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The Effects of COVID-19 on the Service Delivery of Speech and Language Therapy: A Literature Review

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Murray State University Honors College

HONORS THESIS

The Effects of COVID-19 on the Service Delivery of Speech and Language Therapy: A

Literature Review

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Approved to fulfill the
requirements of HON 437

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The Effects of COVID-19 on the Service Delivery of Speech and Language Therapy: A
Literature Review

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of the requirements
for the Murray State University Honors Diploma
Nancy Hanna Hill
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Abstract

The purpose of this thesis was to investigate the effects of the novel coronavirus disease 2019 (COVID-19) pandemic on the service delivery of speech and language therapy services in schools, early intervention, and outpatient settings. This analysis examined various service delivery settings in the realm of speech-language therapy that were affected by COVID-19. Per guidance of the Centers for Disease Control and Prevention (CDC), worldwide governing legislatures, and American Speech-Language-Hearing Association (ASHA), many measures were put into place throughout the spread of COVID-19. Quarantine, the use of various protective tools, and social distancing interrupted face-to-face services that are essential to speech-language services. For this literature review, research focused specifically on providers and children in early intervention and preschool through second grade. This analysis aims to analyze the differences in the quality of services provided and identify the challenges that arose in service delivery due to the pandemic and its guidelines. In addition, this analysis attempts to explain the importance of face-to-face speech-language therapy services and how they were affected during the outbreak of COVID-19.

Introduction

In December 2019, the Wuhan Municipal Health Commission in Wuhan, China reported cases of pneumonia of unknown origin (World Health Organization [WHO], 2020). The World Health Organization (WHO) announced in January 2020 that the reported pneumonia cases in Wuhan, China were, in fact, a new coronavirus (World Health Organization, 2020). The novel coronavirus was officially named COVID-19 and is caused by SARS-CoV-2 (Centers for Disease Control and Prevention [CDC], 2021). As of November 2021, WHO confirmed 252 million cases of COVID-19 in 220 countries around the world (WHO, 2020). In the United States, there have been 46.4 million confirmed cases and over 751,000 people have died from the virus, according to WHO. The first confirmed COVID-19 case in the United States was on January 21, 2021, and WHO declared the virus a pandemic on March 11, 2020. According to the Centers for Disease Control and Prevention (CDC), a pandemic is “an epidemic that has spread over several countries or continents, usually affecting a large number of people” (CDC, 2012). A national emergency was declared on March 13, 2020, in the United States by former President Donald Trump (WHO, 2020). It is at that time that the United States was faced with the task of preventing the spread of the virus. However, the country, and the entire world, were vastly underprepared. Daily lives were interrupted in every aspect, including in the realm of speech-language pathology services.

The spread of COVID-19 is primarily through respiratory droplets (Omer et al., 2020). When a person affected by the virus coughs, sneezes, or speaks, infected droplets can land on another person that is within six feet, or potentially farther, of them (Omer et al., 2020). The easily transmissible nature of the virus prompted global governments to implement measures to protect the public and prevent the spread. For example, in the United States, social/physical

distancing measures, lockdowns, face mask mandates, and the closure of schools and businesses were implemented. These measures were enacted to curb the spread of the virus and control the outbreaks. Without these regulations, the effects of the virus would assuredly have been catastrophically worse (Atalan, 2020). However, the effects of the regulations that were implemented to protect citizens of countries affected by COVID-19 have undoubtedly impacted said citizens.

This thesis explores several questions concerning the effects of COVID-19 on the service delivery of speech-language therapy services. It examines the various restrictions and precautions of the COVID-19 pandemic and how they impacted service delivery. It also examines the importance of in-person therapy and how they were affected during the pandemic. In addition, it also examines the differences in quality of services provided and the challenges that arose during service delivery.

For individuals involved in speech-language pathology, whether as professionals or as patients, COVID-19 changed the way services were delivered. In normal circumstances in the absence of a pandemic, the majority of services are delivered face-to-face. Speech-language pathologists (SLPs) typically need a close distance when working with their patients in order to provide treatment and assessments (Tohidast et al., 2020). SLPs place an emphasis on mouth, lip, and tongue movements during therapy such as articulation; however, this tool is difficult to use amidst COVID-19 procedures (Gunjawate et al., 2020).

One of the main restrictions that affected the use of face-to-face services was the closure of schools and businesses. During the spring of 2020, beginning in early February, schools and businesses began discontinuing in-person services and switching to virtual platforms in order to comply with social distancing and lockdown measures (Decker et al., 2020). Social distancing

refers to staying at home and away from others, when possible. to prevent spreading COVID-19, which is the less severe version of the stay-at-home orders (or lockdowns) that essentially required schools and businesses to close (Maragakis, 2020). This closure severely affected SLPs and patients alike.

In the United States, nearly eight percent of children ages 3-17 have a communication disorder, roughly 55% of which receive intervention services (Black et al., 2015). The children who receive services either had to do so virtually, in a modified face-to-face format, or not at all. Many children on caseloads have Individualized Education Plans (IEPs) that state what services schools must provide in order to serve their disability (Kaiser & Roberts, 2012). Even in a pandemic, IEP services are still required. Virtual therapy does not work for all students, based on their individual needs, and may not fit best for the services required in the IEP (Taylor, 2020). One topic this thesis explores is the differences in the quality of services provided during the pandemic compared to before the pandemic, specifically if the quality served the student appropriately according to each individual's IEP requirements, and what some of the challenges were that arose.

In addition to virtual therapy, the use of masks and physical distancing impacted the service delivery of speech pathology. For SLPs who were able to continue offering services in-person, masks and social distancing hindered the face-to-face format. A face mask covers the user's nose and mouth in an attempt to limit exposure to infected respiratory droplets and large particles, while also preventing individuals who have COVID-19 from spreading the virus (Food and Drug Administration [FDA], 2021). Face masks obstruct the mouth when they are worn if the mask does not have a clear insert where the lips should be. This obstruction makes demonstrating mouth, lip, and tongue movements difficult, if not impossible. Masks remove the

ability to read lips and muffle sounds, which can make speech more difficult to comprehend (American Speech-Language-Hearing Association [ASHA], n.d.a).

