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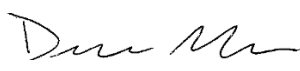
Exploring the Use of Occupational Therapy Telehealth Services in Early Intervention
During COVID-19

By

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This thesis is submitted in partial fulfillment of the requirements for Honors in the
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**Exploring the Use of Occupational Therapy Telehealth Services in Early Intervention
During COVID-19**

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Abstract

During the COVID-19 pandemic, the use of telehealth has increased significantly, including for occupational therapy (OT) services provided in the early intervention (EI) setting. While preliminary research evaluates the effectiveness and benefits of telehealth services in early intervention occupational therapy (EI OT), few studies compare telehealth to traditional in-person services. The purpose of this research study is to understand experiences with telehealth for EI OT services during COVID-19 as compared to experiences with previous in-person services from the perspective of OTs and parents. Using a qualitative case study design, interviews were conducted with one EI OT practitioner and two of their patient families. Major results identified using thematic content analysis include positive aspects of telehealth, such as increased access to the service provider, flexibility, and limited exposure to illness in general, as well as challenges to the use of telehealth, including significant safety concerns and problems associated with the lack of physical interaction and in-person services, resulting in perceived ineffectiveness of telehealth for specific EI OT services, dependent on the type of service. These findings add to existing research by identifying aspects of telehealth services that need to be considered by EI OTs when evaluating whether telehealth is an appropriate form of service delivery, as well as identifying aspects that may need to be adapted in order to increase feasibility and safety of telehealth services.

Exploring the Use of Occupational Therapy Telehealth Services in Early Intervention During COVID-19

Introduction

Early intervention (EI) services are crucial because early childhood is a formative period of development. Interventions that promote development during this time can have significant impacts on future functioning (Case-Smith & O'Brien, 2014). However, there is a discrepancy between the number of children who need EI services and the number who are receiving services (Rosenberg et al., 2013). Many children are not receiving services due to limited access and staff shortages, especially in rural areas (Cason et al., 2012). Telehealth, however, has the potential to address these issues and has been identified as a model to increase access to EI services (Cason et al., 2012).

Telehealth is an emerging model of service delivery in the healthcare system and is increasingly used across healthcare professions, including occupational therapy (OT) (Cason, 2014). Telehealth involves the provision of services through information and communication technology (ICT) from a location that is physically distant from the patient. In OT, telehealth can be used to provide a variety of services, including evaluation, intervention, consultation, and monitoring (Cason et al., 2018). It can also be implemented in many different populations, including children and their families who are receiving EI services (Cason, 2011).

While the use of telehealth has been increasing over the past decades, it is not widely used in early intervention occupational therapy (EI OT) at this point (Cason et al., 2012). However, during the COVID-19 pandemic, as in-person interactions became limited, many service providers and patients who had not used telehealth in the past or had limited experience with telehealth were thrust into using this service delivery model (Neece et al., 2020). Due to the

service delivery changes imposed by COVID-19, it is important to understand best practices in telehealth, as well as perceived benefits and barriers to its use, since telehealth will likely continue to be used as the pandemic continues, and possibly even after restrictions have been lifted (Jeste et al., 2020). This knowledge about perceptions of telehealth and its effectiveness in promoting child development can be used to inform future telehealth service delivery, including elements of best practice to implement as well as existing barriers to address. Additionally, the imposed change to the use of telehealth during COVID-19 provides a unique opportunity to better understand the use of telehealth in EI OT, since this allows researchers to compare individual's experiences with in-person therapy before COVID-19 to their experience with telehealth when changes in service delivery were implemented. Thus, current research is needed to understand the use of telehealth in this context, including an understanding of perceptions of telehealth, an evaluation of the effectiveness of services, and an understanding of the overall experience patients and practitioners have had while using telehealth. This information could be used to inform best practices for future use of telehealth as it continues to be applied in EI OT services.

Literature Review

The literature review for this study focused on telehealth as a service delivery model, the importance of EI services, and the current use of telehealth for OT services. It further focused on existing literature supporting the use of telehealth as a service delivery model. However, since limited research exists about the effectiveness of telehealth for EI OT services, research studies were examined that support the use of telehealth for EI services across a variety of professions, as well as for pediatric OT services. While there is limited previous research about effectiveness of telehealth for EI OT, there are numerous studies about the perceived benefits and barriers to

the use of telehealth, which are presented. Lastly, studies about the use of telehealth during the COVID-19 pandemic are examined, as this time period has initiated substantial changes in the use of telehealth as a service delivery model.

Telehealth as a Service Delivery Model

Telehealth is an increasingly popular service delivery model that is used across a variety of professions and areas of practice throughout the world. The American Telemedicine Association defines telehealth as the “use of electronic or digital information and communications technologies to support clinical healthcare, patient and professional health related education, and public health and health administration” (Richmond et. al, 2017, p. 63). This definition reflects the broad and overarching nature of telehealth, which encompasses a range of services, from sending messages to a provider through a virtual platform to receiving an entire therapy session through two-way videoconferencing. Under the overarching scope of telehealth, there are a variety of other terms that have been used to describe virtual provision of services. There is debate over terminology, with some of these terms used more commonly in certain professions or even in different countries. For instance, telepractice is endorsed by the American Speech-Language-Hearing Association and telecare is used predominantly in the UK. Telerehabilitation is another commonly used term among many rehabilitation disciplines (Richmond et. al, 2017). The American Occupational Therapy Association (AOTA) endorses and uses the term telehealth, as it best represents the scope of OT services and is also the most commonly used term in U.S. state and federal policies (Cason et al., 2018). While there are many different terms used, they all reflect the idea that services are provided at a distance, with the provider and consumer at separate locations, which is a service delivery model that has significantly expanded in use over the past decades (Richmond et. al, 2017).

History of Telehealth

While telehealth has gained in popularity recently, it is not a new practice delivery model. Building on the long-standing use of long-distance communication, telecommunication began to be applied in the medical field after the development of electrical systems in the 1700s and 1800s, which allowed for its exponential expansion (Field, 1996). For instance, the first public telegraph in the U.S. was used in 1844 during the Civil War to communicate about medical supplies and casualties. In 1876, when the telephone was patented, this invention provided even more advanced options to communicate health-related information, including sending still and video images through telephone circuits. All these technological advances created the foundation for telemedicine and telehealth to form (Field, 1996; Nesbitt, 2012).

Early telehealth services were mainly provided in the form of telemedicine offered by doctors, beginning as early as the 1890s and continuing throughout the 20th century. This new form of service delivery arose out of the concern about limited access to physician services in rural areas, although urban areas also benefited from telemedicine during these times. Telemedicine was used for a variety of purposes and continued to expand as technology advanced (Field, 1996). For instance, doctors provided telephone home visits starting in 1897 to reduce unnecessary office visits, and in the 1920s, radios were used to give medical advice to clinics on ships (Nesbitt, 2012). As technology advanced, telephone circuits were also used to transmit radiological images in the 1950s. In 1964, telemedicine was used for group therapy consultations, including to provide speech therapy, diagnosis of difficult psychiatric cases, and a variety of other uses (Field, 1996).

Throughout this period during the 1960s through 1970s, telemedicine expanded in use, and several federal agencies provided grants to support various telemedicine applications,

demonstrations, and pilot projects. However, towards the end of the 1970s, there was a decreasing interest and investment in telemedicine due to high transmission costs, technological difficulties, lack of provider interest, and limited insurance coverage. This caused a decrease in telemedicine use and projects, until a resurgence of interest occurred towards the end of the 1980s due to further improvements in technology (Field, 1996). Since this time, there has been a rapid expansion of telemedicine, with increasing research showing improvements to access and quality of care, as well as decreases in cost as technology has become more advanced and widespread (Field, 1996; Nesbitt, 2012).

Today, due to the advancement and progression of telehealth services over the past decades, an increasing number of professions and areas of practice are beginning to adopt this service delivery model. For instance, telehealth services are used by a variety of healthcare professionals, including physicians, nurses, psychologists, physical therapists, speech-language pathologists, and OTs. Additionally, these professionals are implementing telehealth services in many settings, including hospitals, clinics, schools, community-based settings, and homes (Richmond et. al, 2017). These changes reflect the increasing use and popularity of telehealth, which has been identified as a beneficial and effective service delivery model by many healthcare professions (Richmond et. al, 2017).

Telehealth in Occupational Therapy

Along with other professions, OT has adopted the use of telehealth as a service delivery model. The World Federation of Occupational Therapists (WFOT) and AOTA have both released position statements about the use of telehealth as a service delivery model for OT, in which they outline the ways in which telehealth can be used in OT, as well as potential benefits and considerations regarding the use of telehealth (Cason et al., 2018; World Federation of

Occupational Therapists [WFOT], 2014). In the AOTA position paper, telehealth is defined as “the application of evaluative, consultative, preventative, and therapeutic services delivered through information and communication technology (ICT)” (Cason et al., 2018, p. 1). The authors outline the uses of telehealth in OT services, stating that these services can be provided synchronously, meaning they are delivered in real time through interactive forms of technology, as well as asynchronously, through the use of store-and-forward technologies, which involve the patient accessing recorded data outside of session times (Cason et al., 2018).

The authors further outline the application of telehealth in each portion of the OT process, using tele-evaluation, teleintervention, teleconsultation, and telemonitoring. Telehealth can be used to perform evaluations of a patient through assessments, observations, and interviews. As with in-person evaluations, clinical reasoning must be used to determine the best type of assessments to administer and the appropriate type of ICT to use. Additionally, while there is evidence showing that some assessment tools are reliable when administered remotely, OTs must take into consideration whether a specific assessment is reliable in the remote format when determining which to use (Cason et al., 2018). Telehealth can also be used to provide virtual intervention and consultation services, and evidence indicates effectiveness and a variety of benefits to providing these services using telehealth. OTs can also use telehealth for telemonitoring, or remote patient monitoring (RPM), which is commonly used in the medical model but can also be applied in OT to monitor if a client is adhering to their intervention program (Cason et al., 2018).

While AOTA highlights the multitude of ways in which telehealth can be used in OT services, the authors also mention clinical and ethical components, as well as legal and regulatory aspects that must be considered when providing telehealth services. In terms of ethics,

practitioners must consider if telehealth is the most appropriate way to deliver services for each individual client, as well as consider whether telehealth is a safe and effective method.

Additionally, OTs must stay up to date with state licensure laws, as each state has different regulations regarding the use of telehealth within OT (Cason et al., 2018). Overall, as indicated in the AOTA and WFOT position statements, telehealth can be an appropriate service delivery model for OT, with increasing research indicating potential benefits and effectiveness in a variety of settings and populations (Cason et al., 2018; WFOT, 2014).

Early Intervention Services

EI is the provision of services for infants and toddlers, ages birth through 2 years old, who have a developmental delay, an established risk, or are considered at risk. The intent of EI services is to promote the child's development, minimize the potential for delays in development, and help their family meet the child's needs (Case-Smith & O'Brien, 2014). These services are provided under the Individuals with Disabilities Education Act (IDEA) Part C, which is a program that was established by Congress in 1986 due to the urgent and substantial need for services for these infants and toddlers. The goal of the program is to help promote development for these children, decrease the likelihood of institutionalization, and provide the family with support to help the child, as well as reduce educational costs by lowering the need for future special education (U. S. Department of Education, 2020).

IDEA Part C covers 16 primary services for qualifying children, including OT services, which must be provided in a natural environment and be family-centered (Case-Smith & O'Brien, 2014). Services that a family receives are mapped out using an Individualized Family Service Plan (IFSP). This document provides information about the child and family, including the child's levels of performance and the family's priorities and concerns. It also outlines the

services the family is receiving and allows everyone involved in the team to be informed about the plan and progression of services (Case-Smith & O'Brien, 2014).

