PERSPECTIVES OF STUDENTS IN TELE-SERVICE DELIVERY IN SPEECH-LANGUAGE PATHOLOGY

ASHIYA SHAIMA

Register No: 19SLP005

This Dissertation is submitted as a part of fulfillment

for the Degree of Master of Science (Speech-Language Pathology)

University of Mysore

Mysore

ALL INDIA INSTITUTE OF SPEECH & HEARING,

MANASAGANGOTHRI, MYSURU-570006

SEPTEMBER 2021

CERTIFICATE

This is to certify that this dissertation entitled **"Perspectives of Students in Tele-Service Delivery in Speech-Language Pathology"** is bonafide work submitted in part fulfillment for the degree of Master of Science (Speech-Language Pathology) student with Registration Number 19SLP005. This has been carried out under the guidance of the faculty of this institute and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

Mysuru

September, 2021

Dr. M. Pushpavathi

Director

All India Institute of Speech & Hearing

Manasagangothri, Mysuru – 57006

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Mysuru
September, 2021

Guide
Dr. R Rajasudhakar
Associate Professor
Department of Speech-Language Sciences
All India Institute of Speech and Hearing
Manasagangothri, Mysuru -575006

DECLARATION

This is to certify that this dissertation entitled **"Perspectives of Students In Tele-Service Delivery in Speech-Language Pathology"** is result of my own study under the guidance of Dr. R Rajasudhakar, Associate Professor in Speech Sciences, Department of Speech Sciences, All India Institute of Speech and Hearing, Mysuru and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

Mysuru **Registration No: 19SLP005**

September, 2021

Dedicated to my Ever-loving Mom

Acknowledgement

This dissertation is an important milestone of my postgraduate life. And it would not be possibly achieved by me if not because of various people that I am grateful for. Like most of the people in my life already know, gratitude is a very strong emotion for me. Greatest of all. Mostly I go overboard with the 'thank you' very vocally itself, but this dissertation demands me to be inking it down too. So, here we go…

'Sometimes the difficulty that you and I go through is actually a small price to pay, for a lot of khair (good), that will either come to us now or after we return back to our Lord' -Nouman Ali Khan.

This line is something I live by. So, first and foremost, I want to thank my ***Allah****, the Almighty, for everything he has blessed me with and everything he hasn't.*

For all of his constructive advice and invaluable guidance, I will be eternally thankful to my guide, ***Dr. R Rajasudhakar****, Associate Professor in Speech Sciences, Department of Speech Sciences, All India Institute of Speech and Hearing, Mysuru. You are modest, humble, and as approachable as one could be. You, sir, are incredibly amazing, both as a mentor and as a person. Thank you for your time and,*
patience in rectifying all of my mistakes despite your busy schedules.

I dreaded statistics for so many reasons unknown. But with this dissertaion there was no way to escape it. Dr. Vasanthalakshmi M. S was humble enough to explain it in way that It seemed not-so-dreadful. I'd like to express my sincere gratitude to her for taking the time to explain and answer all of my doubts.

We all become what we are professionally because of so many but mainly that someone in our lives who unknowingly inspire you so much. And it is very important for us to recognize and be grateful to those heroes. In my case it was always a SHE-ro. So, I want to thank ***Malavika ma'am****, for being the inspirational woman she is and motivating me and many to be the SLP that we are today.*

As J.K. Rowling rightly points out, ***"Family is a life jacket in the stormy sea of life."*** *This dissertation is just an excuse to begin with, but my* ***mom*** *has always be my best hero and deserve all the love in this world for the woman she is. My* ***dad, brothers, bhabis, Gundu and Laddu****, you all are my everything. I am extremely grateful to almighty for blessing me with the best of the family one could ever have.*

I'd be lying if I said this master's journey was like a walk in a park. I would often find myself doubting my own abilities and being negative about being a good SLP and what not. But there was one person who always reminded me that there is more to me than what I believe I am. I'm very grateful to have found someone as understanding as ***Farish*** *to be my life partner and my greatest cheerleeder. So, I thank him for all the 'You can do it'-s and 'Go for it'-s that was much needed.*

My dissertation partners, ***Architaa and Syam*** *for their ears and calmness which was surely needed to deal with my anxious self.*

My ***Ikigai, Kavitha, Sunnimeeryols, Chashma Gang,*** *Sunaina, Jesty, Rikas and so many more. I am so grateful for each one of you. If it weren't for you all, I would have not been the luckiest girl in the whole world. I love you all and you guys make me happy, mostly. Thank you for keeping up with my every self, everytime.*

My sincere thanks to all the participants for their valuable time and participation. My in-laws, all of my friends and my batchmates from KMC, Mangaluru and AIISH, you all

are those special people who contribute so much and make my world better, unknowingly.