Furthermore, physical distancing measures were also implemented. Physical distancing refers to the practice of keeping at least a six feet difference between individuals in order to avoid contact with the virus (Maragakis, 2020). Physical distancing has the potential for speech to sound quieter and makes seeing visual cues that assist in communicating meaning more difficult (ASHA, n.d.a). Even if SLPs and clients were able to remove their masks by sitting six feet apart with plexiglass barriers between them, distance hinders effective communication (Acoustical Surfaces, Inc., n.d.). In sum, SLPs and patients are not truly face-to-face with a mask and at least six feet between each other.

Significance

It is essential to understand how the service delivery of speech-language therapy services were affected by COVID-19 in order to determine the success of patients. It is important to know what effects the COVID-19 pandemic precautions had on providing services to clients, specifically young clients, so SLPs can evaluate the outcomes of therapy. The overarching goal of speech-language therapy is to improve overall communication by addressing delays and/or disorders. One hypothesis of this study is that COVID19 restrictions and precautions resulted in a different and potentially lower quality of services. This lower quality of services has the potential to affect the outcomes of therapy.

This study focuses on children in preschool through second grade, ranging from ages three to eight, which is the age group where the prevalence of speech, language, swallowing, or voice disorders is the highest (Black et al., 2015). Age is one of the most critical factors in the development of speech and language (Tohidast et al., 2020). Delays that occur in the early years

of life in the development of speech and language are some of the earliest indicators of deficits that may affect many disciplines of development (e.g., academic and social) for individuals across aging and the life span (Kaiser & Roberts, 2012). There is a dire need for children who exhibit delays and disorders to receive SLP services due to the significance of age in childhood development, specifically in terms of speech and language. A hindrance in services can equal the persistence of speech and language problems in children, in addition to decreasing their quality of life in the future (Tohidast et al., 2020). When intervention-based support is removed, children who have speech, language, voice, or swallowing difficulties are at a higher risk for long-term delays in speech, language, reading, socio-emotional, and academic development (Tambyraja et al., 2021).

Understanding the impact of intervention and supports on children is key to understanding the repercussions of their removal. This study attempts to elucidate how the removal of face-to-face support systems provided in the field of speech-language pathology could potentially lead to regressions, developmental delays not being treated or remediated as quickly, and backlogs in testing—which can lead to students not being identified for services.

In terms of speech-language pathology, regression refers to “any convincing report of loss of previously acquired skills, whether or not prior development was reported as normal or delayed” (Wilson et.al, 2003, 509). Children typically regress when faced with a stressful event or a drastic change in their lives (American Academy of Pediatrics, 2009). Additionally, regression can happen, specifically with speech and language skills, when children are not consistently immersed in specific skills and practicing them in various settings (e.g., school, therapy, or the public sector). When COVID-19 precautions were put into place, many of the

settings mentioned above were affected, meaning that some children were not consistently receiving interventions or being able to practice their skills in school.

In order for a child to qualify for speech-language therapy services, he or she must be evaluated. “SLPs must work as part of an interdisciplinary team that uses a variety of assessment tools and strategies to gather developmental, functional, and academic information” (U.S. Department of Education, 2006; CFR 300.304). Due to the restrictions implemented for COVID-19 precautions, assessment procedures slowed or halted altogether (Chadd et al., 2021). Waiting lists for evaluations have significantly increased, along with a delay in early intervention leading to children not receiving services when they need them (Clegg et. al, 2021). As schools and clinics begin opening again and returning to semi-normal operations, speech-language pathologists have been overwhelmed by the large number of children needing speech and language services (Chadd et al., 2021). This backlogging may remain to be a problem for many years to come. Children may be overlooked or never receive services. If they do receive services, it may be months or years after they need them. This study aims to recognize and explain how COVID-19 precautions changed the entire trajectory of the field of speech-language pathology.

Review of Literature

Service Delivery during COVID-19

Service delivery in speech-language pathology is provided mostly via one-on-one, face-to-face. Service delivery refers to the modality used to target goals specific to the individual receiving services (ASHA, n.d.c). According to the American Speech-Hearing-Language Association (ASHA), the service delivery method selected is dependent upon the client's needs, evidence-based practice, and clinical appropriateness. Service delivery consists of setting (the location of treatment), dosage (frequency, intensity, and duration of treatment), format (one-on-one, group, or via consultation), and provider (individual providing treatment) (ASHA n.d.c).

In a study by Chadd et al. (2021), the impact of COVID-19 on the service delivery of speech therapy was explored. The population of the study included roughly 17,000 speech-language pathologists who were members of the Royal College of Speech and Language Therapists (RCSLT). Two surveys were conducted, the first in April of 2020, and the second in August-September of 2020. The surveys sought to answer the following: nature of changes in roles of SLP's, responsibilities and duties, the extent of intervention provided, beneficial changes to clinical practice, and service delivery. In order to determine the impact of COVID-19 on service delivery, the results were compared to previous data regarding service delivery before the COVID-19 pandemic.

The results of this study indicated that there were significant changes in the speech-language therapy profession, which included the use of different service delivery methods. The first survey included 544 SLP's, and 343 (63.1%) reported an altered method of service delivery. Furthermore, 266 (48.9%) reported they no longer were directly, or face-to-face, providing services. 240 (44.1%) responded that their location of service delivery was affected due to the

closure of places of work, such as schools or clinics. For those who did continue to provide services, 330 (60.7%) and 237 (43.6%), respectively, reported that more services were provided via telephone or video conferencing. The frequency of clients seen also changed, with 242 (44.5%) reporting a decrease in frequency of services and clients receiving services. In the initial survey, results indicated that 406 (74.5%) of respondents had clients not receiving intervention. In the second survey, 313 (83.5%) reported the same. The reasoning for the lack of intervention was most commonly cited to changes in service delivery based on policies and national guidance, lack of access to teletherapy for clients, and/or teletherapy was not suitable for specific clients. Teletherapy was cited to not be suitable for specific clients due to goals not achievable when not in-person, attention decreased significantly due to distractions, and certain impairments/disorders made it difficult for the client to attend and stay engaged.

In sum, both surveys presented data that suggests SLPs have faced considerable changes to service delivery in terms of format, setting, and dosage. Multiple factors have caused these shifts in service delivery, specifically mandates and restrictions at the local, state, and national levels. SLPs have adapted to these changes, and many have switched to online service formats in order to provide therapy remotely. However, not all respondents reported such drastic changes. The survey results indicated that many SLPs did not have to alter their method of service delivery, as they were not greatly affected by COVID-19 in their practices. Overall, the impact on service delivery, as supported by data in the survey, has been substantial.

Telepractice

What is Telepractice?