Importance of Early Intervention Services

The provision of EI services can have significant positive effects on children's development and future functioning. Early childhood is an essential time for intervention services because significant brain development occurs during the first three years of life, and the brain has the greatest neuroplasticity during this time period (Case-Smith & O'Brien, 2014). Thus, promotion of development through EI services can have a substantial impact on future learning potential and functioning for these children (Case-Smith & O'Brien, 2014). In fact, EI services have been shown to be very effective in attaining these goals, as evidenced by data collected from EI services provided through IDEA Part C (Early Childhood Technical Assistance Center [ECTA], 2020). Through IDEA, states are required to report data annually to the Office of Special Education Programs (OSEP) in the U.S. Department of Education. This data includes three categories of child outcome measures: development of social relationships, use of knowledge and skills, and taking action to meet needs (ECTA, 2020). Each year, the ECTA Center (funded through a cooperative agreement with OSEP) analyzes this data and creates a national summary report of these child outcomes. For example, the most recent data from 2018 indicates that children receiving EI services show greater than expected gains in the three major categories of outcome measures. Additionally, a large percentage of these children leave the EI program with age-expected levels in these skills (ECTA, 2020). Through analysis of data from 2014 through 2018, ECTA found that there is stability in the outcomes of this program, as there is minimal change in numbers between years. Overall, this data indicates that EI services are

consistently effective in reaching the goal of promoting development and minimizing delays in the infants and toddlers receiving services through IDEA Part C (ECTA, 2020).

Early Intervention and Occupational Therapy

Since OT services play an important role towards the goal of meeting functional needs of children, it is considered a primary service under IDEA Part C. OT services in EI address a variety of areas in childhood development, including adaptive development and adaptive behavior and play, as well as sensory, motor, and postural development. They also address primary occupations for the child, including activities of daily living (ADLs), rest and sleep, play, and social participation, with outcome goals such as improved developmental performance and increased participation in these occupations (Case-Smith & O'Brien, 2014).

AOTA has outlined the roles an OT can take in providing EI services and as part of the EI team (Clark et al., 2017). These include a role as evaluator, which involves working with the family to determine concerns and priorities for the child, as well as service provider, which involves implementing intervention. OTs can also play a role as service coordinator and collaborative team member, which involves working with all members of the team to develop and implement the IFSP. Lastly, OTs can also serve as a resource, consultant, and advocate for the family throughout the treatment process. Given the variety of these roles, OTs are significant and important contributors to EI services (Clark et al., 2017).

An important component of EI services is the family-centered approach. As outlined in IDEA Part C, EI services should be provided in a natural environment (U. S. Department of Education, 2020); thus, OTs often provide EI services in the home or community-based settings (Case-Smith & O'Brien, 2014). Additionally, OTs work collaboratively with family members, who can be both consumers and partners in the process, in order to ensure that the needs of the

child are met (Case-Smith & O'Brien, 2014). One method through which this is achieved is the use of family coaching and providing support to the parent. This involves working with the caregiver to plan therapeutic activities that benefit the child and fit into the family's routines. The therapist can model these activities and then provide feedback about the parent's use of them. This method helps to increase parent confidence and allows them to integrate therapeutic activities into their daily life, in order to help improve their child's outcomes (Case-Smith & O'Brien, 2014).

This method of family coaching fits well with the telehealth service delivery model since observation of parent-child interactions and provision of feedback can often be provided through telehealth, which aligns well with consultative services (Case-Smith & O'Brien, 2014; Cason, 2011). The telehealth model also suits EI service delivery since it is preferentially provided in a natural environment (U. S. Department of Education, 2020), and the telehealth model allows families to continue receiving these services from their home (Case-Smith & O'Brien, 2014; Cason, 2011).

Telehealth as a Service Delivery Model for Early Intervention Services

As telehealth increases in use, it is also beginning to be applied in EI settings. There is increasing research exploring the potential benefits and drawbacks of telehealth as a service delivery model in EI, as well as its effectiveness in providing EI services. While there are barriers to the implementation and use of telehealth that still need to be addressed, telehealth has the potential to address problems in the EI setting, including limited access for children who need services (Cason, 2011). Providing access to EI services is increasingly important as there is a growing need and demand for EI services. This is partially due to the increasing prevalence and diagnosis of developmental delays among infants and toddlers, as well as personnel shortages,

especially in underserved and rural areas (Cason et al., 2012). These factors have led to an increased discrepancy between the number of children who need EI services and the number who received these services (Rosenberg et al., 2013). In fact, a national survey by Rosenberg et al. (2013) compared the percentage of children who were likely eligible for IDEA Part C services, based on state eligibility definitions, to those who received services, and found that only four states were serving approximately the same proportion of children who were eligible. All other states were serving fewer children than those who were eligible. The biggest discrepancy was discovered in two states where the ratio of eligible to served children was as high as 26:1 (Rosenberg et al., 2013). While part of this discrepancy is due to vast variation in the restrictiveness of eligibility definitions across states, with some states having definitions that qualified up to 78% of children for IDEA Part C services, the authors found that even if all states had highly restrictive criteria, about 9% of children would still be eligible for services, compared to the 2.8% that were actually served across the U.S. in 2010 (Rosenberg et al., 2013). Although this data was obtained in 2010 and discrepancies in those served versus those eligible may have changed since then, it still indicates that there are high proportions of children eligible for IDEA Part C services who are not receiving them (Rosenberg et al., 2013).

With increasing evidence regarding the effectiveness of telehealth, this service delivery model could be promising in solving some of the issues of access to services (Cason, 2011). However, the use of telehealth in EI is still relatively limited, as shown in a 2012 survey from the National Early Childhood Technical Assistance Center (NECTAC), which assessed the utilization of telehealth within EI programs across the U.S. (Cason et al., 2012). Survey questions were sent to IDEA Part C coordinators on the NECTAC distribution list, and representatives from 26 states and one jurisdiction responded. Results from the survey show that

16.7% of respondents reported that OT was used in their state. Additionally, 20% reported using telehealth within EI programs across a variety of professions; 10% reported not using telehealth. Yet, the percentage not receiving telehealth were planning to within the next 1 to 2 years (Cason et al., 2012). This study is limited in terms of a small sample size, with only 30 participants representing the entire U.S., and the fact that the use of telehealth may have changed since the survey date in 2012. However, the results still indicate that while the use of telehealth for EI services may be increasing, it still is not widespread, including for EI telehealth services provided by OTs (Cason et al., 2012). Although telehealth use is limited in EI services, there is increasing research about telehealth and evidence supporting its use as a service delivery model (Cason, 2011; Cason et al., 2012).

Evidence Supporting Telehealth as an Effective Service Delivery Model

While there is research indicating that telehealth has the potential to address issues of access to EI services (Cason, 2011), it is also important to examine the effectiveness of telehealth in improving outcomes and achieving intervention goals. With the increasing use and interest in telehealth as a service delivery model, more research has begun to focus on the effectiveness of telehealth for providing services in EI and pediatric populations. While there is increasing research about the effectiveness of using telehealth in EI services, most of this research is focused on professions other than OT. Research that focuses on the use of telehealth specifically within OT encompasses a broader pediatric age range, whereas little research exists regarding outcomes of telehealth as a service delivery in OT for the youngest pediatric population targeted by EI services.

Effectiveness and Outcomes of Telehealth Services in Early Intervention

A variety of research studies have been published exploring the effectiveness of telehealth as a service delivery model for providing EI services across a variety of therapy professions. The majority of this research focuses on populations of children with autism spectrum disorder (ASD) in the EI setting, although a few studies include early childhood settings. Several systematic reviews have concluded that preliminary evidence suggests telehealth can be a promising service delivery model for children with ASD (Boisvert et al., 2010; Ferguson et al., 2018; Parsons et al., 2017; Sutherland et al., 2018).

Since EI services involve very young children, several of the studies examined in these systemics reviews used interventions that were catered towards parent coaching and consultation. Thus, the researchers examined change in outcomes related not only to child skills but also parent outcomes (Lindgren et al., 2016; Meadan et al., 2016; Vismara et al., 2009; Vismara et al., 2012; Vismara et al., 2013; Vismara et al., 2016).

One series of studies, performed by Vismara and colleagues, examines the use of the Early Start Denver Model (ESDM) through videoconferencing to provide EI services to families of children with ASD. Parent training in these studies was provided by therapists with a background in psychiatry and behavioral sciences (Vismara et al., 2009; Vismara et al., 2012; Vismara et al., 2013; Vismara et al., 2016). Across these studies, the authors have found that parents demonstrated increased intervention skills and engagement style after intervention, and children demonstrated improvement in outcome measures. In their most recent study, the authors used a more rigorous research design, a randomized controlled trial, where they compared a treatment-as-usual control group (n=10) to a telehealth treatment group (n=14) receiving the Parent-ESDM intervention. The authors found that the telehealth treatment group demonstrated

higher parent fidelity gains than the control group, and they also reported significantly higher satisfaction and confidence. Additionally, children's social communication skills increased for both groups at the same rate. This data suggests that telehealth can be an appropriate service delivery model for this intervention, both in terms of promoting parent outcomes, as well as child growth (Vismara et al., 2016).

Another study, performed by Lindgren et al. (2016), also compared EI telehealth treatment to in-person therapy services provided by behavior analysts. In this study of 107 children diagnosed with ASD or other developmental delays, families received therapy services through in-home therapy, clinic-based telehealth, or home-based telehealth, in which the parents were taught how to implement techniques to address their children's 'problem behaviors'. The researchers found that regardless of the model of intervention received, parents were equally successful in implementing the techniques they learned and reported high acceptability of the program. Likewise, reduction in children's 'problem behaviors' were found in all groups, with equivalent outcomes indicating that telehealth-based services were as successful as in-home treatment. While these results do not indicate a difference in effectiveness between service delivery models, they do indicate that telehealth has the potential to yield equivalent results as compared to traditional in-person implementation of this intervention (Lindgren et al., 2016).

Lastly, Meadan et al. (2016) also measured parent and child outcomes in a study examining the effects of using telehealth as a service delivery model for EI services provided by doctoral students in special education. The researchers modified the in-person Parent-Implemented Communication Strategies (PiCS) program to better fit the telehealth service delivery model. After implementing the modified Internet-Based PiCS program with three mother-child dyads, the researchers found that the parents were able to apply strategies learned in

the program accurately and that they reported high satisfaction with the program. The parent's implementation of strategies also correlated with moderate positive changes in child's communication skills for two out of three participants. Although this study did not compare telehealth and in-person service delivery models, it does suggest that modification of in-person programs to fit the telehealth service delivery model could have the potential to be a beneficial method for implementing this intervention (Meadan et al., 2016).

Overall, these research studies provide evidence that telehealth has the potential to be a useful method of service delivery for EI services across a variety of therapy professions. While there is increasing evidence to support the potential usefulness of telehealth, many of these research studies are limited in terms of using small sample sizes and methodology with limited rigor. Additionally, the majority of current research is focused on children with ASD, and thus findings cannot be generalized to other populations. However, despite these limitations, the existing evidence indicates that telehealth is a promising emerging service delivery model for EI services (Lindgren et al., 2016; Meadan et al., 2016; Vismara et al., 2009; Vismara et al., 2012; Vismara et al., 2013; Vismara et al., 2016).

Effectiveness and Outcomes of Telehealth in Pediatric Occupational Therapy

While a variety of studies have been published that investigate the effectiveness of telehealth in EI across several professions, few studies specifically focus on the use of telehealth as a service delivery model for the profession of OT in EI services. However, literature does exist that examines the use of telehealth in OT for a broader range of pediatric participants, that is from infants and toddlers through older children.