And, "Last but not least, I wanna thank me, I wanna thank me for believing in me, I wanna thank me for doing all this hard work, I wanna thank me for having no days off, I wanna thank me for... for never quitting, I wanna thank me for always being a giver and tryna give more than I receive, I wanna thank me for tryna do more right than wrong, I wanna thank me for

just being me at all times…"

-Calvin Cordozar Broadus Jr.

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Chapter I

INTRODUCTION

More than a billion people make India's population, with about 1.8% of them having disabilities (Rehabilitation Council of India, 2016). In recent decades, there is a spurt in the awareness of the communication problem amongst people and the number of people seeking Speech-Language services. The diagnosis and treatment of such disorders have traditionally been done through an in-person consultation between clinician and client. Until recently, this model of service delivery was believed to be conventional. However, the field of speech-language pathology is eminently suitable for tele-practice as well due to various factors such as rapid technological advancements, a lack of sufficient manpower of Speech-Language Pathologists to meet the growing client population, geographical limitations of clients in need of service, and so on (Theodoros, 2013).

With advancements in technology and related science, telecommunication mode has been best used in the healthcare sector. Tele-practice is quickly developing and revolutionizing Audiology and Speech-Language Pathology, particularly in Indian scenario, despite its infancy. American Speech-Language-Hearing Association [ASHA] (2017) refer tele-practice to "The application of telecommunications technology to the delivery of speech-language pathology and audiology professional services at a distance by linking clinicians to clients/patients or clinicians to other clinicians for assessment, intervention, and/or consultation." It offers several benefits, including enhanced access to services irrespective of language and cultural variation, easier alliance among diverse professionals, cost savings for clients, and so on (Mohan et al., 2017).

Since the earliest reported application of tele-practice in the area of Speech-Language-Pathology, there have been numerous significant technological advancements (Vaughn, 1976). Teletherapy is now utilized as an alternate mode of therapy delivery due to its adaptability and other advantages. It is recognized to have the potential to augment intervention timing, outcome, and so on, resulting in the best treatment outcomes for the client.

There is currently substantial evidence to support the hypothesis that tele-practice is a viable option to improve the quality of services delivered and, as an outcome, the quality of life (Mashima & Doarn, 2008). Different disorders, such as articulation problems, language disorders, autism, dysphagia, and so on, have all demonstrated favourable outcomes when assessed and treated via tele-mode (Waite et al., 2006; Parmanto et al, 2013; Waite et al., 2010; Malandraki et al., 2011).

Due to the current outbreak of COVID 19, social distance is being implemented worldwide to prevent the disease from spreading. As a result, the potential of technology has been explored in practically every aspect of lifestyle, including Speech-Language service delivery. Several notable associations, such as ASHA and ISHA, have emphasized the use of tele-practice by SLPs thus far. Tele-practice, according to the ASHA, is a feasible alternative for offering SLP services during this pandemic since it allows for both assessment and management. The whole service process can be more protective of the threat of COVID-19 spread to clients and their caregivers by offering tele-mode SLP services, in addition to numerous other benefits.

Despite the various advantages, professionals, particularly student clinicians in tele-practices, face challenges. While the online form of service is growing in developing countries like India, it is not without challenges, such as fluctuating internet

connections, technical concerns, compatibility issues with devices and servers, etc. These act as significant obstacles in the delivery of quality service. Teletherapy's ease and flexibility will ensure that it becomes a part of post-pandemic life if these problems are overcome.

Need for the study

As the immediate user of this service delivery approach, it is crucial to examine professionals' and/or student clinicians' attitudes toward the use of tele-practice. There has been various research carried out in western countries on the same. Mashima and Doarn (2008) conducted a thorough assessment on previously done tele-practice research and found that rigorous, well-controlled, randomized trials were few, with little research including clinician perspectives. It is critical to understand the viewpoints and attitudes of SLPs. Understanding how SLPs view and use tele-practice in their program might help the profession discover methods that deliver excellent tele-practice services to suit the requirements of a growing number of clients (ASHA, 2005). Additionally, information regarding the challenges experienced and how they were overcome may also be helpful to others who want to employ tele-practice as a service delivery paradigm as their mode of service delivery.

To prevent communication failure and /or academic delay and/or social failure, professionals and/or student therapists must grasp how distant technologies may connect children and older clients in need to therapy services. Several research studies support the use of tele-practice in the school environment; several compared tele-practice to traditional treatment, but very few examine SLPs' knowledge, attitudes, and beliefs. In countries like India, the number is much lower. Hence, the present study

shall shed light on student clinicians' perspectives on service delivery in Speech-Language Pathology through tele-mode in the Indian context.

Aim of the study

The aim of this study is to determine empirically the undergraduate and postgraduate students' perspectives and opinions on tele-mode service delivery in Speech-Language Pathology.