Telepractice is the act of a service provider virtually providing clinical care to their clients. Specifically, “teleservice (telepractice) means the application of telecommunications

technology to the delivery of services at a distance by linking the practitioner to a student, parent/caregiver or other service provider for assessment, intervention, or consultation, often through related services identified in a student's Individualized Education Plan (IEP)" (Taylor, 2020). The use of teletherapy varies for each field of service. Fields such as speech and language, occupational, and mental health therapy services are provided via an online format through telehealth (Goode & Shinkle, 2019). During virtual sessions, both the client and clinician are able to hear and see each other in a synchronous (client interactive), asynchronous (store-and-forward), or hybrid (combination(s) of synchronous, asynchronous, and/or in-person) environment (Stanford, 2020). The services provided via teletherapy are intended to be functionally compatible to what the therapist would provide over a face-to-face format (Taylor, 2020).

Prior to COVID-19, the use of telepractice was not a common occurrence. The adoption of telehealth has steadily increased over the last 20 years until the COVID-19 pandemic greatly accelerated its use (Monaghesh & Hajuzadeh, 2020). As reported by the American Academy of Psychiatry (2021), 64% of survey respondents reported zero patients on their caseload received services via telehealth prior to the U.S. lockdown precautions in 2020. However, as of January 2021, 80% of respondents reported they provided services via telehealth to between 75-100% of patients. While this study was conducted among psychologists, it is relevant to SLPs due to the fact that many SLPs did not use telehealth prior to the pandemic (Chadd et al., 2021). Before the pandemic, teletherapy was mainly used for rural patients who had trouble reaching a provider (Showalter, 2020). However, with the outbreak of COVID-19 in the spring of 2020, a need for contactless access to therapy arose. Due to the high rate of transmission COVID-19 exhibits,

telepractice has allowed service providers to interact with their patients without an increased risk of infection from the virus.

Telepractice in Speech-Language Therapy

The American Speech-Language Hearing Association defines telepractice, in terms of speech-language pathology and audiology, as “the application of telecommunications technology to the delivery of speech language pathology and audiology professional services at a distance by linking clinician to client or clinician to clinician for assessment, intervention, and/or consultation” (ASHA, 2005). Telepractice is sometimes used synonymously with “telehealth,” “teletherapy,” “telespeech,” “telemedicine,” or “telerehabilitation,” though ASHA primarily employs the term “telepractice.”

In terms of service delivery models, telepractice is relatively new in the field of speech-language pathology. Telepractice for SLPs was first pioneered in the mid-1970s at the Birmingham Veterans Administration (VA) Hospital, where most forms of telehealth or telemedicine were being developed and used by VA hospitals (Houston, 2013). It began as a project by Dr. Gwenyth Vaughn of the audiology and speech pathology services and was intended to provide remote capabilities for service delivery for clients seeking services in speech, language, or hearing. Over the course of four decades, development and research of telepractice has continued and been adopted by service providers.

In 2005, ASHA determined that telepractice is an appropriate mode of service delivery (ASHA, 2005). When using telepractice, clinicians must provide services that are equivalent in quality to in-person services while also adhering to state and federal laws, ASHA policy, ASHA Code of Ethics, and ASHA Scope of Practice (ASHA, 2005). ASHA (2005) defines the roles and

responsibilities of a teletherapist as utilizing appropriate technology, following regulations for technology use, selecting clients who are appropriate for assessment and intervention via telepractice, maintaining appropriate documentation, and respecting established regulations regarding telepractice. The constantly evolving nature of telepractice requires ongoing education and training and may even include licensure for a number of states. In order for telepractice to be an appropriate service model for clinicians, it must be a conscious effort to fulfill their roles and responsibilities in a comparative manner of in-person services, while also managing technology, utilizing ethical considerations, and following telepractice-specific rules and regulations.

Efficacy of Telepractice

The efficacy of telepractice has been a popular topic of issue that has been studied and researched since its introduction. Specifically, concerns about the quality and efficacy of service delivery via telepractice versus in-person services have risen. A number of studies have been conducted and determined that results achieved through telepractice and in-person service delivery models were equivalent. However, due to the small, specific population involved in the studies, it was noted that telepractice should not be used as a complete replacement for in-person services (Wales et al., 2017).

In a study by Wales et al (2017), the effectiveness of speech-language interventions provided through the service model of telepractice versus traditional in-person delivery was explored for school-aged children (ages 4-12 years). For this study, a systematic review was conducted through the use of five databases, two journals, and reference lists. Seven articles were selected for the use of the study and focused on the delivery of speech and language intervention of school-aged children through telepractice. Of the included studies, two consisted of randomized controlled trials, two were comparison studies of the validity of telepractice

delivery in comparison to in-person delivery, and three studies used a pre- versus post- study to determine improvements in intervention using telepractice. Five of the studies investigated both speech sound and language intervention and two investigated specifically speech sound intervention via telepractice. In order to examine the efficacy of telepractice, the included studies used six outcome measures: the *Goldman Fristoe Test of Articulation* — second edition (*GFTA-2*), Functional Communication Measures (FCMs), goal achievement, informal probes, changes reported on progress reports, and comparison of pre-intervention baseline with post-intervention production levels.

The results of this study indicated that most of the studies reviewed found telepractice delivery comparable to in-person services for school-aged children. Three studies used pre- and post- intervention tested with the *GFTA-2* to compare telepractice to in-person delivery. All three studies reported significant progress in both service delivery models, with no significant difference between the two models. Two studies used (FCMs) to measure progress and outcomes. Both studies reported conflicting data for each telepractice delivery group and each in-person delivery group. For speech intervention via telepractice, improvement in speech production was increased in one study and lower in the other. For language intervention via telepractice, improvement was lower in one study and higher in the other, respectively. Two studies used goal achievement to determine outcomes in telepractice only. 73.68% achieved or exceeded their goals in one study and 60% achieved all goals in the other. One study used informal probes to examine progress and reported that all participants made progress in their speech and language goals. Two studies used progress reports for outcome measurements. In one study, 75% of participants in both telepractice and in-person delivery made adequate progress. In the other study, 88% of participants made adequate progress in the telehealth model and 84%

made adequate progress in the in-person model. Two studies used pre-intervention baselines and post-intervention production level comparisons. The results of both studies indicated that progress was achieved in both service delivery models, with no significant difference between the two models.