In terms of studies examining the use of OT within the larger pediatric population, several studies provide preliminary evidence that outcomes for children, as well as for their

parents, can improve with OT telehealth services (Benham & Gibbs, 2017; Criss, 2013; Gibbs & Toth-Cohen, 2011; Little et al., 2018). In a study by Little et al. (2018), the researchers investigated the effectiveness of using videoconferencing to deliver an Occupation-Based Coaching intervention to 17 parents of young children diagnosed with ASD, ranging from 2- to 6-years-old. Researchers found that there was a significant increase in parent efficacy post-intervention, and parents also reported satisfaction with the goal attainment of their child (Little et al., 2018). In another study, Gibbs and Toth-Cohen (2011) explored the use of telehealth in addition to traditional clinic-based OT services for four families with 5- to 12-years-old children who were diagnosed with ASD. Parents reported that they found it beneficial to collaborate with the OT during telehealth sessions, stating they appreciated this approach versus past in-person experiences that were focused more on their child. Additional telerehabilitation sessions allowed the parents to receive continued support by asking questions and reviewing techniques learned in the clinic, which was found to promote carryover of home programs and increase feelings of competence (Gibbs & Toth-Cohen, 2011). While both of these studies are limited in terms of their small sample size and generalizability, they provide preliminary evidence that OT services through telehealth can be beneficial to parents by increasing efficacy, feelings of competence, and improved implementation of therapy techniques at home (Gibbs & Toth-Cohen, 2011; Little et al., 2018).

Several research studies also indicate that OT services provided through telehealth to pediatric patients are effective in increasing child outcomes. For instance, both Gibbs & Toth-Cohen (2011) and Little et al. (2018) reported improvements in child outcome measures. Little et al. (2018) collected pre- and post-intervention data about the children's sensory processing characteristics and engagement in activities and found that there were significant increases in the

children's frequency of activity participation and play activity, as well as diversity of activities engaged in and skill development diversity. They also found significant increases in goal attainment post-intervention, indicating that providing intervention through telehealth was effective for these participants (Little et al., 2018). Gibbs & Toth-Cohen (2011) also collected pre- and post-intervention data about the children's sensory processing skills and found stable or improved outcomes for three out of the four participants. While these findings do not indicate strong effectiveness for all participants, data was only collected for four weeks, which may not have been long enough to see significant improvements in outcomes (Gibbs & Toth-Cohen, 2011).

Two further studies explored the effectiveness of OT services provided through telehealth in school-based settings. Criss (2013) explored the effectiveness of providing telehealth intervention focused on improving handwriting to eight elementary school students at an online charter school. Participants who had difficulties with fine motor and/or visual motor skills, which impacted their performance in handwriting, received handwriting-focused intervention from an OT through the study. The researcher found that for five out of eight students overall handwriting performance scores increased by at least 5% from pre- to post-intervention, with scores for the other three participants remaining relatively unchanged. An average of all scores also indicated that they increased in all the sub-components of handwriting that were assessed. Additionally, students and their parents (who received consultation during the intervention) reported high satisfaction with the program. In fact, 86% of the parents reported they were "happy that the occupational therapy services are offered in an online virtual format" (Criss, 2013, p. 44). While this study only represented a small sample size, it provides preliminary evidence that telehealth can be an effective model for providing handwriting-focused OT intervention (Criss, 2013).

Lastly, Benham and Gibbs (2017) performed a study that explored the effectiveness of using the *Timocco Gaming System* in telehealth interventions for two elementary school students with difficulties in a variety of developmental skills. *Timocco* is an interactive virtual gaming program that includes games designed by an OT to promote development of cognitive and motor skills. Students were provided with intervention sessions in which they used the program while a research assistant was present to customize the game to their needs. Using the *Bruininks-Oseretsky Test of Motor Proficiency, Second Edition Short Form (BOT2-SF)* to collect pre- and post-intervention data, the researchers found moderate improvement in scores (by 12 points and by 3 points out of 88 points respectively for each student). Additionally, the students reported that they had an overall positive experience with the program. While these results are limited by a small sample size and only show moderate improvement, they provide preliminary evidence that this telehealth intervention is feasible and could be effective, although the authors recommend *Timocco* as an adjunctive intervention to regular OT services, not as a replacement (Benham & Gibbs, 2017).

Overall, there is preliminary evidence that OT services provided through the telehealth service delivery model can potentially be an effective form of intervention for pediatric populations, both in terms of children and parent outcomes. However, the majority of this evidence is limited in terms of using small sample sizes and limited rigor in design and methodology. Additionally, none of these research studies compare the use of telehealth to traditional in-person services. Thus, the results indicate that telehealth can be effective in increasing outcomes, but the findings do not provide information about which form of service delivery is more effective in achieving these results (Benham & Gibbs, 2017; Criss, 2013; Gibbs & Toth-Cohen, 2011; Little et al., 2018).

Perspectives About Telehealth Use in Occupational Therapy for Early Intervention Services

While research regarding the outcomes of telehealth for EI services provided by OT is lacking, research does exist regarding the perspectives of telehealth as a service delivery model in OT for providing EI services. Several research studies explore the perceptions of both parents and service providers, in which different perceived benefits of telehealth have been identified, as well as barriers to its successful implementation (Ashburner et al., 2016; Campbell et al., 2019; Cason, 2009; Gardner et al., 2016; Jacobs et al., 2015; Rortvedt & Jacobs, 2019; Serwe, 2018; Wallisch et al., 2019).

The perception of a service, both from the patient and provider perspectives, is an important factor to consider since attitudes and acceptance can have an impact on the use and effectiveness of the service (Chedid et al., 2013; Dunkley et al., 2010; Wade et al., 2014). In fact, research indicates that a key factor in the success of telehealth services is the provider's acceptance and willingness to use this model (Wade et al., 2014). Additionally, the provider's perception of their patient's opinions about telehealth also impacts their likelihood to use telehealth (Chedid et al., 2013), especially when there is a mismatch between the client's and provider's perspectives (Dunkley et al., 2010). Thus, it is important to understand the perspectives of both the provider and patient in order to optimize the use of telehealth services.

Benefits of Telehealth in Occupational Therapy Services for Early Intervention

When examining the use of telehealth as a service delivery model in OT for EI services, a frequently mentioned benefit of telehealth practice compared to in-person services is the increased compatibility with everyday life and the ability to receive support from home. Many researchers have reported this aspect as a benefit identified by both patients and providers. In one

study, Wallisch et al. (2019) explored the lived experiences of eight parents receiving coaching-based OT telehealth intervention to help with the care of their children (who were under the age of 7-years-old and diagnosed with ASD). One theme that emerged from the semi-structured interviews was the compatibility of telehealth with daily life, with parents highlighting how the telehealth intervention fit in their daily routines and their individual family situations, and also allowed for more flexible scheduling. Additionally, they appreciated receiving therapy in their natural environment, since this also fit better into their routines (Wallisch et al., 2019).

A similar study compared the perception of in-person EI OT services versus those provided using telehealth for families of children with ASD. Ashburner et al. (2016) found that families liked being able to access services from home, since being in a natural environment eased the transition for their child as they did not have to adjust to an unfamiliar clinic. Parents further highlighted the convenience of being at home, stating that it was easier to coordinate between parents and deal with problems if they came up in the moment (Ashburner et al., 2016). Other studies mentioned the benefit of being at home for immunocompromised children (Cason, 2009), as well as children who are home-bound due to other medical issues or disabilities (Rortvedt & Jacobs, 2019).

Several studies have shown that service providers also reported compatibility with everyday life as a benefit of telehealth, as it allowed for more flexible scheduling (Ashburner et al., 2016; Campbell et al., 2019). Service providers further indicated that it was helpful to observe the child in their natural environment (Gardner et al., 2016). Overall, these studies demonstrate that there are many perceived benefits of telehealth services in terms of compatibility with everyday life and convenience of operating in the natural home environment.

Another benefit of telehealth identified by patients and service providers is the increase in regular, ongoing support, especially for people in rural areas. Ashburner et al. (2016) reported that all participants in their study (rural-based parents and OTs) identified regular, on-going support as a benefit; parents highlighted how telehealth allowed them to receive follow-up appointments that they would not otherwise have had. This allowed them to keep on track with treatment plans for their child and reminded them of treatment aspects they had forgotten to implement (Ashburner et al., 2016). Similar results were found in a pilot study looking at the perspectives of rural families receiving EI OT services (Cason, 2009). Parents in this study also reported that telehealth allowed for more frequent sessions that supplemented their face-to-face services and allowed for more timely recommendations, which was helpful since their child mastered new skills between sessions (Cason, 2009).

A further benefit of telehealth identified in many studies is the reduction in cost, time, and travel. Ashburner et al. (2016) reported that all participants, patients as well as providers, identified this as a benefit of telehealth. Additionally, providers highlighted that the use of telehealth allowed them to work less overtime, since they no longer needed to travel long distances to different rural locations (Ashburner et al., 2016). In another study examining the perceptions about an education-based telehealth program for caregivers, participants highlighted these benefits as well. Some program participants stated that they would not have been able to participate in the program if it were not virtual, due to barriers of distance and the need to drive (Serwe, 2018).

In addition to the reduction of travel time, telehealth can also reduce costs for patients as well as service providers and the companies they work for. Parents and service providers have both reported this as a perceived benefit in several studies (Ashburner et al., 2016; Gardner et al.,

2016; Rortvedt & Jacobs, 2019). Further, in a study by Cason (2009), the author performed a cost-saving analysis that predicted actual savings. When accounting for decreased travel costs and loss of the provider's availability for therapy due to travel time, the author found that 87% more rural-based children could receive EI OT services without increasing costs (Cason, 2009). In this study, cost-saving analysis was based on reimbursement rates in Kentucky in 2009, comparing community-based services to telehealth services. While these results cannot be generalized due to the specific location and date of the results, they still indicate that savings are possible when telehealth services are used (Cason, 2009).

While many of these benefits of decreased time, travel, and cost are especially pertinent in rural areas, a study showed that they were also perceived as benefits in suburban areas. In a study examining the perception of the use of telehealth in suburban school-based OT, service providers also identified less travel as a benefit of telehealth, as it allowed for cost-savings and for better use of time (Rortvedt & Jacobs, 2019).

The use of telehealth also has the benefit of addressing staff shortages, which is an issue in many rural areas (Ashburner et al., 2016; Cason, 2009), although it has also been identified as an issue in suburban areas (Rortvedt & Jacobs, 2019). Cason (2009) highlighted the lack of service providers in rural Kentucky, which was a major cause of limited EI services for children and contributed to the state falling short of its target goal for the percentage of children receiving EI services. However, the author identified the use of telehealth services as a potential solution, as it could help alleviate some of these provider shortages and increase the percentage of children receiving services (Cason, 2009).

Another benefit of telehealth reported by both parents and providers is the promotion of teamwork and a collaborative relationship. Ashburner et al. (2016) found that rural-based

patients and providers thought that telehealth allowed for enhanced communication among all team members, as everyone could be brought together at the same time, which allowed for increased communication and clarity in communication, and was also perceived to be easier and more convenient for everyone. Rortvedt and Jacobs (2019) found similar perceptions among suburban-based service providers. Additionally, OTs and other school-based staff reported a benefit of easier consultation and supervision of other providers using virtual means (Rortvedt & Jacobs, 2019). Furthermore, Wallisch et al. (2019) reported that parents felt like they were partners with the OT during the intervention process and valued the collaborative relationship they formed, although these results could also be attributed to the nature of the coaching-based therapy approach used in this study.

Another reported benefit of telehealth is the perceived upskilling of parents (Ashburner et al., 2016), as well as higher feelings of parent empowerment (Wallisch et al., 2019). In a study examining perceptions of rural-based parents and service providers about face-to-face versus telehealth services, all participants reported the benefit of education and upskilling using telehealth (Ashburner et al., 2016). Participants highlighted that telehealth provided the opportunity for coaching of specific skills and techniques, which was limited in face-to-face sessions due to time restraints and pressure to focus on addressing as many goals as possible. By using telehealth, the OT and parent could work together to develop practice techniques as well as individualized resources for the family, which allowed the parent to gain more skills to implement outside of therapy sessions (Ashburner et al., 2016). The use of telehealth also made it easier to share resources; both service providers and parents commented on the ease of sharing resources and seeing the resources visually, which helped to enhance their understanding of how to use the resources (Ashburner et al., 2016).