Objectives of the study

- To determine the views/opinions on speech-language pathology service delivery through tele-mode by Speech-language pathology undergraduate (UG) students.
- To determine the views/opinions on speech-language pathology service delivery through tele-mode by Speech-language pathology postgraduate (PG) students.
- To determine the challenges faced by the groups (UG and PG) while rendering Speech-language pathology related services through tele-mode.
- To compare the views/opinions between the groups (UG and PG) on speech-language pathology service delivery through tele-mode.

Chapter II

REVIEW OF LITERATURE

The present study focuses on assessing the perspectives and opinions of student clinicians on the service delivery in Speech-Language Pathology through tele-mode. In this chapter, significance of tele-health in clinical interactions involving the discipline like Speech and Language therapy is elaborated. Speech therapy done through tele-mode and the outlook of the student clinicians about the same in health-care and therapy settings were reviewed in this chapter.

The World Health Organization (WHO) in 2011, defined tele-health as "the delivery of health care services, where patients and providers are separated by distance." Tele-health uses ICT for the exchange of information for the diagnosis and treatment of diseases and injuries, research and evaluation, and for the continuing education of health professionals. Tele-health can contribute to achieving universal health coverage by improving access for patients to quality, cost-effective health services wherever they may be. It is particularly valuable for those in remote areas, vulnerable groups and ageing populations.

The American Speech-Language-Hearing Association [ASHA] (n.d.) divides tele-health into three different types: (i) synchronous, (ii) asynchronous, and (iii) hybrid.

i. Synchronous services are real-time services that are done with interactive audio and video connection. This type of service creates an in-person experience that is corresponding to a traditional form of service delivery.

ii. Asynchronous service, also known as a store-and-forward type of service, includes storing and forwarding images for viewing or interpretation.

iii. Hybrid is another mode of tele-service wherein combinations of both real-time, asynchronous, and/or traditional face-to-face services can be considered for tele-practice.

2.1a Tele-health and Tele-speech therapy

Tele-health is a relatively new addition to the area of speech and language pathology that has acquired a lot of traction in recent years. Recent advances have led to significant growth in technological resources for the purpose of health education, screening, assessment, and intervention in various communication disorders. The usage of this service delivery model in Audiology and Speech-Language Pathology is supported by professional organizations such as the American Academy of Audiology and the American Speech-Language-Hearing Association.

Tele-health is defined by the American Speech-Language-Hearing Association [ASHA] (n.d.) as the use of telecommunications technology to provide professional health services at a distance by connecting clinicians to clients or clinicians to clinicians for assessment, intervention, and/or consultation. Instead of terminologies like telemedicine or tele-health, the term tele-practice has been introduced to avoid the misconception that these services are solely utilized in health-care settings. Tele-practice is a suitable style of service delivery for the field of speech-language pathology, according to recognized organizations such as the American Speech-Language-Hearing Association (ASHA) (ASHA, 2005).

In the following sections, an attempt is made to evaluate existing research on tele-practice and its use in the field of speech-language pathology. Reviewing the

literature will aid in identifying shortcomings in the subject, which may subsequently be addressed with the following study.

2.1b History of Tele-practice

In the 1940s, tele-health became a reality when radiography pictures were relayed over a telephone line 24 miles apart between two townships. This is said to be the first instance of an electronic medical record transfer across the globe. However, the first effort at speech therapy tele-practice took place in Birmingham, Virginia in 1976 in order to better serve the rural populations there (Moore, 1999).

Tele-practice is a new area that is gaining popularity across the world. The relevance and important role of tele-practice in the field of speech-language pathology has been recognized by countries such as Australia and the United States of America. In their brief study on Tele Speech-Language Pathology and Audiology, Yashaswini and Rao (2018) said that ‘tele-health' was not recognized as a way of providing treatments to individuals at a distance until 2013. The report also highlighted a survey done in Croatia of Eastern Europe. The survey conveys that the SLPs and AUDs belonging to Croatia have the minimal digital literacy necessary for 'tele-health.' However, there existed awareness of remote and online rehabilitation benefits among the clinicians in Croatia.

Tele-therapy is currently in full bloom, and it is well-known to have set clear future paths. Tele-practice has the ability to "extend clinical services to remote, rural, and underserved populations, and to culturally and linguistically diverse populations," according to the American Speech-Language-Hearing Association [ASHA] (2005). Speech-Language Pathologists are increasingly using telemedicine to offer services

throughout the world. Tele-practice, on the other hand, is still in its infancy, and further study into the different aspects of it is needed.

2.1c Tele practice in India

In developing nations like India, the field of speech-language pathology and audiology is relatively new. Therefore, there is no heap of studies found on the same regard. According to the census of India 2011, India has a population of more than a billion, among whom approximately 4% have communication disorders. If compared, the result will denote a very low ratio of clients to the SLPs. In a nation like India, the infrastructure and use of Information and Communication Technology (ICT) is rapidly expanding, making it qualified to solve the challenges that tele-practice presents.

