Spectrum Disorder) and feeding challenges, what intervention type or theoretical approach do you PRIMARILY use?

- Sensory Integration
- Behaviorism
- Parent-training
- Oral Motor
- Other (please specify)

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CURRICULUM VITAE