Lastly, studies have also reported parent and provider satisfaction with the use of telehealth services. Cason (2009) found that two families who participated in 12 weeks of EI OT telehealth services reported high levels of satisfaction. They also reported that they believed their child experienced benefits from participation in the intervention (Cason, 2009). In another study, Serwe (2018) found that providers also reported satisfaction with their experience of the telehealth model. Using the *Telehealth Usability Questionnaire*, participants rated the telehealth system high in terms of usefulness, ease of use, effectiveness, and reliability. On average, participants rated their satisfaction with the telehealth system as 5.3 on a 7-point Likert scale, with 1 indicating 'disagree' and 7 indicating 'agree'. Additionally, participants thought that telehealth was an acceptable means of providing services and that they would use telehealth again, with a mean score of 6.2 for both (Serwe, 2018).

Providing services through a telehealth delivery model has been shown to have a variety of perceived benefits. Overall, telehealth has the potential to improve access to services in a variety of ways, from increasing flexibility of scheduling to decreased travel to providing regular support to decreasing overall costs, all of which are especially pertinent for rural patients and service providers (Ashburner et al., 2016; Campbell et al., 2019; Cason, 2009; Gardner et al., 2016; Jacobs et al., 2015; Rortvedt & Jacobs, 2019; Serwe, 2018; Wallisch et al., 2019). Additionally, telehealth has been perceived as helpful and effective by both patients and service providers, who have reported being satisfied with these services (Cason, 2009; Serwe, 2018).

Barriers of Telehealth in Occupational Therapy Services for Early Intervention

While there are many perceived benefits to delivering services through telehealth, there are also barriers that need to be considered and addressed where possible. One of the most frequently cited barriers is technological difficulties involved with the use of telehealth.

Ashburner et al. (2016) found that all participants struggled with technological difficulties and reported this as a source of frustration. Issues included slow internet access, partially due to residing in rural areas, as well as incompatibility of the patient's technology with the telehealth software used, either because their computers was not up to date or they were too up to date (Ashburner et al., 2016). Additionally, lack of experience with technology also contributed to the technological difficulties experienced (Ashburner et al., 2016).

Serwe (2018) also found that technological difficulties presented a barrier to telehealth use, with participants reporting issues with connectivity and audio interfering with services. Similar results were reported by Campbell et al. (2019), who found that participants reported not only internet connectivity issues, but also barriers related to having access to a device. Interestingly, the researchers found that despite the issues with technology, participants were willing to work around these issues in order to make the use of telehealth possible (Campbell et al., 2019).

Other logistics related to the use of technology were also reported as perceived barriers. For instance, school-based OTs and other school staff reported concerns about privacy with the use of telehealth software (Rortvedt & Jacobs, 2019). Another study of EI providers found that 40% were concerned about security issues and 44% were concerned about privacy issues (Cason et al., 2012). Additionally, ensuring supervision of school-aged children was also a concern, especially before and after sessions, or during sessions if the child left the visible area (Rortvedt & Jacobs, 2019). Environmental set-up and camera angles were also a reported concern in terms of the ability to observe the child as they navigated through their environment during EI telehealth sessions (Cason, 2009). Further, access to equipment was an issue, with both parents and providers reporting concerns about availability of equipment, and that differences in

resources available to patients and providers made it harder to demonstrate and practice skills and techniques (Cason, 2009; Rortvedt & Jacobs, 2019).

Another commonly reported barrier to the use of telehealth is the lack of physical interaction. In several studies, both parents and providers noted perceived difficulties or concerns about communicating and developing a therapeutic relationship via telehealth (Campbell et al., 2019; Jacobs et al., 2015; Rortvedt & Jacobs, 2019). Rortvedt and Jacobs (2019) found that providers were concerned that telehealth services would make it more challenging to build connections, which could impact their ability to build rapport with patients. Serwe (2018) found similar results, with providers reporting decreased communication when using telehealth, which impacted their confidence in providing services. In the study by Campbell et al. (2019), both parents and providers reported difficulty, or thought they would have difficulty, with communication and building rapport. However, these difficulties were reported at a higher frequency by participants who were considered “naïve” (had never heard of or experienced telehealth) or “aware” (had heard of but not experienced telehealth). Among participants considered “familiar” (had both heard of and experienced telehealth), fewer participants reported these difficulties, which indicates that practice using telehealth may help participants to learn how to effectively communicate virtually and become comfortable using the platform (Campbell et al., 2019).

Another concern related to lack of physical interaction via telehealth is the inability to engage in hands-on assessments and interaction. School-based service providers thought it would be challenging to complete student evaluations, since they perceived that hands-on evaluation of body structures and functions is an important part of assessments (Rortvedt & Jacobs, 2019). Similar concerns regarding performance of assessments were also voiced by participants in the

study by Campbell et al. (2019). However, other research has highlighted that certain assessments can be performed reliably via telehealth with assistance of in-person caregivers or assistants as needed (Cason et al., 2018). Several of these studies are highlighted in the *AOTA Position Paper on Telehealth in Occupational Therapy*, where tele-evaluation is presented as a viable option to use in OT, as long as clinical reasoning is always used to determine if this is the best choice for the patient and if there is evidence supporting the reliability and validity of using a specific assessment tool remotely (Cason et al., 2018).

In addition to concerns about performing evaluations virtually, another perceived issue with lack of physical interaction in telehealth is the inability to engage in hands-on activities with the patient. School-based providers reported that some children require physical prompts to stay focused, and thus they thought it would be challenging to engage in effective sessions using telehealth (Rortvedt & Jacobs, 2019). In another study, both parents and service providers reported similar concerns, stating they did not think certain hands-on activities could be done via telehealth. Even if they were possible, some participants thought it would be more valuable if the provider was in the room (Campbell et al., 2019). Additionally, all parent and service provider participants in this study reported that they did not think children would be able to participate fully in telehealth sessions, due to limited ability to sit still, pay attention, and concentrate during virtual sessions (Campbell et al., 2019).

Lastly, given these different barriers to the use of telehealth, some participants stated that they did not think telehealth should replace face-to-face services, although they thought it could be a good option to build on and supplement in-person sessions. Ashburner et al. (2016) found that all participants, both rural-based families and service providers, reported they preferred to have an initial face-to-face visit prior to telehealth sessions, as this helped develop a relationship

and build trust, which made them feel more comfortable in subsequent virtual sessions. Providers also reported that meeting children in-person helped to get to know them and their family better, since it was hard to effectively capture certain factors over video, including nonverbal communication and eye contact. Thus, they believed that telehealth sessions could augment therapy, but should not completely replace face-to-face contact (Ashburner et al., 2016). Gardner et al. (2016) found that prospective telehealth users had similar perceptions. While many participants were open to trying telehealth, many believed they would still require in-person visits to complement virtual sessions (Gardner et al., 2016).

Altogether, these studies indicate that a variety of factors present as barriers to the implementation of telehealth from both the patient and provider perspectives, including technological issues such as connectivity problems, security, and privacy concerns, as well as logistical issues, including difficulties with supervision, observation, and demonstration of skills. There are also perceived barriers related to the inability to provide in-person and hands-on therapy through telehealth, as well as concerns about the development of a therapeutic relationship (Ashburner et al., 2016; Campbell et al., 2019; Cason, 2009; Cason et al., 2012; Cason et al., 2018; Gardner et al., 2016; Jacobs et al., 2015; Rortvedt & Jacobs, 2019; Serwe, 2018). While some of these barriers can be addressed, some participants argue that telehealth services should not replace in-person therapy and should rather be provided as a supplement to traditional services (Ashburner et al., 2016; Gardner et al., 2016).

Overall, research studies have found a variety of perceived benefits and barriers to the use of telehealth, from both the provider and patient perspectives. While telehealth allows for increased access to services, there are still barriers in telehealth that impact its use and effectiveness (Ashburner et al., 2016; Campbell et al., 2019; Cason, 2009; Cason et al., 2012;

Cason et al., 2018; Gardner et al., 2016; Jacobs et al., 2015; Rortvedt & Jacobs, 2019; Serwe, 2018). However, as the use of telehealth increases, especially due to the changes in service delivery during COVID-19, it is important to consider these factors and incorporate subsequent changes to improve future telehealth services.

Telehealth during COVID-19

During the COVID-19 pandemic, many services throughout the world have been temporarily eliminated or altered in order to slow the rapid spread of COVID-19, a deadly disease that was first found in 2019. Many countries closed schools and transitioned to online learning, and many service providers transitioned to telehealth practice, including OT services. While this transition to virtual services was essential in containing the world-wide outbreak, it caused many challenges for service providers and patients, including children and their parents (Neece et al., 2020). In fact, several preliminary studies have already been published regarding the changes in service provision during the beginning of the COVID-19 pandemic, as well as the impact this has had on parents, children, and service providers (Camden & Silva, 2020; Jeste et al., 2020; Neece et al., 2020).

Impact of COVID-19

Dealing with COVID-19 has introduced many new challenges and stressors into the lives of everyone across the world, including families with children receiving therapy services. In a brief report by Neece et al. (2020), interviews were performed from March 31 to May 5, 2020 with 77 parents of 3- to 5-year-old children with developmental delays or ASD, in order to examine the impact of COVID-19 on their families. Parents reported many challenges during these new times. The issues most frequently mentioned involved difficulties related to being stuck at home, balancing work with home life, caring for children given the lack of childcare,

adapting to changes in routines, emotionally supporting their family, finding activities to prevent child boredom, navigating financial concerns, and dealing with the decrease or discontinuation of their child's professional services. These reported factors illustrate the vast variety of challenges families are dealing with, including changes in services received, which is highly concerning given the importance of therapy during early childhood (Neece et al., 2020).

Parents also voiced their concern about the long-term impact of the pandemic if it continued, although some families did not think it would have an impact on them or were unsure what the impact would be. Concerns frequently mentioned by families were related to the economic impact, their children's emotional health, and the lack of educational and developmental progress in their children due to decreased services (Neece et al., 2020). While this study provides several important findings, they cannot be generalized to the larger population as participants were mainly from ethnically diverse families residing in Oregon and California who were already involved in a larger trial (Neece et al., 2020). However, the results of this study still highlight the multitude of challenges experienced by these and many other families during the pandemic, which are important factors to consider as they could impact patients' perceptions and experiences with services, as well as the effectiveness of services (Neece et al., 2020).

One of the main challenges for many families during COVID-19 is the change in services provided to their children. In fact, Neece et al. (2020) found that changes in services was the most commonly reported secondary concern among parents, with 77.9% saying that their child's services had decreased, while 18.2% reported that they stayed the same or were delivered online, 2.6% reported a mix of change based on the type of service, and 1.3% reported an increase in services. This indicates that many parents were tasked with suddenly overseeing their children's

educational and therapeutic needs, often without the needed support from providers (Neece et al., 2020).

Another preliminary research study by Jeste et al. (2020) also indicates similar results regarding changes in services during COVID-19. In a survey completed online between April 15 and May 4, 2020, 818 caregivers to individuals diagnosed with intellectual and developmental disabilities (IDD), the majority of which were under the age of 21, reported changes in educational and healthcare services. The majority of participants resided in the U.S., although there were also participants from a variety of other countries. Results of the survey indicate that among participants in the U.S., 74% were no longer receiving at least one therapy or educational service, and 30% experienced a loss in all services, while for 56% there was a change in service modality, meaning that at least one service had continued through tele-education or telehealth (Jeste et al., 2020). In terms of OT services specifically, 451 of the participants (67.4%) received OT prior to COVID-19. Of these participants, 57.2% lost access to OT services, 3.1% received in-person services, 22.2% received services via video, 7.8% via email, and 9.8% via a combination of video and email (Jeste et al., 2020). Data from all these studies indicates that many educational and therapy services, including OT, have changed for children during the COVID-19 pandemic, with the majority experiencing decreases in the services they are receiving, while some have shifted to other means of service delivery, including telehealth (Jeste et al., 2020; Neece et al., 2020).