The Government of India launched a flagship programme called "Digital India" with the objective of transforming the country into a digitally empowered society and knowledge economy. Programmes like these have been contributing in making India, a nation with promising advance in tele-practice (Digital India Programme, n.d).

Although India with its spiking growth as internet user, not until a decade back did the use of ICT in the field of applied sciences have been reported. Not many researches have been carried out in this regard. The researches that have been established also are not as dynamic and extensive. In this section, a review of a few of those limited researches will be done and an attempt will be made to highlight the gap that is identified in it.

An Indian case report of a person with Aphasia who was treated with the use of tele-practice in 2012 was known to be one of the first few reported research. The case study is reported to be the first of its kind and a pioneer to many more work using

tele-practice that followed then. In the year 2016, a thirteen-year review of telemedicine in a south Indian hospital is also reported. The review corroborated the importance of professionals like SLP and AUDs in the overall tele-health.

The first ever survey on tele-practice in India was conducted by Mohan et al. (2017). An online survey was distributed to all ISHA-registered speech-language pathologists and audiologists in the United States. The survey examined the state of tele-practice in speech-language pathology and audiology in India, as well as the perspectives of professionals who provide services in India via tele-practice (n=25) or face-to-face (n=180). The authors reported that the majority of those in the face-to-face group considered tele-practice to be a service delivery of viable form. Participants from the group of tele-practitioners and 28% from the face-to-face group believed that students with Master's in speech-language pathology or audiology should be the service provider. The authors also highlighted a number of other noteworthy findings.

Yashaswini & Rao published a brief study on Tele-Speech-Language Pathology and Audiology in India in 2018. Their work trails from the beginning to the current status of tele-practice in India. The authors sent a questionnaire to the SLPs involved in tele-practice. The questions were formed to research the discrepancies in traditional and the tele-practice service delivery. In addition, the research attempted to compare tele-practice in speech language pathology in India and the United States. The study's findings on SLP perspective and reported the technical barriers such as network problems and issues with videoconferencing software packages and reports are akin to studies done in other countries like the USA. Authors have also highlighted the concerns like "enhanced responsibility of caregivers, uncertainty about professionals'

skills, and lack of face validity that would ensue automatically in a physical setting" (Yashaswini & Rao, 2018).

In the year 2020, Venkatraman, Ganesan, Mahalingam, and Boominathan profiled the current direction in clinical voice therapy followed by SLPs through a questionnaire-based study. Fifty-five Speech-language pathologists meeting with the inclusion criterion were included in the study by the authors, and the voice therapy-related questionnaires were made accessible to them via e-mails and social networks.

The authors reported that most respondents worked in hospitals and hospital-based setups. They also report that 96.36% of the study population worked with the adult population mostly and sometimes with pediatrics & geriatrics. Concerning the therapy techniques used by the SLPs, the authors give an account for both hypofunctional and hyperfunctional cases, wherein breathing exercises (58.18%) and VFE (32.72%) being the mostly used techniques, respectively.

The research participants used auditory feedback (96.36 %) and visual feedback (72.72 %) often during therapy, according to the authors. The authors also found that 89.09 % of SLPs use the traditional one–one approach, Tele-practice (18.18 %), and intense short-term treatment (27.27 %) as modes of service delivery in treating dysphonia clients.

2.2 Comparison Tele-practice vs Conventional

In the past, there have been a number of comparison studies carried out with an aim to justify which form of therapy is superior. The knowledge on this type of study is

important to know the effectiveness of one type over the other. Reviewing the articles pertaining to it shall highlight the need for more refined articles in the field.

Johnson, Alvares, Rowan and Creaghead (2010) conducted a pilot study comparing the therapy efficiency provided through tele-practice with conventional face-to-face therapy to 38 school children exhibiting misarticulation, language delay and/or dysfluency or learning disability.

The authors divided the participants into two groups. While one group received telemedicine treatment for four months, the other group subsequently received conventional therapy. The authors evaluated the considered outcome measures such as student progress, participant satisfaction etc., using progress reports, standardized rating scales, and test material like Goldman-Fristoe Test of Articulation.

The authors found no evidentiary difference between the first or the second treatment group, indicating that the students' performed the same with tele-practice and conventional treatment. Also, authors reported the overwhelming satisfaction of students and their parents considering the tele-practice.

To evaluate the state of speech-language and hearing sciences in tele-health, Molini-Avejonas et al. (2015) conducted a systematic review of 103 publications. A total of 103 papers were chosen by the authors. Overall, the data showed that tele-health activities outperformed the other options. Other findings stated by the authors were tele-health's benefits and drawbacks. Access to treatment, cost-effectiveness, and contentment are only a few of the benefits mentioned in the research. Little or no access to service providers, economic challenges, and geographic limitations are among the barriers highlighted.