While the results of the study support the efficacy of telepractice, limitations exist that could affect the conclusion. The variety of outcome measurements was broad and not cohesive in its implementation across the seven used studies, potentially equaling a misrepresentation of results (Wales et al., 2017). The variation in the intensity and duration of each used study also has a potential impact on results, as well the intervention(s) used (Wales et al., 2017). Unequal sample sizes led to difficulties in generalizing the results of the studies and comparing them (Wales et al., 2017).

Overall, the results of the study supported the efficacy of using telepractice as a service delivery model for speech and language intervention to school-aged children. When compared to in-person delivery, telepractice showed little to no discrepancies in effectiveness. Results in both service delivery models displayed that participants made significant and similar improvements (Wales et al. 2017). Despite potential limitations, there is promising evidence for the efficacy of telepractice for school-aged children, though more research is still needed. These results are supported by other studies in the efficacy of telepractice in childhood fluency (Sicotte et al., 2003) and childhood articulation and language production (Grogan-Johnson et al., 2001). According to Houston (2014), telepractice is now a trusted and effective way to diagnose and treat children and adults in the fields of medicine, psychology, speech-language pathology, audiology, and early intervention.

Limitations of Telepractice

ASHA (2010) provides a range of professional issues and limitations associated with telepractice and how they could potentially impact service delivery. Three of the key issues include technology, privacy regulations, and state telepractice laws.

Technology is the biggest barrier to both clinician and client due to the potential lack of technological compatibility (ASHA, n.d.d). These issues can include differing hardware and software, bandwidth speeds, and lack of proper technology due to financial or geographic constraints. Technology failure is a common occurrence linked with those three issues.

Tucker (2012) completed a survey study with SLPs to determine the experiences, attitudes, and beliefs about the elements of telepractice as a model of service delivery in schools among students in elementary to high school. These students were receiving services for articulation, fluency, language, learning disabilities, autism spectrum disorder (ASD), central auditory processing disorder (CAPD), and using augmentative and alternative communication (AAC). In terms of technology failure, the most commonly reported limitations related to telepractice included interruption of networks and failure/breakdowns of the hardware and/or software. All five participants included in the study reported difficulties with using technology for the purpose of telepractice. Another reported limitation was the lack of technical support to troubleshoot difficulties. There were no trained assistive personnel in technical support that were able to provide help on the ends of both the clients and clinicians.

Data from the study also indicated that a lack of experience with using technology for therapy was a major concern among SLPs and their clients. According to respondents of the survey, frustration with deciding which types of technology to use during therapy was significantly correlated with a lack of training and experience. All five of the participants reported prior training for technology use, but no in-depth or specific training. Tucker (2012)

reported that an increased satisfaction with using teletherapy was aligned with an increase in knowledge, experience, and training with troubleshooting and teletherapy itself.

Tucker (2012) also found that technology limitations also include intervention and assessment procedures that involve direct physical contact, such as an oral mechanism examination (ASHA, 2010). The lack of physical contact with clients was reported by four of the participants to be a barrier to telepractice. Specifically, telepractice made it difficult to see what position the client's articulators were in and could not adjust them. Guiding the individual articulators of young clients via telepractice proved to be a challenge for the participants without direct physical contact. Clients, like SLPs, also had to learn to adjust to learning in front of a screen. Not all clients are suited to this type of learning or capable of learning in this format (e.g. lack of technology).

Not all clients have reliable and efficient access to the technology needed to participate in teletherapy. This problem is most prevalent in lower income, minority households. "Roughly one-third (35%) of households with children ages 6 to 17 and an annual income below \$30,000 a year do not have a high-speed internet connection at home, compared with just 6% of such households earning \$75,000 or more a year. These broadband gaps are particularly pronounced in black and Hispanic households with school-age children – especially those with low incomes" (Auixer, et al. 2020). Clients struggling to access technology creates another limitation to using telepractice for therapy. However, according to the Individuals with Disabilities Education Act (IDEA), public and educational agencies are obligated under federal and state law to provide or pay for any services that are also considered special education or related services (such as, but not limited to, assistive technology devices and services, related services (e.g. speech-language therapy), and supplementary aids and services) that are necessary for ensuring a free appropriate

public education to children with disabilities within the state. Despite this, Brokepp (2021) conducted a nationwide survey among school districts concerning telepractice use in schools. Results indicated that school districts lacked funding for supplying both SLPs and clients with necessary technology and teletherapy software. The districts expected the clinicians to use the same technology for virtual care that they provided for other education (e.g., Zoom or Google Meet) instead of using software specifically for telepractice. Brokepp (2021) concluded that when districts do not provide the necessary technology or software, it places the responsibility on the client and clinician to provide this. As stated previously, not all clients have the means for the required technology and software, which would imply services would be hindered by this lack of technology.

Another potential limitation of telepractice is lack of privacy and confidentiality. SLPs are mandated by ASHA's Code of Ethics, federal and state laws, and the Health Insurance Portability and Accountability Act of 1996 (HIPAA) to protect the privacy of client records and information (ASHA, 2010). Clients are legally ensured protected health information (PHI), and telepractice has the potential to lead to a breach of HIPAA. Confidentiality and/or HIPAA has the potential to be breached if the device used for teletherapy is not secure or equipped with privacy protection. In addition, if the teletherapy session does not take place in a room that is isolated with all doors closed, personal health information has the potential to be overheard or accidentally shared with individuals present. Furthermore, if data and documentation is not stored in a secure location, it has the potential to be a breach of HIPAA and/or confidentiality. For example, if the clinician is providing teletherapy services through his or her home, the clinician must ensure no other individuals are present and that documentation is not easily accessible to others. In order for confidentiality to be maintained, service delivery via

telepractice must occur in a secure room, on a secure device, and documentation must be stored in a secure location (ASHA, 2010). These three aspects mentioned must all be HIPAA compliant in order to protect client confidentiality.

In addition to HIPAA compliance issues with privacy, this mode of therapy is vulnerable to hacking. For example, consistent third-party protection is not guaranteed when using technology that allows voice messages to be carried over the Internet, such as Skype, which leaves users vulnerable to hackers and viruses. Concerns arise when SLPs and their clients have transitioned from school or office to home because certain virtual private networks (VPNs) or firewall systems may not be present to protect consumer privacy. They may lack necessary tools such as an ethernet connection, antivirus software, and telepractice software with proper privacy protection (Houston, 2014). When these tools are not present, it puts technology at a higher risk for being hacked. For example, the FBI received multiple reports in 2020 concerning hijackings of teleconferencing platforms. If this were to happen, the therapy session would no longer be secure or private. In addition, if client files were stored on the clinician's laptop or computer, they could easily be accessed by hackers if there was no privacy protection on the device. This has the potential to lead to unauthorized viewers seeing and sharing the confidential information about a client's medical history, assessment results, and intervention data.