A further study by Camden and Silva (2020) showed that service providers reported an increase in use of telehealth during COVID-19. In a pre-COVID-19 survey of 1,333 pediatric PTs and OTs from 76 different countries, 4% reported using telehealth. In May 2020, 107 of these therapists responded to a follow-up survey regarding telehealth use during COVID-19,

with 70% indicating they were now using telehealth (Camden & Silva, 2020). Overall, this preliminary data shows a significant increase in clinicians using telehealth and indicates the new prevalence in the use of telehealth during COVID-19 (Camden & Silva, 2020; Jeste et al., 2020; Neece, et al., 2020).

In the U.S., these increases in telehealth use during COVID-19 have been made possible in part through changes in state regulations and insurance coverage. Before COVID-19, legislation about the use of telehealth varied between states, and telehealth services were not reimbursed by many health insurance companies (Cason et al., 2018). However, during COVID-19, many state licensure boards changed their regulations to allow for wider use of telehealth during these times (American Occupational Therapy Association [AOTA], 2020b), and many insurance companies expanded their coverage for telehealth services provided by OT (AOTA, 2020a). While some of these changes are temporary, they have allowed for an increase in the use of telehealth as a service delivery model in OT during these times (AOTA, 2020a; AOTA 2020b).

Perceptions About the Use of Telehealth in Early Intervention During COVID-19

Given the increasing use of telehealth and the current context with COVID-19, it is important to understand the impact this imposed change had on therapy services provided. Several preliminary studies have begun to explore this topic in order to understand how parents, children, and practitioners are handling these changes. Jeste et al. (2020) explored the perceptions about virtual education and healthcare services received during COVID-19 among caregivers of individuals with IDD. Results indicate that the majority found telehealth to be helpful to some extent (either “a little”, “somewhat”, or “extremely helpful”), although 14% of U.S. participants reported they found telehealth services to be “not at all helpful” (Jeste et al., 2020). Even among participants who found services helpful, many parents had suggestions

regarding the use of telehealth, including the need for more frequent tele-education sessions, the continuation of previous service plans, better programming and planning, and better support and less demand on parents. Thirteen percent of caregivers suggested a full return to in-person services, reporting that virtual services did not work as well for their child. This data indicates that while the majority of participants found telehealth services at least somewhat useful, there were also a variety of suggestions for improvement (Jeste et al.,2020).

Therapists also reported needs for improvement regarding the use of telehealth for service delivery, as indicated in Camden and Silva's (2020) study of pediatric PTs and OTs. Therapists reported the need for support in terms of equipment and technology used for sessions, support from the organization they were employed at, and support through training about how to use this service delivery model (Camden & Silva, 2020).

Understanding patient and providers' perspective about telehealth services during COVID-19 is important since this can have an impact on the use and effectiveness of the services provided (Chedid et al., 2013; Dunkley et al., 2010; Wade et al., 2014). Additionally, understanding perceptions of telehealth, as well as aspects that were successful and aspects that require improvement, is important information that can be used to inform future practice, since many services continue to be provided virtually given the on-going nature of COVID-19, and may continue even after COVID-19 restrictions have been lifted (Jeste et al., 2020).

Conclusion

As the use of telehealth has increased over the past decades, more research has examined the effectiveness of this service delivery model, as well as perceptions regarding its use. Preliminary evidence suggests that telehealth can be an effective service delivery model for the provision of EI services in general. Numerous studies found increases in parent and child skills

after telehealth intervention provided by a variety of therapy professionals in the EI setting (Lindgren et al., 2016; Meadan et al., 2016; Vismara et al., 2009; Vismara et al., 2012; Vismara et al., 2013; Vismara et al., 2016). A few preliminary studies have also compared telehealth to traditional in-person services and found equivalent or increased outcomes in certain settings (Lindgren et al., 2016; Vismara et al., 2016). Additionally, preliminary evidence supports effectiveness of the telehealth service delivery model specifically for OT interventions with the larger pediatric population; several research studies report equivalent or increased scores in outcome measures for children after specific interventions (Benham & Gibbs, 2017; Criss, 2013; Gibbs & Toth-Cohen, 2011; Little et al., 2018).

In addition to this preliminary evidence supporting the effectiveness of telehealth, there is further evidence outlining the perceived benefits of this service delivery model for the provision of OT services in the EI setting. Benefits reported by both parents and providers include increased access to services, especially in rural and underserved areas due to decreases in cost, travel time, and provider shortages. Additionally, participants have reported that telehealth is more compatible with their everyday life and allows for more flexible scheduling. These beneficial aspects of telehealth have led to reports of high satisfaction with telehealth services (Ashburner et al., 2016; Campbell et al., 2019; Cason, 2009; Gardner et al., 2016; Jacobs et al., 2015; Rortvedt & Jacobs, 2019; Serwe, 2018; Wallisch et al., 2019). However, barriers in the use of telehealth in EI OT services have also been identified, including lack of physical interaction, which is perceived to impact the therapeutic relationship and the provision of hands-on services. Additionally, parents and providers have reported challenges related to technological difficulties and concerns about privacy. For these reasons, participants have suggested that telehealth should not replace in-person services, although it has the potential to be a beneficial adjunctive therapy

approach, especially for those who have limited access to services (Ashburner et al., 2016; Campbell et al., 2019; Cason, 2009; Gardner et al., 2016; Jacobs et al., 2015; Rortvedt & Jacobs, 2019; Serwe, 2018).

While there is increasing evidence that supports the use of telehealth, this service delivery model so far has not been implemented extensively. However, during the COVID-19 pandemic, many service providers who had not used telehealth in the past or had limited experience with telehealth began using this service delivery model (Neece et al., 2020). Given the ongoing nature of COVID-19, the reliance on telehealth services by healthcare professions will likely continue or increase and may even persist after restrictions have been lifted (Jeste et al., 2020).

Due to the current nature of COVID-19 and the resulting transition to the use of telehealth, it is important to understand the available research about the use of telehealth as a service delivery model. The research available so far can be used to inform telehealth services during this time of need, including providing information about beneficial aspects of telehealth that can be implemented and built on, as well as barriers that can be addressed, with the goal of learning how to overcome them. However, there are gaps in the available research about the past use of telehealth, as there are few studies looking specifically at the outcomes of telehealth use in EI OT services, and there are also few studies that compare the use of telehealth to traditional in-person services, especially in the context of EI and OT services. Further, the research that is available about the use of telehealth in EI services and pediatric OT services is often limited to small sample sizes and to methodology with limited rigor.

In addition to these gaps in the research, there is also limited research about the use of telehealth during COVID-19 given its recent nature. However, this situation presents a unique opportunity that allows future studies to compare the use of telehealth before and after its

implementation on a wider scale and examine its effectiveness for each individual participant as compared to their previous in-person services. As the use of telehealth for EI OT services increases, it is important for future research to focus on these areas in order to gain a greater understanding about the effectiveness of telehealth services as compared to usual in-person services, especially in the current context of COVID-19.

Problem Statement

During the COVID-19 pandemic, many services have transitioned to virtual platforms, including EI OT services, with many service providers and patients thrust into this service delivery model despite limited past experience with it. While there is preliminary research regarding the effectiveness and benefits of telehealth services in EI OT, there are few rigorous studies comparing telehealth to traditional in-person services. Additionally, given the current nature of COVID-19, there is minimal information from research studies about the imposed transition to telehealth during this time. The aim of this research study is to gain an understanding of the use of telehealth in EI OT services during COVID-19 as compared to experiences with previous in-person services from the perspective of OTs and parents, in order to answer the research questions: 1. Was the use of telehealth during COVID-19 effective in terms of children's outcomes? 2. What aspects of telehealth services during COVID-19 were perceived as beneficial and what aspects presented as barriers to its success?

Methodology

This research study was reviewed and approved by the Elizabethtown College Institutional Review Board (IRB) following an expedited review. The study was conducted using a qualitative, descriptive case study design, which involves the in-depth description of the experiences of one or several participants in regard to the effect of intervention or a new

phenomenon (Taylor, 2017). For this research, the case study focused on several participants who were providing or receiving EI OT services through telehealth during COVID-19, in order to understand their experiences during this time.

Participants

Participants were recruited using convenience sampling. Contact information for potential OT practitioner participants were provided by local EI providers, and these OTs were contacted via email by the primary investigator. OTs who were interested in participating were asked to forward information to eligible patient families they worked with. Families were provided with the primary investigator's email and asked to respond if they were interested in participating. IRB approval was received prior to contacting participants and data collection. All participants signed an Informed Consent Form before participating in the study.

Inclusion criteria for participants in this study included proving/receiving services that met these criteria: 1) OT services were provided/received in the EI setting at least biweekly, 2) in-person services were provided/received before the start of COVID-19, and 3) transition occurred to telehealth during COVID-19 for at least one month of telehealth services.

Participants recruited for this research study included one OT and two families this OT worked with. The OT provides home-based EI services in and around the greater Harrisburg, PA area. She provides services to a few urban patients; however, most of the families she works with live in suburban or rural areas. Her specialty includes the use of neuromuscular electrical stimulation (NMES) and cranial sacral fascial therapy (CSFT) in order to address feeding problems, including dysphagia and other difficulties with swallowing. She also provides interventions focused on fine motor and sensory work if there are further problems in these areas.

For the family participants, the mother of each child participated in the interview. The children receiving services were aged 18- and 21-months old and are both males. Neither child has a specific diagnosis; however, one child had abnormal formation of his brain in utero, while the other has damage to his basal ganglia and will likely be diagnosed with a form of cerebral palsy in the future. Both children have been receiving OT services for several months, with one starting at 3-months-old and the other as soon as he was discharged from the neonatal intensive care unit (NICU).

Data Collection

Data was collected using semi-structured interviews that were conducted over Zoom by the primary investigator. Each interview lasted approximately 20 to 30 minutes and was recorded for later reference during data analysis. Questions for the semi-structured interviews covered information about the experience of using telehealth during COVID-19 and follow up questions were asked as appropriate in order to gain more in-depth information (see Appendix). Interview questions were developed based on the research questions, as well as important themes identified in the literature review. The primary investigator also followed up with the OT participant via email to ask clarification questions that came up during data analysis.

Data Analysis

Data analysis was conducted using qualitative thematic content analysis following Braun and Clarke's six-step process of 1) familiarizing yourself with the data, 2) generating initial codes, 3) searching for themes, 4) reviewing themes, 5) defining and naming themes, and 6) producing the report (Braun & Clarke, 2006). For step one of this process, each interview was transcribed verbatim. A deductive approach was used for analyzing the data, in which the researcher came up with codes based on existing knowledge from the literature review and the

research questions. Initial codes and themes were generated following this background knowledge, and further subthemes were identified by finding patterns among data for each theme. Themes and subthemes were reviewed and refined throughout this process by returning to the raw data set in order to make sure they accurately represented participant's responses. In order to maintain credibility during this process, member checking was used by providing the OT participant with a report of the identified themes in order to verify their accuracy.

Throughout the research process, risk was minimized, and confidentiality was maintained through several steps. The primary investigator communicated with participants through an email account on a secure computer and through the secure videoconferencing platform of Zoom, with appropriate settings turned on to ensure privacy during the interviews. All data was stored on a secure computer and pseudonyms were used for each participant. Additionally, as few indirect identifiers as possible were obtained for each participant. Recorded interviews were deleted after transcription, and the researchers were the only individuals who had access to the data.

Results

Participants

In order to understand contextual factors that may have impacted perceptions of telehealth, participants were asked about their experience with technology and telehealth in general prior to the COVID-19 pandemic, the number of telehealth sessions they received, the type of telehealth services they engaged in, and the type of EI OT services they were receiving.