Dunkley, Pattie, Wilson, and McAllister (2010) published a paper that summarised the findings and implications of two linked investigations. The research looked into how people and Speech Language Pathologists in rural Australia used information and communication technology and their views about them (ICT). The first study looked into the perspectives of rural residents who might use tele speech-language pathology services while the second looked into the perspectives of rural SLPs who might deliver tele speech-language pathology services.

Rural households had greater access to various ICTs than SLPs, according to the research. Both rural residents and SLPs agreed that face-to-face and tele-health-delivered treatments may be different and that tele-health services may not fit all potential customers, according to the authors. Authors also report of rural residents' being eager to attempt telespeech-language pathology services in the subsequent years

Along with the effectiveness, the difference between the conventional mode and tele-mode of therapy shall be evaluated in reference to the confidence and comfort of the SLP. Clinicians' perceptions of therapeutic relationships in face-to-face and tele-practice speech–language pathology sessions were assessed by Freckmann and colleagues in 2017. The findings indicated no significant differences in SLP confidence or familiarity with novel software and technology depending on the method of service delivery.

2.3 Tele-health Settings and Technologies

2.3.1 Telephone

Telephone has been a part of history of tele-health since decades as mention earlier. In the pioneering study, the researcher has used a hardwired telephone to provide service to a client diagnosed with aphasia. In this method, a medical practitioner provides therapy to the patient over the phone in this method of service.

2.3.2 Mobile phone applications

When modern mobile technology such as mobile phones is used in health-care scenarios, the process is termed as mHealth. Presently there are numerous applications and software contributing to health services. Both Android and iOS applications that is easy, free or inexpensive, are examples of the same.

2.3.3 E-Therapy

The advancing health services which are provided by means of the internet are identified as E-therapy. This type of therapy is widely available, making it easily accessible and convenient for various therapy services. E-mail assistance, video conferencing, virtual reality technologies, chat rooms, or any combination of these can be used to deliver e-therapy services (Manhal-Baugus, 2001).

2.3.4 Video Conferencing

Video conferencing is an audio and visual communication between client and clinician overcoming geographical barriers. This proceeds in “real-time”, hence providing the client and clinicians to interact with the information just as they get it (Norris 2001).

Tele-practice services are most commonly given in public health and private practise settings. However, tele-health services were also provided by service providers from non-residential health care institutions or schools. Also, there have been many technological developments since the foremost documented use of tele-practice within speech-language pathology field. At present, technologies like telephone, e-mail, video conferencing, skype, and many more of such software and hardware are readily available. The preference and accessibility of the same vary across. There has been various researches contributing more information on this aspect. In this section of the literature review the articles inclusive of comprehensive details on the same will be highlighted.

Hill and Miller conducted a web-based survey in 2012 to learn more about the forms of technologies used by SLPs in Australia to provide health services. The poll included professional SLPs in Australia who use tele-health in their clinical settings. Tele-health services were delivered in a variety of venues, including public health institutions, private hospitals, public health settings, community service, and specialty services, according to the survey results.

However, the study had some limitations of its own, such as excluding the clinicians not using tele-health and the lack of consideration of the experience of respondents in tele-service. This limitation gives rise to the need for more research in the same area. This also develops a knowledge on the fact that tele-practice settings and technologies in the Indian context is not extensively researched; however, some studies shed light on the same aspects.

One of those studies is the survey done by Mohan et al. that reveals that most of the participants providing tele-service were self-employed, followed by a public or a

private non-profit organization and then central government organization; and least were an employee of a private organization (Mohan et al., 2017).

Another questionnaire-based study carried out in Kerala in the year 2020, mentioned that online platforms such as WhatsApp, Zoom, phone call, Google meet, Microsoft team, and Skype was used by SLPs for tele-practice. Two of the seventy-seven participants reported that the online platforms mentioned above would be chosen based on the convenience of clients and familiarity of the clinician with the app (Vrinda & Reni, 2020).

2.4 Requirements for tele-therapy setup

a) Manpower related: Parents/Caregivers, School teachers, Shadow teachers, e-helper etc are the people involved with the child while they are attending speech-language pathology-related services through tele-mode. Parents/caregivers especially involve in preparing the child for the therapy by setting up devices in advance and inconvenience to his/her child, doing the troubleshooting that might be required, executing the demonstrations given by clinicians at the other end of the screen etc.
b) Technology related: Quintessential internet that is both stable and speedy is one of the main requirements. A well-charged Laptop/ Desk Computer/ Tablet device/ mobile phones with a camera along with a mic, speaker, headsets etc., will be required. With these hard-wares, the required soft-wares such as identical application in both clinician and client's system is another requirement. The systems used must be HIPAA-compliant and have automatic log-off capabilities when the system is unused for a longer time period (HIPAA, 2020).

c) Space-related: The setup with proper lighting and relatively quiet space would be ideal to carry out tele-sessions as to avoid any distraction.

d) Consent related: Consent from the client/client party, in the form of e-mail or written script or verbal mode, has to be taken for. The consent needs to be obtained for the initiation of therapy services and also if recording the sessions for purposes like research or assessments.

e) Other related: Therapy resources that support the tele-mode interactions should be ready in prior to the actual session. Virtual re-enforcers to enhance the likelihood of interactions also should be thought of. Set the table closer to the charging point for the cases where the system might run out of charging. Keeping a water bottle on a side table for the clinician is also essential as tele-therapy, like conventional therapy also imposes vocal load.