State telepractice laws and regulations are another key issue regarding potential limitations to telepractice. Telepractice laws and regulations vary from state to state (ASHA, 2010). According to the ASHA (ASHA, n.d.b) Code of Ethics, telepractice can only be used as a mode of service delivery if services are consistent with state and federal laws, while also complying with local, state, and federal laws and regulations related to practice. In addition, if a

clinician's client resides in a different state, the clinician is subject to the laws and regulations in that state. Therefore, telepractice may not be possible for said clients.

Implementation of Telepractice during COVID-19

Several studies indicate that speech-language therapy delivered via telepractice can be effective for children with various communication disorders (Houston, 2014). These studies mainly focused on specific intervention approaches and occur in tightly controlled, technologically supported environments, such as university clinics (Grogan-Johnson et al., 2013). Therefore, these studies may not fully represent the most current and day-to-day practice. According to ASHA's statement on evidence-based practice (EBP) (ASHA, n.d.b), "it is an approach in which current, high-quality research evidence is integrated with practitioner expertise and client preferences and values into the process of making clinical decisions" (ASHA, 2005). It is important to keep EBP in mind when considering the routine use of telepractice during COVID-19. The evidence available to SLPs may not be current, which may affect the previously supported efficacy of telepractice. Knowledge of whether SLPs had the resources, tools, and support to implement teletherapy from their homes to children in their homes during the peak of the COVID-19 crisis is limited. Thus, understanding how SLPs implemented telepractice and faced challenges is essential to determining the efficacy of telepractice during COVID-19.

Furthermore, the data provided by studies also revealed that teletherapy has almost exclusively been used and considered as an alternative method of service delivery, only when face-to-face options are unavailable (Tambryraja et al., 2021). The use of it in a routine form of service delivery has been studied limitedly. To support this, Tucker (2012) completed a study where a survey was distributed to 1,900 SLPs regarding the use of teletherapy in their everyday

practice. Of the 170 SLPs who responded, only seven (6%) had experience using telepractice. Of those seven, only three were currently providing teletherapy.

To gain insight into the implementation of telepractice by SLPs during COVID-19, Tambryaja et. al (2021) conducted a study using school-based speech-language therapy service delivery. The main research questions presented were the extent to which telepractice was implemented, how familiar and prepared SLPs were for the switch to telepractice, what technologies and resources were used, and what additional barriers were observed for telepractice during COVID-19. Participants included 1,109 school-based SLPs. The SLPs responded to a survey in June of 2020 that was distributed in an online format (e.g., social media, ASHA servers, and state speech and hearing association servers). The survey questions consisted of four categories: workplace context and background characteristics, provision of telepractice services, telepractice infrastructure (most commonly used technologies and support/materials provided), and barriers/challenges.

The results of the provision of telepractice services indicated that over 60% of SLPs who responded provided telepractice to either some or all clients on their caseloads. In terms of technologies most commonly used in telepractice, the results report that the most commonly used were Zoom (66.6%) and Google Hangouts (40%). The most commonly used hardware was a laptop or desktop computer (79%), and the second most common was an iPad (30%). The types of supports provided by schools/districts was also surveyed in a select all that apply format, with 45.3% of respondents reporting that hardware was provided for them. 26.7% reported that software was provided, 24.7% reported that they received training, and 34.5% reported that no resources were provided by the schools/districts. Barriers/challenges to telepractice were also surveyed, with the most frequently noted barrier being children's difficulties with Wi-Fi access

(70.4%). Second was poor attendance for telepractice sessions (68.8%) and third was low levels of children's engagement (64.9%).

Prior to COVID-19, only 5.2% of SLPs in a survey administered by ASHA (2020) provided services via telepractice. As stated previously, over 60% of respondents in the survey by Tambryaja et al. (2021) used telepractice for clients. While both studies had differing participant numbers, the increase to the use of telepractice is significant. A quarter of SLPs received no telepractice support or resources from school districts. Even fewer reported that they received hardware, software, or training. The shift to telepractice was already demanding and sudden, so a lack of receiving support or resources may have greatly affected some SLPs when using or attempting to use telepractice (Tambryaja et al., 2021). The top obstacles SLPs faced were Wi-Fi access limitations, poor client attendance and engagement, and the time commitment taken by SLPs to train clients and families telepractice use. Many of these barriers had the potential to have a compounding effect on one another. For example, Wi-Fi and connectivity issues could have led to children not showing up for therapy sessions and could have led to child engagement issues if the video quality was poor (Tambryaja et al., 2021). In addition, the rapid shift of parents having to work from home and balancing their child's telepractice sessions could have also led to poor attendance for sessions (Tambryaja et al., 2021).

Many of the challenges highlighted support the need for further research into the use of telepractice in a routine format of service delivery. Some of the challenges were directly caused by COVID-19, such as parents working from home and the child missing therapy sessions. Others suggest more training and resources are needed for SLPs in order to make telepractice an efficient form of service delivery. Lack of student engagement and support from schools/districts are a key indicator of this.

Telepractice versus In-Person Service Delivery during COVID-19

Telepractice has been proven to be an effective form of service delivery. However, there has not been an abundance of research committed to studying its efficacy during COVID-19. Face-to-face, or in-person, speech-language therapy was the primary source of service delivery prior to COVID-19. The question of how telepractice compares to in-person services then emerges.

Brennan (2021) conducted a study to determine if therapy provided via telepractice was more or less effective than in-person therapy. The study consisted of a survey answered by 20 parents/caregivers of children receiving speech-language therapy. The first group of questions focused on routines, sleep, and behaviors since the start of the pandemic. The second set of questions focused on therapy provided in-person versus telepractice.

In terms of structure of the client's daily routine, 74% of respondents indicated the routine was less structured. 55% of the respondents indicated that the clients experienced no change in the amount of sleep they received. 50% of the respondents indicated that the client's behavior was worse since the pandemic began. In terms of telepractice, 63% of respondents indicated that compared to previous in-person therapy, telepractice was less effective. 19% of respondents indicated it varied from day to day, 12% indicated telepractice was more effective, and 6% indicated that there was no difference. When asked what contributes to telepractice being less effective, responses included: easier means of escape (90%), increased distractions (73%), less structured daily routines (55%), therapist had less control (55%), technology use created distractions (28%), and less sleep (9%).