In terms of background with technology and telehealth, none of the participants had used telehealth for EI OT services before, or for any other services, except for one parent who had one personal appointment using telehealth previously. However, all participants reported that they were familiar with videoconferencing technology prior to the COVID-19 pandemic. While not

all participants were familiar with the specific telehealth platform used for services, they stated that the transition to using videoconferencing technology during the COVID-19 pandemic was not a major adjustment. Additionally, the OT did receive approximately 10 to 15 hours of telehealth training, which involved watching and participating in telehealth sessions.

At the start of the COVID-19 pandemic, all participants transitioned to the use of telehealth services in mid-March, as in-person services were suspended due to COVID-19. In-person services started to re-open for EI in PA during mid-June. These regulations resulted in most participants receiving telehealth services exclusively for approximately three months. However, the OT participant was able to provide some in-person services during these three months using funding received from a Paycheck Protection Program loan. One parent participant reported they received about four telehealth sessions during the beginning of COVID-19, and then transitioned back to in-person services only, unless the OT was out of town and could not provide in-person services. The other parent said that she received telehealth sessions during the initial lockdown and has been receiving a hybrid of telehealth and in-person sessions ever since.

For the telehealth sessions, both parents used videoconferencing platforms with video and audio. The OT stated that she mainly used FaceTime, Zoom, and Google Duo platforms, as well as phone calls with some clients. Between sessions, all participants reported using text messaging to check in as needed, which included providing updates and asking questions.

In terms of services received, both parents reported that typical in-person sessions involved NMES and CSFT, with the focus of increasing feeding ability. NMES was paired with swallowing and feeding experiences, such as practicing sucking and eating. Further, one parent stated that in-person sessions involved working on fine motor skills, such as practicing a pincher grasp. The OT would bring a variety of adaptive equipment options, such as different baby

spoons and cups, to practice with and determine which worked for the child. Lastly, in-person sessions involved parent-coaching, in which the OT would demonstrate a skill, the parent and OT would practice it together, and then the parent would practice it on their own. Overall, in-person services involved a lot of hands-on activities and therapy.

In contrast, telehealth sessions involved watching the parent engage with the child and practice different skills while the OT coached the parent. For example, one parent said the OT would watch her play with her child and watch her feed him while he was sitting in a highchair, and provide feedback during these activities. It was also reported that telehealth sessions involved talking about what the parent had been practicing at home between sessions and how this practice was going. Overall, telehealth sessions involved more watching, providing feedback/coaching, and communicating about at-home practice, whereas in-person sessions involved more hands-on therapy.

Themes

Through qualitative thematic content analysis, four overarching themes and several subthemes were identified. The overarching themes include: 1) positive aspects of telehealth, 2) challenges to the use of telehealth services, 3) perceived effectiveness of telehealth as compared to in-person services, and 4) future considerations for telehealth use.

Positive Aspects of Telehealth

This theme examines aspects of the telehealth service delivery model that participants found to be positive or beneficial, as compared to the in-person service delivery model. Since parent participants received a variety of telehealth services, they were asked to answer all questions regarding their perspective of telehealth services in relation to the EI OT services they received. The OT was asked to answer the majority of questions in relation to her overall

experience providing EI OT services using telehealth, except for a few questions about the effectiveness for the specific families participating in this study. From the parent perspective, both parents reported that they could not think of any positive aspects of the EI OT telehealth services they received. Thus, all positive aspects of telehealth identified below are from the OT's perspective.

Increased Access to Service Provider

This subtheme presents a positive aspect of telehealth services for parents, although it was identified by the OT participant. The OT said that, from her perspective, parents had more access to her through the use of telehealth services than previous in-person services, which she thought was beneficial for them. With the use of telehealth, she mentioned that parents had the ability to check in with her between sessions by texting or calling her. While parents would sometimes send her texts between sessions prior to the COVID-19 pandemic, parents were using these forms of telehealth more frequently during COVID-19, and she could also get reimbursed for it (if it was a video or audio call). The OT stated:

Parents love it, they love the flexibility of it, they love the ability to touch base with the provider if someone in their house is sick. They love having access to me, if I permit it, they love having access to me when I'm also on vacation, so I think there are some good things to come out of it.

She added, "it was good to have that kind of contact with them and you like to feel like you're wanted, you're needed". This quote exemplifies that increased access was a positive experience for her as well (although it also presented as a challenge sometimes, as explained later in this report).

Flexibility of Services

Another positive aspect identified by the OT is the increased flexibility of services through telehealth, as compared to in-person. This includes geographic flexibility, as she said that she was able to see patients via telehealth when she was out of town and could not provide in-person services. She appreciated this flexibility as she could go on vacation and still see patients during this time. She also stated that telehealth provides more flexibility with timing. For instance, parents could check in with her between sessions if they had a question or update, rather than waiting for the next in-person session. Lastly, she also liked the flexibility of telehealth for team meetings, which involve several members of the care team meeting with the parent at the same time. She reported that telehealth allowed her to “pop in on those meetings when I’m driving”, which allowed for more flexibility in terms of timing. She also liked team meetings through telehealth because not everyone had to be in the house at the same time.

Limited Exposure to Illness

The OT thought that the use of telehealth holds families accountable from a health perspective and limits her exposure to illness. Prior to the COVID-19 pandemic, she reported showing up to family’s houses to provide therapy and finding out that someone was sick, which exposed her to illness. Given the context of COVID-19, she now asks screening questions to make sure everyone in the home is healthy before providing in-person services. This limits her exposure to illness, not only in terms of COVID-19 but also other illnesses. The OT stated that through the use of telehealth, a family can still receive services if someone in their home is sick, without exposing her and increasing the likelihood of her contracting the illness.

Challenges to the Use of Telehealth Services

Lack of In-person, Physical Interaction

All participants identified that hands-on aspects of therapy were challenging over telehealth, since NMES requires the therapist to administer the treatment. Given the hands-on nature of this intervention, as well as other services the parents were receiving, both reported telehealth was challenging since these hands-on components could not be completed. One parent said:

Inability for her [OT] to be in the home and perform the VitalStim®, I mean that is something that only she can do. It is not a piece of equipment that she could leave at my house and say “here in my absence you can hook him up and do it”, no, so only she could do it.

The parent added, “hands-on training with the VitalStim® was not even an option, just because it is something I cannot do as a parent, I have to have a specialist to do that”.

Another aspect of services that was challenging given the lack of in-person interaction over telehealth included that the OT was not able to demonstrate skills to the parent. Instead, she had to provide verbal instruction to the parent, which was more challenging for the parent to understand. It was also harder for the OT to observe over telehealth as compared to in-person, and thus harder to provide feedback. One parent stated, “she [OT] is really good at identifying the cues, even better than me as a mother, when it comes to aspirating, not aspirating, good mouth movement, good lip movement, good tongue movement. She just couldn’t see that in telehealth”.

The OT also identified this as an issue and pointed out that it impacted the effectiveness of services. She summarized her overall experience with telehealth by saying, “for what I

specifically do it was a tragic nightmare” and further remarked that, from her perspective, these challenges with telehealth caused families she worked with to feel that services over telehealth were meaningless. She stated:

From my perspective they became very meaningless to my families, so they were like “I don't see what else we can do on the screen, we need you here, look at her coughing and choking”. I'm talking them through how to do back blows, I'm talking them through how to get them out of chairs... so I mean for me it didn't work.

Logistical Issues with Environmental Set Up

All participants identified logistical issues over telehealth as another challenge. When using telehealth, parents had to handle many different factors simultaneously, including managing the camera, supporting their child in a highchair, feeding/interacting with their child, and maintaining the child's attention. One parent said:

My son, he can't sit up on his own, so he has to be in his supported chair. So then I am trying to have him in his supported chair, position the camera close enough, and then also have hands to feed. And that chair itself makes a gap as is, so it was just awful.

Another logistical issue was managing the camera angle and being able to see the child's mouth, since a main focus of treatment was feeding, and the therapist needed a good view in order to help address issues. One parent stated, “you cannot really see a baby's mouth, even if I have the camera close enough, not too close because he cannot touch it, but close enough that she can see him. It is just not nearly as effective”. The OT also mentioned that camera angles were a challenge for her, since some parents would not show their own face or show their child on camera, which made it challenging for her to interact and know what was happening.

Lastly, one parent stated that it was challenging to maintain the child's attention while juggling all these logistical issues. Specifically, her child wanted to play with the iPad (used as their camera during sessions), which further added to the logistical challenges of setting up the camera. She said, "it is really hard to keep a child's attention with telehealth because all they want to do is grab the device, they do not care about what you are trying to do, they just want to get the iPad".

Incompatibility with Learning Style

One parent and the OT mentioned that a further challenge of telehealth included that it was not as effective for visual learners. The OT explained that in the parent-coaching model used for EI the therapist demonstrates a skill/activity, then the parent and therapist do it together, and lastly the parent practices by themselves. Over telehealth, the OT said that the parent was missing the first two steps of this process, which is challenging for people who are visual learners. This was also reflected by the parent's experience, who mentioned that she learns better when she watches, then gets help with practicing, and receives feedback. Through telehealth, she was not able to watch the OT demonstrate a skill, so she did not find telehealth helpful in that regard. The parent stated:

She would tell me to practice liquids, or practice thicker foods, or practice baby foods, so that is something I would do after she left... it was nothing she could really show me over telehealth and then I could go practice and utilize.

Access to Equipment

One parent identified access to equipment as a challenging aspect of telehealth. For in-person services, she mentioned that the OT would bring many different adaptive equipment options to test with the child to see which were most effective for facilitating feeding. However,

over telehealth this was not an option since the OT was not able to bring the equipment to the home. The OT did report trying to overcome this challenge by mailing supplies to parents instead. While this did help support interventions she was implementing, it also brought up a further challenge of liability issues; if the families were to use the supplies without instruction and it had gone wrong, the OT could be held liable for this.

Issues with Parent Involvement

The OT identified that some parents either underused or overused telehealth services, which was challenging for her as the service provider. She remarked that some parents ignored telehealth services, saying, “I feel like it is easy to ignore telehealth, it's easy to not respond to a link, it was easy to not be accountable”. She thought parents responded better when they knew someone was coming to their home, since it is harder to ignore someone who is physically at their house.

On the other extreme of parent involvement, she experienced that some parents overused telehealth services. As explained earlier, increased access to the service provider was a positive aspect of telehealth for parents; however, some families overused this access, which was a challenge for the OT. She stated:

I have one family... that would call me everyday, several times a day, and talk for an hour at a clip... it got to be out of hand in that respect... I would have to ignore her calls and that just sort of intensified it. But she would everyday, “I need to talk to you, can we do a Google Duo?”, or she would just called me on Google Due, it didn't matter to her, and I said “I am with somebody right now”, “Well you need to hang up with them and talk to me”.

Safety Concerns

The OT highlighted safety concerns as another challenge of telehealth services, stating that she could not always see what was happening in the home or be there to intervene if needed. When using telehealth, she said it was easier to hide what was happening in the home, since the service provider could only see what the parent was showing them. She provided an example saying, “The little girl that almost died, we didn’t know she [mother] never took her out of the chair, if we had been in the house we would have had hands on her, we would have seen”. A further example included a child who almost starved to death; since the service providers were not coming to the home, they did not see that formula was stacking up instead of being used and that the parent was missing feedings. Overall, the OT stated, “it is very difficult to tell on a video platform if a child has lost weight or is bruised or is otherwise neglected.”