2.5 Different terminologies used.

Many terms are synonymously used, including tele-health, e-health, and telemedicine. There is clear lack in understanding of usage and relevance of these terms. Few of the terms used are Tele-medicine, Tele-practice, Tele-health, Tele-therapy, Tele-rehabilitation and E-health .

Tele-health: It is the use of telecommunications and digital communication technologies to offer and facilitate health and health-related services such as medical treatment, provider and patient education, health information services, and self-care.

Tele-therapy: It is the application of any form of therapeutic intervention at a distance, including physical, occupational, and speech-language pathology treatment modalities (SLP).

Tele-rehabilitation: It is described as the delivery of medical rehabilitation services using electronic information and communication technology over a long distance. It is well-known for providing customers with immobility or those who are disconnected from offline service with access to excellent amenities (Rosen & Michael J., 1999).

Telemedicine: It is a broad term that encompasses all aspects and activities of health-care and the health-care system that are carried out via telecommunications technology.

E-Health: It refers to health services and information given or enhanced via the internet and similar technologies. It is a new topic at the confluence of medical informatics, public health, and commerce. In a larger sense, the word describes not just a technological advancement, but also a state of mind, a style of thinking, an attitude, and a dedication to utilise information and communication technology to enhance health care locally, regionally, and globally (Eysenbach G, 2001).

Tele-practice: It is the use of telecommunications technology to provide speech-language pathology and audiology professional services across long distances by connecting clinicians with clients or clinicians with clinicians for evaluation, intervention, and/or consultation. The American Speech-Language-Hearing Association (ASHA) concluded that tele-practice is a suitable service delivery paradigm for audiologists and speech-language pathologists (SLPs) (ASHA, n.d.).

In 2012, Fatehi and Wootton examined the frequency of keywords like "tele-health," "e-health," and "telemedicine" in the Electronic databases. There were 11,644 documents containing these keywords in the title or abstract, according to their search. Telemedicine was mentioned in 8028 papers, making it the most prevalent

word, followed by e-health and finally tele-health. As per their research, there has been a considerable increase in the publishing of the phrases stated above during the last two decades. According to their observations, there will be more documentation in the future that refer to ‘e-health' rather than ‘telemedicine.'

2.6 Therapeutic alliance

Synonymous terms for the therapeutic alliance are working alliance, therapeutic relationship and rapport. Clinicians and clients frequently believe that developing rapport through tele-practice is impossible, or that if it is, it would be ineffective compared to face-to-face service delivery. The following section, few studies done previously on evaluating therapeutic alliance shall be reviewed. However, it is to be noted that there is very less literature that is contributed to this end.

Freckmann, Hines, and Lincoln in 2017 investigated the face validity of the Therapeutic Alliance Scales for Children-Revised for paediatric speech–language pathology, determining whether there is a difference in therapeutic alliance reported by 17 SLPs performing face-to-face sessions versus 14 SLPs performing tele-practice sessions, or in their ratings of technology confidence. An online survey was carried out and the responses were elicited from SLPs with the age range of 23 - 64 years and work experience of 1 - 42 9.6 years.

According to the authors, non-government organisations were the most common workplace for tele-practice, which could have been influenced by recruitment strategies, and approximately 45 percent of face-to-face SLPs provided services to metropolitan areas, whereas tele-practice SLPs provided services to rural centres. The authors also stated that children with speech delay or disorder made up 93.5 percent of the caseload

in both the tele-practice and face-to-face groups. The study revealed the most commonly used technology by the SLPs for their tele-practice was Skype followed by another mode of technology.

The authors discovered no significant differences in TASC-r scores across the groups. The study also found no differences between the two groups in terms of trust in daily software and technology or familiarity with new software and technology. The TASC-r may have the potential to enhance assessments of tele-practice services across disciplines, according to the authors.

2.7 Satisfaction

The satisfaction that followed the therapy services are indicative of a success and comfort of various mode of speech therapy services. The evaluation of the same is utmost necessary. The studies with objectives to describe the satisfaction level has been done in recent years. However, studies dedicated solely to rate the satisfaction level is very insignificant in number. This section of the chapter shall review the literature pertaining to the same.

According to results from the aforesaid pilot study, Johnson and colleague (2010) "the students receiving the service and their parents were overwhelmingly satisfied with tele-practice. Speech language pathologists, e-helpers and school principals were generally satisfied with tele-practice. Teacher satisfaction surveys indicated that they did not know enough about the project or the students' and parents' reactions."