Results from this survey indicate that most caregivers perceived that the clients did better with in-person therapy as opposed to telepractice. However, 12% of respondents found that

telepractice was more effective. This study was an opinion-based survey driven by responses from parents/caregivers, so results may not be generalizable.

Face Masks

In addition to telepractice changing service delivery, face masks changed the in-person service delivery format. A face mask is worn over the user's nose and mouth to reduce the risk of droplet and airborne transmission of viral respiratory disease. As a result of COVID-19, the CDC (2020) recommends wearing face masks in public spaces and when in close contact with those not living in the individual's home. When masks properly cover the nose and mouth of the wearer, the risk of infection by other's droplets is reduced (Greenhalgh et al. 2020). The risk of spreading infected droplets increases when speaking, so the use of face masks is intended to decrease this risk (Asadi et al., 2019). As a result of this, COVID-19 has led to the use of masks by professions that typically would not wear masks, such as SLPs.

Masks can reduce sound by anywhere from three to twelve decibels; they also result in difficulties of high-frequency sounds passing beyond the mask (Goldin et al., 2020). This can make it more difficult to understand speech and those with higher-pitched voices. It has been found that the muffling effect of masks can be considered equivalent to the listener having a slight high-frequency hearing loss (Corey et al., 2020).

There are a variety of masks available for use, each of which is made from different materials. The three most commonly used masks are N95 respirator masks, cloth masks, and surgical masks. Goldin et al. (2020) reported that surgical masks had the potential to decrease speech output by 2-4 decibels (dB) and N95 masks had the potential to decrease speech output as much as 12 dB. Atcherson et al. (2020) conducted a study to expand on the work conducted by

Goldin et al. (2020) by determining the impact of mask wearing on speech output and analyzing how newer face mask options, such as clear insert masks, have the same impact.

To determine this, they analyzed the maximum reduction of sound pressure levels (SPL) (in decibels) of the different face mask types. Results showed that surgical masks reduced sound pressure level by 5 dB, N95 masks by 10.9 dB, transparent window masks by 12-13.3 dB, and fully transparent masks by 21.2 dB. They also tested the effects of the addition of face shields to masks. It was found that the combination of face shields and masks reduced SPL in a range of 20-29.2 dB. According to Atcherson et al. (2020), fully transparent face masks or those with insert windows significantly reduced the level of sound pressure. It has the potential to decrease speech perception even more than speech than non-transparent masks. However, the transparent masks are essential to preserving the non-verbal cues of the face for the comprehension of speech and meaning (Atcherson et al., 2020).

Face masks pose a number of issues for clients, specifically children, receiving speech-language therapy services. Traditional, non-transparent masks present a visual barrier to clients who rely on non-verbal communication of the face, such as mouth, lips, tongue, cheeks, and teeth (Nobrega et al., 2020). Clients who rely on lip reading are unable to do so when traditional masks are worn. Lip-reading cues are particularly important for auditory comprehension and understanding in patients with communication difficulties or hearing impairments (Dupuis 2011). In addition, voices are distorted and/or muffled from both the SLP and the client (Nobrega et al., 2020). The breakdown of speech quality, combined with potential noises of occupied rooms and the lack of visual cues, can make speech difficult to understand for many individuals. It can be especially difficult for children who are acquiring and developing speech,

language, literacy, and learning (Nobrega et al., 2020). These difficulties may lead to frustration and miscommunication between the client and SLP, which can affect rapport.

Mask wearing creates a material, physical barrier to successful communication.

Linguistic and non-verbal information are both essential for understanding communication.

Effective communication is a necessity for building therapeutic relationships among clients and SLPs (Ha & Longnecker, 2010). Effective communication and rapport with patients are key for positive therapeutic relationships, patient satisfaction, and high-quality services (Danzl et al., 2012). A lack of a therapeutic relationship between clients and SLPs can affect goal planning, intervention, and success (Marler & Ditton, 2020). It has been found by Barry et. al (2008) that positive interactions between clients and clinicians influence the outcomes of performance and intervention.

Face coverings have had a significant impact on certain standardized assessments and specific interventions used by clinicians. For example, a dysarthria assessment, such as the *Frenchay Dysarthria Assessment - Second Edition (FDA-2)*, assesses the reflexes, respiration, lipid, palate, laryngeal quality, tongue, and intelligibility of clients (Enderby & Palmer, 2008). It is essential for the mouth to be seen for this assessment since it requires close proximity and a lack of facial obstruction. Marler & Ditton (2020) have questioned the validity of standardized assessments that have been administered when both the assessors and assessed wore face masks. The effects of mask wearing have also had extensive implications for interventions where observing the mouth and face of the clinician is a fundamental basis of motor-based interventions (Marler & Ditton, 2020). SLPs who would typically rely on modeling and shaping articulators have been stripped of their intervention instruments.

Social Distancing

Social distancing refers to the practice of increasing the space between individuals and decreasing the frequency of contact with others to reduce the spread of a disease, particularly COVID-19 in the case of the present (CDC, 2020). It is suggested to stay at home and away from others as much as possible, but it is recommended to stay at least 6 feet away from others if public outings are required (Maragakis, 2020). In the United States, policies were implemented to increase social distancing in order to prevent the spread of COVID-19 (VoPham et al., 2020).

VoPham et al. (2020) conducted a study to determine the effectiveness of social distancing in preventing COVID-19 transmission. They found that social distancing policies were overall successful in reducing the spread. It was reported that social distancing was associated with a 29% reduction of prevalence of COVID-19 and 35% reduction of mortality related to the disease. While the study was observational, it supports the enforcement of social distancing as an effective way of helping prevent the spread of COVID-19.

There is evidence to support the effectiveness of social distancing in preventing the transmission of COVID-19, but there are limitations associated with social distancing. Social distancing has the potential to negatively affect speech transmission and perception. Social distancing creates a longer distance for speech to travel between the speaker and listener (Grieco-Calub, 2021). According to the inverse square law, the sound pressure level of speech decreases by 6 dB for every doubling of the distance of the sound source (Acoustical Surfaces, Inc., n.d.). For example, the average decibel level of human speech is between 50 and 65 dB (Friedman, 2019). At a three-foot distance for the listener, it will be at 65 dB. At a six-foot distance, which is the recommended minimum social distancing length, the sound intensity will be at 59 dB. This decrease in energy can have an impact on the listener by the speech being less audible or completely imperceivable in instances where the child has hearing difficulties. In order for

successful communication to occur, the content of the speech must be understood by the listener.