Another safety concern over telehealth was the inability of the OT to physically intervene if needed, for instance when children were choking or if a child was in physical danger. The OT stated that there were instances in which the parent left the room to get something or turned their back and was not aware of a safety hazard. To provide an example, OT said, “I’m yelling on the screen ‘she’s standing on the tray’”. There were other instances where a child was choking and the OT had to talk the parent through how to do back blows since she was not physically present to help. The OT summarized these different safety issues by saying:

I witnessed two children choke on the camera, one almost climbed out of a highchair and fall on their head. Two of the children died during this time from abuse and neglect, and one almost died of starvation. And when that happens there is a review board that meets and they talk about why and how to prevent it from happening again, and the prevailing

answer was that if we had been in the home, we would have reported to Children and Youth and it would not have happened.

Perceived Effectiveness of Telehealth as Compared to In-Person Services

Ineffectiveness for Hands-on Therapy

All participants found telehealth to be ineffective in terms of providing therapy that was hands-on. During in-person services, the OT provided NMES and CSFT for both families, and both parents as well as the OT pointed out that this type of therapy could not be provided over telehealth. One parent stated, “it is just 100% an in-person intervention”. When comparing in-person and telehealth services, the OT said about one family, “now that we're back half face-to-face with him, he is sailing, he has made so much more progress in his outcomes”.

Ineffectiveness for Parent Coaching

All participants also found telehealth to be ineffective for parent coaching, as compared to in-person services. One parent reported that she found parent coaching over telehealth ineffective since the OT could not demonstrate skills and walk her through how to do them. She stated that there was “nothing she could really show me over telehealth”. The other parent thought parent coaching worked over telehealth, but it was not as effective as in-person services. She said:

In person is just better because... she [OT] would actually be able to show me what to do, and then I would always try it, “oh you mean like this?”, or, “how did you hold that?”

And she was right there and she could do a little bit better of a job of showing me.

The OT found parent coaching to be ineffective for both of these families and commented that it was hard to demonstrate skills for the parents over telehealth and explain what she wanted them to do. With one family, she said that she would try to explain an activity but the parent did

not understand what to do, which made it hard to accomplish anything during the sessions. In comparison, during in-person sessions she could just demonstrate what she meant, which was easier for the parent to understand and replicate.

Effectiveness Dependent on Type of Service

All participants identified that they found telehealth to be more effective for other types of services. The OT stated, while she did not find telehealth effective for the majority of her case load, she did like using it for team meetings, since telehealth allowed for more flexibility and she did not need to be in the home for the meetings. She also reported that for one of the families she worked with she found telehealth to be as effective as in-person services. With this family, she used more of a problem-solving model, rather than hands-on therapy. She would meet with the mother and another service provider to discuss medical issues and trouble shoot behavior problems. She stated:

We were able to progress outcomes, we were able to troubleshoot physician appointments, and test results. And she was texting us and faxing us, texting us so that we could print on our machines, like all this information about her child, so I think it worked out really really well.

The OT also remarked that the mother was good at reporting, was very compliant, and followed through on suggestions. Further, she had received enough in-person services prior to the transition to telehealth that she knew what to do. Overall, the OT concluded, “it depends on the situation, depends on the family, depends on what I'm working on, if it would be effective or not. But by and large with the case load that I have right now it is not effective”.

The parent participants also stated that they found telehealth to be effective for other types of services their child was receiving. These included EI services from other professions,

such as nutritionists and EI special instructors. They mentioned that consultation-based services were effective, where they were just reporting to the professional and the provider did not need to physically see the child. One parent also mentioned that her data-based nutrition services were effective over telehealth, while her hands-on PT services were not effective. One parent said, “just for consults I actually prefer telehealth, it has been great”. She stated that she liked the convenience of not having to go to an office, since the travel and waiting adds time to the visit length and she could avoid this when using telehealth for these visits.

Future Considerations for Telehealth Use

Both parents reported that they do not want to use telehealth in the future for the specific EI OT services they are receiving. They added that given the context of COVID-19 and the alternative of not having any services, they did appreciate that telehealth was an option; however, they would not continue using telehealth for their EI OT services unless it was the only option available.

The OT said that she would use telehealth in the future but only for specific services for which she found it effective, such as team meetings. She would also use it when a family wanted to check in with her and she was not available for in-person services. However, she stated she would only use telehealth if she could continue to get reimbursed for services provided, since telehealth for EI OT services in PA were not covered by insurance prior to COVID-19.

When asked about ways to increase the effectiveness of telehealth services, one parent did mention that over time a few of the logistical challenges improved slightly as she got more experience and practice using telehealth. She said, “I feel like just more telehealth, attention span maybe was a little better. He got less interested in the iPad... And as time went on, we got better with camera placement and being able to see things”. However, both parents reported that they

did not think training in the use of telehealth would be effective since most of the challenges they were facing were related to the hands-on nature of the services they were receiving, and “there is just no way around it” and “it is not really easy to overcome that”. The OT stated that the telehealth training she received was helpful, but she did not think further training for her or for parents would be helpful because, “some things just are really tough and really ineffective over a video platform.”

Discussion

The results of this research indicate that, compared to in-person services, there are positive aspects to telehealth as well as aspects that are more challenging. Positive aspects that were identified in this research include flexibility of services and scheduling, which is consistent with existing research and is a commonly reported benefit of telehealth (Ashburner et al., 2016; Campbell et al., 2019). Increased access is another benefit of telehealth identified in this research. This theme has also been identified in previous literature; however, findings of those research studies have focused more on the aspect of increased access to OT services, rather than access to the service provider outside of scheduled sessions. For instance, previous research indicates that telehealth allowed for more regular and on-going services, especially for people who live in rural areas and could only see a provider inconsistently (Ashburner et al., 2016; Cason, 2009). This research study supports a different version of increased access, as it highlights that increased access to the service provider between consistent sessions was a benefit of telehealth services.

This research also revealed that reduced exposure to illness can be a benefit of telehealth for the service provider, since they have the option to provide virtual services if someone in the home is sick rather than risk contracting the illness through in-person services. This theme has

been identified in previous research; however, much of that research focused more on the patients. For instance, one study mentioned the benefit of telehealth for immunocompromised children, stating that it allowed them to receive services at home rather than visiting a clinic where they would be exposed to illness (Cason, 2009). This benefit for immunocompromised children was also identified in a more recent study looking at the use of telehealth during the COVID-19 pandemic (Murphy, 2021). When searching databases using appropriate key words, only one study was found that identified reduced exposure to illness as a benefit to the service provider. Hoel et al. (2020) examined the use of telehealth for OT services during COVID-19 and identified that providers felt safer working via telehealth during the pandemic and had lower fear of contracting or spreading COVID-19, since they were not providing in-person sessions. While the research by Hoel et al. does identify the benefit of limiting exposure to illness for the service provider given the context of COVID-19, results from this research study take it one step further by showing that telehealth can limit the provider's exposure to illness in general, not just during the COVID-19 pandemic, and allows patients to still receive services when someone in their home is sick. This beneficial aspect of telehealth was likely identified only in current research studies given society's increased focus on health and heightened precautions regarding illness in the context of COVID-19.

In terms of challenges to the use of telehealth services, this research study identified that lack of in-person and physical interaction, logistical issues, and access to equipment are all barriers to the use and effectiveness of telehealth. These findings are supported by existing research studies, which have frequently identified these themes (Campbell et al.'s study, 2019; Hoel et al., 2020; Rortvedt & Jacobs, 2019; Tenforde et al, 2020). This research study further added to the existing understanding of challenges to the use of telehealth by establishing that

safety concerns could present a major challenge to providing telehealth services, since the service provider cannot see everything that is happening in the home and is not able to physically intervene if needed. While previous research addresses safety concerns, it mainly focuses on the aspects of security and privacy when using virtual platforms (Cason et al., 2012). Another study addressed the concern of supervision of elementary school children if they left the visible area during a session (Rortvedt & Jacobs, 2019). A thorough search of databases identified only one study that addressed safety concerns similar to the findings in this research. Physicians in Lebanon identified ‘safety of telemedicine’ as a theme in a recent study about the use of telehealth during the COVID-19 pandemic; one participant mentioned concern about missing signs of physical abuse because a thorough examination could not be administered through telehealth (Helou et al., 2020). Thus, the findings of this research highlight specific safety concerns that have not been addressed in most previous research. It identifies that safety issues occurring in the home, such as abuse and neglect, may be easier to hide over telehealth, and the service provider cannot physically intervene if needed, for example when a child is choking. Lastly, this research also found that a visual learning style may not be as compatible with telehealth. Parent involvement with telehealth, either in the form of underusing or overusing telehealth services, was further identified as a challenge. Through database searches, no existing literature was found that mentioned either of these challenges to the use of telehealth.

The results of this research indicate that all participants found telehealth to be ineffective for the hands-on services they were providing or receiving, as well as for parent coaching, since the hands-on NMES and CSFT could not be provided and it was hard for the OT to demonstrate skills, observe, and provide feedback to parents over telehealth. While there is limited previous research about the effectiveness of telehealth for EI OT services specifically, research exists

about the effectiveness for EI services across a variety of professions, as well as for pediatric OT services. Those studies provide preliminary evidence that supports the use of telehealth for EI services and for pediatric OT services, both in terms of child outcomes and parent coaching. However, the majority of this research involved interventions that focus on parent training to address their child's behavioral problems, sensory processing issues, engagement in play and other activities, handwriting performance, and development of motor skills (Benham & Gibbs, 2017; Criss, 2013; Gibbs & Toth-Cohen, 2011; Lindgren et al., 2016; Little et al., 2018; Meadan et al., 2016; Vismara et al., 2009; Vismara et al., 2012; Vismara et al., 2013; Vismara et al., 2016). Thus, the services provided in those studies differ vastly from the hands-on NMES and CSFT provided to participants of this study. While the participants in this research study found telehealth to be ineffective for the specific hands-on EI OT services they were receiving, they did find telehealth to be an effective form of service delivery for more consultation-based and problem-solving oriented services. This indicates that participants did not find telehealth in general to be problematic; rather, they found telehealth challenging and ineffective as a service delivery model for the specific hands-on services they were providing or receiving in EI OT. Overall, the findings of this research and the contrast to the findings of other research may further support the theme that the effectiveness of telehealth is dependent on the type of services and interventions that are provided.

In fact, there is some research that discusses the idea that effectiveness of telehealth may be dependent on several factors. One research study which surveyed the parents of children with disabilities who were receiving a variety of therapy services over telehealth during COVID-19 found that satisfaction ratings were associated with the setting type in which services were received (outpatient, school-based, or EI). The author proposed that satisfaction ratings differed

between these settings because services differed in terms of their focus and the type of services received (Murphy, 2021). Additionally, in a discussion article about the use of telehealth during COVID-19 for families of children with disabilities, the authors acknowledge that certain types of services may be more effective to implement in-person, such as hands-on therapy and interventions requiring specialized equipment, while other services may be more suited for telehealth, such as team meetings (Camden & Silva, 2021). These statements are consistent with the findings in this research study, as the participants reported challenges with hands-on therapy and the use of specialized equipment (VitalStim® used for NMES). Additionally, the OT identified team meetings to be effective over telehealth. Camden & Silva (2021) further stated that these factors should be taken into account when determining the use of telehealth services, as well as other factors, such as the family and child goals and needs. These findings support the theme that the effectiveness of telehealth may be dependent on the type of service. However, another research study about the use of telehealth during COVID-19 for outpatient hospital therapies (PT, OT, and SLP) found that overall satisfaction was independent of therapist type, visit type, and reason for the visit (Tenforde et al, 2020). Thus, across different research studies, results and opinions differ regarding the effectiveness of and satisfaction with telehealth services as related to the type of service provided.