Another conclusion from Avejonas' systematic review in 2015 was that tele-health users reported higher levels of satisfaction, and that tele-practice was thought to increase the quality of treatment delivered to service recipients. According to

the findings, satisfaction was comparable to face-to-face treatment delivery in terms of contact and ease addressing issues with the therapist.

2.8 Access and use

Rural populations' lack of access to technology has been cited as a barrier to tele-mode delivery of services. Rural residents' access to these technologies is likely to be substantially lower than that of SLPs. However, the findings of the comparative research presented earlier by Dunkley et al. (2010) indicate that rural households had far greater access to a range of ICT than predicted, but SLPs had significantly less access to ICT in their jobs than expected. In addition, the survey discovered that rural people use computers and e-mail less frequently than rural SLPs. Rural inhabitants, on the other hand, have access to ICT in several locations, such as home. Work place, hospital, health Centre etc unlike SLPs, having access to these technologies is only limited to their workplace.

The systematic review highlights the betterment in access to care as the main advantage stated in 80.6% of papers. Tele-health can promote lesser travel time, better health care accessibility to individual of rural areas, and reach more clients.

2.9 Benefits, Barriers, and Facilitators to uptake of Tele-practice

There are a number of difficulties that have arisen as a result of the rapid growth of tele-practice as a service delivery paradigm in recent years. Most commonly known challenges technical delays, network issues, lack of resources, lack of acceptance etc. However, it is no surprise that tele-practice comes with benefits like easier access, cost effectiveness, overcoming of geographical barrier, accessible to patients with mobility

difficulty etc. The articles reviewed under this chapter have inevitably commented on the benefits, barriers and facilitators in different context.

Afore mentioned survey-based study by Hill and Miller (2012) determined the responses by the participants. Accessibility, time efficiency, client attention, caseload management, and cost effectiveness were all recognized as benefits of adopting tele-health in the study. Authors also reports the significant barriers i.e., about technology, telecommunication infrastructure, and resources, as identified by the respondent of the current study. Authors also proposed many possible facilitators mentioned by respondents, including outreach clinics, expanding the evidence basis of tele-practice, providing new practitioners with training, and raising client knowledge of tele-health.

Tucker investigated the phenomena of tele-practice services from the viewpoints of SLPs on the usage of tele-practice in school settings in New Oxford, United States, in his qualitative interviews in 2012. The participating five SLPs had to be the ones who provided tele-services for greater time period. Patients with communication problems such as Articulation disorder, stuttering; Language disorder, Central Auditory Processing Disorder, and others were handled by these SLPs, who ranged in age from 11 to 36 years. The researcher assigned broad topics such as tele-practice challenges and advantages, reasons for acceptance and usage of tele-practice, and recommendations for addressing tele-practice professional challenges after a thorough assessment of each participant's interview.

The findings show that the challenges described by SLPs in this research were comparable to those documented in the literature, and included issues with technological failures, procedural ambiguities, environmental restrictions, and

insufficient information concerning student eligibility and treatment efficacy. As reported by the author in the study, the second theme is that the benefits were also found in the literature and convenient delivery options, collaboration with specialists, lessened the caseload burdens, increased access, etc. were few of the benefits mentioned.

The third theme included SLPs' views of the reasons for tele-practice acceptability or utilisation. Along with other characteristics indicated by the participating SLPs, the author identifies attitude toward tele-practice as a crucial component. The author discusses the end theme that developed from the SLPs' recommendations, and how these suggestions may help others designing a tele-practice programme for school students overcome the problems they experience.

A systematic review (Avejonas et al., 2015) revealed that the tele-health offered benefits and barriers. An advantage such as improved access to care has been most (80.6%) mentioned in the studied papers, followed by cost effectiveness being the second most mentioned benefit. Acceptance of a new form of service delivery, broadband speeds, and the need for data to enhance the software utilised, and other technological restrictions were the primary impediments mentioned in the research. It is important to note, however, that approximately 25 percent of the studies included in the systematic review found no obstacles to tele-health use.

Chapter III

METHOD

The aim of this study was to determine the perspectives of student SLPs about service delivery in Speech-Language Pathology through tele-mode. This chapter provides an overview of the methodology including the process of data collection, inclusion criteria and, the methods of analysis of the current study.

3.1 Research Design

The use of an electronic survey approach to conduct research is recognized to be a rapidly growing body of literature. The current study used a survey-based research design. An e-Questionnaire was specifically developed for the same. The three most common reasons for choosing an e-survey over other traditional approaches were (1) cost-effectiveness, (2) Shorter response times, and (3) greater response rates (Lazar & Preece, 1999). The questionnaire was inclusive of different question types, making it both quantitative and descriptive in nature.

3.2 Participants

The research involved two different groups of student SLPs with different educational qualifications and some experience in tele-mode of speech service delivery. Study participants are cited to as respondents in following survey. Only respondents who fulfilled the predetermined inclusion criteria were included in the study and the rest were excluded. The inclusion criteria were as follows:

- They were able to provide informed consent to the study.