During in-person speech-language therapy, the degradation of speech signals can affect the effectiveness of treatment. When having to sit at least six feet apart, the decibel level of speech decreases, which can affect the comprehension aspect of speech on the side of SLP and the client (Grieco-Calub, 2021). If a client already has a hearing deficit or a receptive language disorder, they may struggle even more when social distancing causes a degradation of speech signals.

Discussion

The purpose of this literature review was to investigate the effects of the novel coronavirus disease 2019 (COVID-19) pandemic on the service delivery of speech and language therapy services in schools, early intervention, and outpatient settings. This analysis aims to analyze the differences in the quality of services provided during non-traditional means, as well as identify the challenges that arose in service delivery due to the pandemic and subsequent guidelines. In addition, this analysis attempts to explain the importance of face-to-face speech-language therapy services and how they were impacted during the outbreak of COVID-19. This analysis supports the theory that COVID-19 had a profound impact on the service delivery of speech-language pathology through the use of telepractice, masks, and social distancing.

Interpretations:

Chadd et al. (2021) conducted a study with results indicating that there were significant changes in the service delivery of speech-language therapy during COVID-19. Chadd et al. (2021) reported that of the 544 SLPs included in the study, 63.1% used an altered method of service delivery as a result of the COVID-19 pandemic. Furthermore, 60.7% provided services via telepractice with 48.9% reported they were no longer providing face-to-face services. This finding correlated with a study conducted by Tambryaja et. al (2021) that reported over 60% of respondents in their survey provided telepractice to some or all of their clients. The data from these studies support the notion that traditional service delivery was significantly impacted by moving many services from strictly face-to-face to strictly telepractice.

Brennan (2021) conducted a study to determine the effectiveness of telepractice compared to in-person services during COVID-19. The results showed that 63% of caregivers in the survey indicated that telepractice was less effective compared to in-person services. Reasons

included: easier means of escape, increase in distractions, less structured daily routines, therapists having less control, and technology use creating distractions. This supports results from Tambryaja et al.'s (2021) study that indicates more research is needed to support telepractice use during COVID-19 because of the specific limitations clients and SLPs faced.

Tucker (2012) conducted a study prior to COVID-19 to determine how many SLPs used telepractice in their daily practice. Of the 170 respondents, 6% had experience using telepractice with 3 respondents currently providing services via telepractice. Similarly, ASHA (2020) conducted a survey where only 5.2% of SLP respondents provided services via telepractice prior to COVID-19. When SLPs began using telepractice as a mode of service delivery during COVID-19, it was a new experience for many of them. Tambryaja et al. (2021) reported that 24.7% of respondents in their survey received no training and 34.5% received no resources from schools/districts. Tucker (2012) reported findings from a study that indicated that all participants received no specific training for telepractice, but all had prior experience. This data supports the notion that many SLPs did not have any prior experience for the switch to telepractice during COVID-19 and did not receive much, if any, training, or resources.

Chadd et al. also reported in their study that changes in service delivery based on policies and national guidance, lack of access to teletherapy for clients, and/or teletherapy was not suitable for specific clients contributed to some SLPs not continuing to provide intervention during COVID-19. This finding correlates with an article provided by ASHA (2010) concerning the range of professional issues and limitations with telepractice and how they had the potential to impact service delivery. It was stated that the key issues with telepractice were technology, privacy regulations, and state telepractice laws. Tucker (2012) found that participants in his study reported that technology failure was a main concern for teletherapy. It was also found that

the lack of physical contact for intervention procedures was a problematic barrier and that not all clients are suited to learning in this format due to difficulties with attention, specific intervention, and certain impairments making therapy difficult via telepractice. Tambryaja et al. (2021) also found that respondents in their survey experienced major troubles with telepractice. Those troubles included Wi-Fi access limitations, poor client attendance, and poor client engagement. Houston (2014) reported that many clients and SLPs may lack necessary tools for telepractice, making telepractice not a viable solution. These findings suggest that telepractice, as it was implemented during the pandemic, was a flawed method of service delivery and experienced several issues and limitations for both SLP and client.

Chadd et al. (2021) found that 51.1% of SLPs continued providing face-to-face services for clients during COVID-19. The face-to-face aspect changed, however, with the use of face masks for in-person service delivery. Marler and Ditton (2020) found that face masks had a profound impact on in-person service delivery due to masks covering the lower portion of the face. Interventions, such as modeling, lip reading, visual cues, shaping, and assessments, were decreased in use and effectiveness for SLPs. Goldin et al. (2020) conducted a study regarding the use of face masks and reported that the three most commonly used masks can reduce sounds anywhere from 3 to 12 decibels. Nobrega et al. (2020) reported that the breakdown of speech quality and lack of visual cues can make speech difficult to understand and can affect the effectiveness of the intervention. In addition to visual cues of the face being obstructed, speech signals decrease with distance. The inverse square law explains that the sound pressure level of speech decreases by 6 dB for every doubling of the distance of the sound source (Acoustical Surfaces, Inc., n.d.). This decrease in speech signals can cause speech to be less audible, affecting the comprehension of speech. This is particularly impactful during speech therapy

when both clinicians and clients must be heard and understood for successful intervention. This data supports the notion that the quality of services may have been impacted during COVID-19.

Implications:

The data collected throughout numerous studies contributes to a clearer understanding of the overall quality of services provided and identifies the specific challenges that arose in service delivery. In addition, the data helps to explain the importance of face-to-face speech-language therapy services and how they were affected during the outbreak of COVID-19.

There was a difference in the quality of services as a result of the impact that COVID-19 had on service delivery. Telepractice replaced face-to-face therapy as a form of service delivery for many SLPs and clients. While telepractice is considered to be an acceptable and effective form of service delivery, there are a great list of barriers and limitations that affect the quality and effectiveness of services via telepractice. In general, telepractice limitations consist of technology, privacy, and state telepractice laws. Technology constraints such as Wi-Fi complications, hardware and software differences, bandwidth speeds, lack of proper technology due to financial constraints, lack of telepractice experience and training on the sides of both SLPs and clients, and lack of physical contact for certain intervention procedures can all greatly affect the quality of services provided. Tambryaja et al. (2021) and Tucker (2021) both found in their respective studies that technology troubles, such as Wi-Fi failures, contributed to poor client attendance and engagement. Clients missed sessions and were not engaged during the sessions, which can affect client's progress. Tambryaja et al. (2021) and Chadd et al. (2021) reported similar findings where 60% of SLPs they surveyed were providing telepractice to some or all of their clients. The 60% of those SLPs surveyed were providing services via telepractice, with data supporting the theory that they most likely faced and encountered barriers with technology.