This research study found that neither of the two parents interviewed were interested in using telehealth in the future for the specific EI OT services they were receiving, since they were not satisfied with telehealth for these services and found it to be ineffective due to the challenges they faced. However, there are various other research studies about the use of telehealth during the COVID-19 pandemic that indicate patients had high rates of satisfaction with telehealth and would use it in the future. For instance, in a study of caregivers of children receiving therapy or

educational services over telehealth during COVID-19, the majority of participants found telehealth to be helpful, with only 14% finding it ‘not at all helpful’ (Jeste et al., 2020). The study by Murphy (2021), about parents of children with disabilities who were receiving a variety of therapy services over telehealth during COVID-19, found that 30% reported low satisfaction with services. In another study of participants receiving outpatient therapy services (PT, OT, or SLP), 78% reported that their overall visit satisfaction was ‘excellent’ and none reported ‘fair’ or ‘poor’ satisfaction (Tenforde et al., 2020). Satisfaction with telehealth services has also been reported in studies prior to the COVID-19 pandemic, with parents in a study about the use of telehealth for EI OT services reporting high levels of satisfaction and beliefs that their child benefited from it (Serwe, 2018). Notably, the intervention provided in Serwe’s (2018) study was focused on consultative therapeutic services for caregivers to facilitate interactions with the child. Additionally, some of these research studies indicate that parents would use telehealth services again in the future. Murphy (2021) reported that 55% of parents indicated they would use telehealth services for their child again. Tenforde et al. (2020) also found that patients reported they would like to have the option of using telehealth for their therapy services in the future, with 69% reporting that they thought there was ‘excellent’ value in having future telehealth visits. Overall, the results of other research differ from this research study in terms of the reported future use of telehealth services, which may further support the theme that the perceived effectiveness of and satisfaction with telehealth services is dependent on the type of services.

This research further identified potential ways in which the effectiveness of telehealth as a service delivery model could be increased. One parent mentioned that increased time and practice with telehealth helped with overcoming a few specific logistical challenges associated

with the use of telehealth. Previous literature has found similar results, with participants who had practice using telehealth reporting that they were more comfortable with the platform, as compared to participants who had never used it before (Campbell et al., 2019). While these findings indicate that increased practice with telehealth may be helpful regarding logistical issues with telehealth, neither parent in this study thought that training in the use of telehealth intervention would have increased the effectiveness of services, since they thought most of the challenges faced could not be overcome given the need for hands-on services. The OT did find training in the use of telehealth platforms helpful, but she expressed the same view as the parents, stating she did not think further training about how to implement intervention using telehealth would be helpful because it is hard to overcome the challenges of providing hands-on therapy virtually. However, various other research studies about the use of telehealth during the COVID-19 pandemic have identified that both service providers and patient participants thought that training in the use of telehealth platforms would be helpful, as well as having access to technological support (Camden & Silva, 2020; Hoel et al., 2020).

Implications for Occupational Therapy Practice

This research has identified several findings that could be implemented into OT practice regarding the use of telehealth for EI OT services. As indicated by the theme that the effectiveness of telehealth may be dependent on the type of service received, it could be helpful for OTs to evaluate several factors when considering the use of telehealth services. This includes evaluating if telehealth could be effective and feasible given the specific type of service they are providing, as well as to consider adapting their service delivery method if necessary and applicable. It might involve considering the positive aspects and challenges to the use of telehealth that have been identified in this research, and determining which may be applicable to

their practice. When evaluating the feasibility of telehealth for the service type, it is also important for OTs to consider if telehealth is a good fit for the specific family they are working with. This might involve considering which benefits and barriers to the use of telehealth are applicable to the family, including looking at parent learning style and involvement. By evaluating different factors identified in this research study, as well as in existing literature, OT practitioners may be able to determine whether telehealth is an appropriate option, and thus increase the likelihood of its success. Other research has highlighted that therapists can engage families in this process, where appropriate, by discussing advantages and disadvantages of each approach (Camden & Silva, 2021). On the other hand, a specific type of service that otherwise might not see amenable to telehealth might possibly become more feasible when adjustments and adaptations are made to improve the effectiveness of using telehealth. This might become especially important when telehealth is the only option as a service delivery method, which was the case during the COVID-19 pandemic, as discussed below.

A major finding of this research study is the importance for OT practitioners to be aware of potential safety concerns associated with telehealth, which they should consider in their evaluation of whether to use telehealth. Findings of this research study establish that safety issues with telehealth can be serious. While some of these safety concerns might not be completely addressed by the use of in-person services, some of the safety issues may be easier to prevent when a provider is regularly present in the home. For this reason, when determining the use of telehealth and when actually providing telehealth services, it is important for practitioners to be aware of the concerns identified by this research in order to prevent danger to the child.

Further, this research has implications for OT practice in relation to the current context of COVID-19. While it is helpful to evaluate whether telehealth is a good choice, this was not an

option during the COVID-19 pandemic, as telehealth was the only available option for practitioners to provide EI OT services. This research identifies challenges that OTs may have to take into account when using telehealth. In instances where telehealth is the only available option, practitioners must be proactive and find ways to adapt delivery methods used with telehealth, in order to minimize some the identified challenges. Findings from this research can help OTs in this process by identifying challenges they may need to address, as well as some potential solutions. For instance, shipping supplies to patients could help overcome the challenge of access to equipment, and setting clear boundaries for families could help address issues with parent involvement. Practitioners might also want to consider using a specialized baby doll as a model to demonstrate techniques. In terms of safety concerns, it could be helpful to provide clear expectations stating that the parent should not leave the room during the session, as well as being proactive by teaching caregivers how to perform back blows ahead of time (to help a child in case choking occurs during feeding practice). Providing training and time to practice using telehealth could also be beneficial in addressing some of the logistical challenges of telehealth. Lastly, using the identified challenges, it would be helpful for OTs to modify programs and interventions to fit the telehealth service delivery model. Most of the research supporting the effectiveness of telehealth for EI services and pediatric OT services used interventions or programs that had been adapted and created specifically for implementation over telehealth to increase their success (Benham & Gibbs, 2017; Criss, 2013; Gibbs & Toth-Cohen, 2011; Meadan et al., 2016; Vismara et al., 2018). Since the telehealth service delivery model presents unique challenges, it could be helpful for OTs to proactively adapt their treatment approach while taking these challenges into account.

Overall, this research adds to existing literature and identifies a variety of aspects of telehealth use in EI OT services that should be considered when evaluating if telehealth services are a good option or that may have to be adapted to increase its feasibility. In fact, the importance of using clinical reasoning to consider whether telehealth is a safe and effective method has been highlighted in the AOTA position paper about the use of telehealth as a service delivery model in OT (Cason et al., 2018). Further, this research identifies challenges to the use of telehealth that need to be addressed when this is the only option for service delivery, and provides preliminary ideas on how to adapt to and overcome the identified challenges.

Limitations

Limitations to this research include the use of a small sample size, which limited the variety of participants recruited. All participants were providing/receiving the same type of EI OT services, and since perceptions of telehealth may be dependent on the type of service, the limited variety in this study could have impacted results. Additionally, the use of convenience sampling for participant recruitment could have further limited the variety of participants and biased the sample. Retrospective bias could have also been present, since most participants provided/received the majority of telehealth sessions approximately one year ago. This could have biased their perception of the services and thus impacted the results of this study. Lastly, a deductive approach was used for thematic content analysis, which could have limited results by providing a less rich description of the overall data set, since data coding was focused on themes based on the original research questions.

Future Research

While this research adds to the body of knowledge about the use of telehealth as a service delivery model, further research is needed in several areas. Since a major limitation of this study

was the use of a small sample size, continuation of this research with a larger sample size is needed to provide more reliable and meaningful results. Further, it would be valuable to conduct future research studies that include participants who are providing/receiving diverse types of EI OT services, in order to identify challenges associated with different types of services and determine the effectiveness of telehealth services based on the type of service. Identifying unique challenges for different types of services could help pinpoint areas that need improvement and services that might have to be adapted to the use of telehealth to increase effectiveness and safety. Understanding the challenges unique to service types might help determine the overall feasibility of telehealth for each specific service and could be valuable for OTs to use as a guide when considering implementation of telehealth as a service delivery model.

Additionally, further research is needed that uses a more rigorous study design, as there are limited rigorous studies that examine the use of telehealth services in EI OT. While qualitative, self-report research studies with in-depth interviews are a very valuable form of research to understand a person's lived experience, it would be important to have more objective information about the use of telehealth and its effectiveness as a service delivery model. For instance, a study using a more rigorous quantitative design, such as a randomized controlled trial, and standardized assessments to measure outcomes, would be helpful to provide objective information about the effectiveness of telehealth services in EI OT, and allow for results that could be generalized.

Conclusion

This research identifies several themes regarding the use of telehealth for EI OT services during the COVID-19 pandemic as compared to previous in-person services, including positive aspects of telehealth, challenges to the use of telehealth, perceived effectiveness of telehealth

services, and future considerations for telehealth use. Positive aspects of telehealth identified in this study include increased access to the service provider, increased flexibility, and limited exposure to illness for the provider. Challenges to the use of telehealth include problems associated with the lack of in-person services, such as the inability to provide necessary hands-on services and issues demonstrating and observing skills. A major challenge identified is safety issues, such as the inability to physically intervene when necessary and difficulty seeing abuse and neglect happening in the home. Further challenges include logistical issues and access to equipment, as well as the potential incompatibility of telehealth with parent learning styles, specifically for visual learners, and issues with parent involvement when using telehealth, including overusing or ignoring services. Due to these challenges, participants found telehealth to be ineffective for the specific and necessary hands-on EI OT services, as well as for parent coaching. However, participants reported that the effectiveness of telehealth was dependent on the type of services they were providing/receiving, specifying that they found telehealth to be better suited as a service delivery model for consultation-based and problem-solving-oriented services. Overall, participants were disinterested in using telehealth for specific hands-on EI OT services, although they would consider using telehealth in the future for other services for which they found it to be effective. Findings from this research identify various challenges that EI OT practitioners should evaluate when considering the use of telehealth. Such evaluation could help determine if telehealth would be effective as a delivery model for the services they are providing and for the family they are working with, or whether they may have to adapt services to increase the feasibility and safety of telehealth services under consideration. While these findings add to previous literature regarding the use of telehealth for EI OT services, further research is needed

to verify the reliability of these results, to compare the use of telehealth for different types of EI OT services, and to identify ways to adapt to and overcome challenges to the use of telehealth.

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Appendix

Interview Questions for OT and Family Participants

Background/contextual questions:

1. What was your experience with technology and telehealth before COVID-19?
2. How many telehealth sessions did you provide/receive during COVID-19? When were these sessions? Are you back to using in-person sessions now?
3. For OTs: What type of EI OT services do you provide?
4. For parents: What is the age of your child and their diagnosis/why they are receiving services?
5. What did a typical in-person therapy session entail? Typical telehealth session? How were these sessions similar/different?
6. What form of telehealth did you use for these sessions (videoconferencing, phone calls, emailing, texting, etc.)?
7. Do you live (or provide services) in a rural, suburban, or urban area?

Questions about positive aspects of telehealth:

8. What did you like most about telehealth as compared to in-person services?
 - a. Follow up: What components do you think would be helpful for continued use of telehealth?

Questions about barriers to the use of telehealth:

9. What did you like least about telehealth as compared to in-person services?
 - a. Follow up: Is there anything you would have changed or anything that could have improved your experience?

Questions about effectiveness of telehealth:

10. Do you think telehealth was effective for the child in reaching his/her goals?
 - a. Follow up: How does this compare to the effectiveness of in-person services?
11. Do you think telehealth was effective in coaching the parent on how to help their child reach his/her goals?
 - a. Follow up: How does this compare to the effectiveness of in-person services?

Questions about overall perception of telehealth:

12. What was your perception of telehealth before COVID-19 and what is your perception of it now that you have used telehealth services more frequently?
 - a. Follow up: If your perception of telehealth has changed, what factors do you think contributed to this change?
13. Would you want to continue using telehealth in the future, even after COVID-19 restrictions have ended? Why or why not?
 - a. Follow up if answer no: Given the context of COVID-19, do you think telehealth services were helpful during this time?
 - b. Follow up if answer yes: Would you recommend telehealth to other parents/therapists?
 - c. Follow up: What would you share with other parents/therapists who wanted to use telehealth?