Those technological barriers have the potential to greatly affect intervention by clients not being able to attend sessions or clients not being engaged, which may result to a decreased effectiveness of interventions.

Furthermore, telepractice is not an acceptable form of service delivery for all clients. Those clients would not be able to receive services via telepractice and would have to rely on in-person services. However, Chadd et al. (2021) reported in their study that 48.9% of SLPs were no longer providing services in-person as a result of the COVID-19 pandemic. They also reported that 75% of SLPs had clients discontinue services. The data suggests that if an SLP was not providing services in-person and he/she had a client that was not suited for using telepractice, they may not receive services at all. When the support systems of intervention are removed, children who have speech, language, voice, or swallowing difficulties are at a higher risk for long-term delays in speech, language, reading, socio-emotional, and academic development (Tambyraja et al., 2021). When children are not consistently immersed in receiving intervention, regressions have the potential to occur. Therefore, the loss of services has the potential to lead to regressions in children. In addition, when clinicians halted services or were not able to provide them via telepractice, it could affect assessment procedures such as administering assessments. This can create a backlog of children who need to be assessed, which can lead to children having to wait before being able to receive services (Clegg et al., 2021). The data suggests that COVID-19 precautions changed not only service delivery, but the entire trajectory of the field of speech-language services.

While the efficacy of telepractice has proven to be an accepted form of service delivery, the studies conducted to support it have been tightly controlled, showing support for it only when face-to-face options are unavailable, and not in a routine format (Tambyraja et al., 2021).

Therefore, there is not enough evidence to support telepractice being an effective form of service delivery for the majority of clients during COVID-19. However, a large portion of clinicians served their clients via telepractice and faced many of the limitations of telepractice and COVID-19 itself. What must be determined next is how telepractice compares to in-person services. Brennan (2021) found that from caregivers' perspectives, telepractice was not as effective as face-to-face services. Clients were less successful with telepractice because the use of technology brought more distractions, ease of escaping, less control of the session, and less structure. Though this study was opinion-based, it gave insight into the perspective of the parents/caregivers. These results provide further support that telepractice may not as effective as in-person services for some children. In-person services can be more effective and appropriate due to less distractions, more structure, less technology limitations, and more control of the session. SLPs are able to be in the same room as the client and provide direct, face-to-face intervention. While distractions may still be present, it is easier for the SLP to control the session due to it being more contained (Brennan, 2021). When clients are in their own home, they are able to escape from the session and be distracted by events, objects, and people in the home. Face-to-face services virtually eliminate all technology limitations, unless technology is being used as a part of the intervention strategy and fails during the session. When that happens, SLPs are able to adapt and use another activity or intervention tool. Through telepractice, their only option is the use of technology. If the technology fails, there is no other way to provide therapy. Therefore, in-person services may be more effective compared to telepractice but are not always feasible due to COVID-19 restrictions.

While in-person services may be more effective than telepractice, they were also affected by COVID-19 restrictions and faced limitations. Face masks and social distancing measures

changed the face-to-face service delivery method. Face masks have the ability to lead to less successful communication by the physical barrier they create. Without non-verbal cues, such as lip reading and modeling, SLPs and clients may struggle to demonstrate and understand intervention strategies. Furthermore, masks have the potential to reduce sound anywhere from 3 to 12 dB, which can also affect the comprehension of speech. Social distancing has the potential to decrease sound signals by 6 dB with every doubling of distance from the sound source. When this is combined with face masks, speech quality can decrease on average anywhere from 9 to 18 dB. The data supports that when linguistic and non-verbal information are restricted with masks and social distancing, it can lead to less effective intervention due to the decrease of speech comprehension.

Limitations:

Although the data gathered in this literature review supports the notion that quality of services may have decreased and services were significantly affected by COVID-19, there were limitations to this research. One limitation of this study was the generalizability of the data. What the data indicates may not be able to be universally applied. There are many factors that contribute to the results of the data. For example, sample sizes, respondents, and personal opinions or biases have the potential to skew the data reported. In addition, these results do not reflect the challenges and limitations all SLPs and clients did or did not experience. Much of the data collected focused on the negative effects of COVID-19 and did not particularly highlight the positive outcomes, such as how telepractice may have been more effective for some clinicians and clients.

Furthermore, there is still limited research of the specific effects of COVID-19 on the service delivery of speech-language pathology services. The pandemic is still a current and

present issue, so the reliability of this data is impacted by the lack of research done on this topic. Due to the lack of data and research on the effects of COVID-19 of service delivery, the results cannot confirm that services were less effective universally. However, they can confirm that service delivery was affected in some capacity for the majority of SLPs and/or clients.

Recommendations:

Additional research in the area of the effects of COVID-19 on service delivery in speech-language therapy should be completed. Future research is needed to establish the effectiveness of services during COVID-19 and how they can and/or did affect clients. A larger sample size of clinicians, clients, and parents/caregivers in various settings and locations should be considered for future research. It would also be beneficial to consider the ages of both clinicians and clients when conducting this research. In addition, it would also be beneficial to consider the different restrictions and precautions of each state when conducting research.

Conclusion

The results of this investigation provide insight and understanding to how COVID-19 affected the service delivery of speech-language therapy. The data collected in this literature review showed that limitations to telepractice may have affected the effectiveness and quality of services. Since telepractice is not suited for all clients, some may not have received services at all if in-person services halted. This could result in children being at risk for regression due to a lack of remediation of delays. In addition, backlogging can occur as a result of the halting of services, leading to children not being able to receive services. Results also found that face-to-face/in-person therapy may have been more effective than via telepractice. However, the data also indicated that in-person services were also affected through the use of face masks and social distancing. Linguistic and non-verbal information was restricted with masks and social distancing, which can affect the quality of services due to the decrease of speech comprehension. Overall, the results of this literature review support the notion of the quality of services being impacted during COVID-19, as restrictions and precautions affected the service delivery of speech-language therapy and affected the entire trajectory of the field.

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