- They had to be currently pursuing their designated qualification in the field of Speech-Language Pathology and Audiology.
- They had to be partaking in on-going tele-based speech therapy services.
- They had the experience of a minimum of 10 online therapy sessions in the field of Speech Language and Pathology.

3.2a Participant Demographics of group I

Group I had sixty-three respondents (n=63) who were pursuing their under-graduation in Audiology and Speech-Language Pathology during the current study. The age of the respondents ranged between 20 years to 25 years, with a mean of 22.5 years of age. Approximately 79% of the student clinicians of group I were in their 3nd year while the rest were from batch of Interns (n=13; 21%). The majority of the respondents were female (n=48; 84%) and only 9 (15%) were male (see Figure 1).

3.2b Participant Demographics of group II

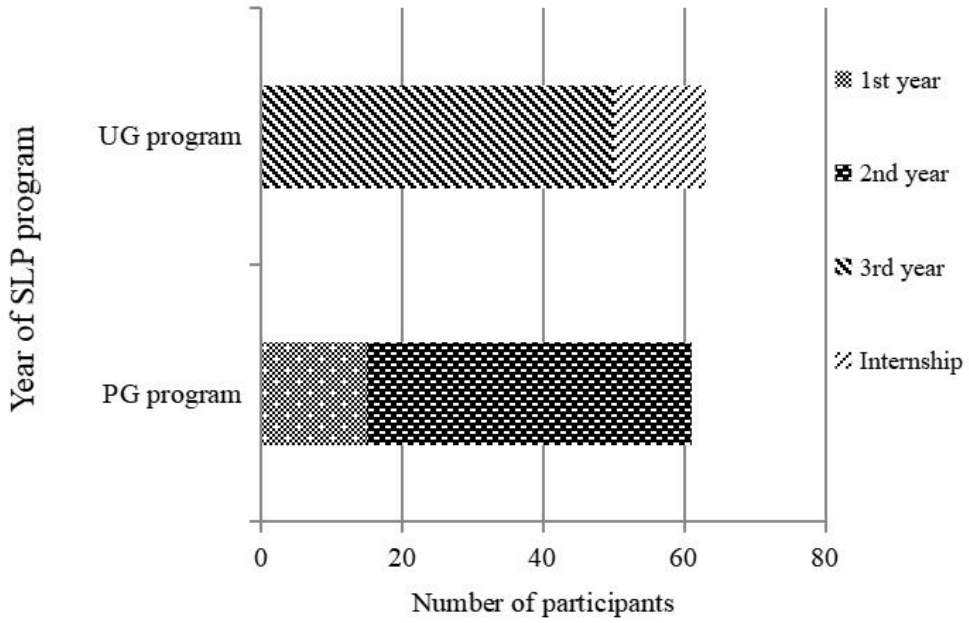
In the second group, i.e., group II, fifty-nine student SLPs pursuing their masters in Speech-Language Pathology were included. Each of the respondents consented to the study after briefing them about the aim and objectives of the study. Two of the respondents did not meet the criteria of having taken a minimum of 10 sessions of tele-therapy and were excluded from the current study. Fifty-seven (96.6%) of the student clinicians completed the survey. The age range of the respondents was from 22 to 29 years, with a mean age of 25.5 years.

As displayed in Figure 1, the number of respondents studying 1st year and 2nd year of SLP master's program is strikingly different. Approximately 75 % of the student

clinicians of group II were in their 2nd year while the rest were from 1st year of masters. The majority of the respondents were female (49; 86%) and only 8 (14%) were male.

Figure 1

Details of respondents in Undergraduate and Postgraduate program in SLP



3.2c Recruitment

The participants were recruited through convenient sampling through the personal contact of the researcher. Each of the participants was given a brief description of the study and the link to the questionnaire to be responded to. They were further requested to share the link, along with the message that included the brief description, aim of the research and the consent form, to the eligible SLPs' of their social networking groups.

3.3 Material

For the current study, the questionnaire (Appendix) titled “Perspectives of Students in Tele-Service Delivery in Speech-Language Pathology” was developed based on an extensive review of literature, to obtain information regarding student SLP’s perceptions of tele-service delivery. It was developed using a google application called ‘Forms’. Each of the questions developed for the same were made definite to be concrete, simple, easy to understand, and unambiguous in nature (Roopa & Rani, 2012).

3.3a Survey Questions

A 62-item questionnaire was developed in English with an assumption that most of the students pursuing their under-graduation and masters are famed to the same language. The formulated questions were sent to five SLPs who had a minimum of 12 months of experience in tele-therapy for content validation. They were asked to rate each question on the basis of its appropriateness on a 5-point Likert scale. The SLPs were also requested to give their propositions and suggestions. After the same, the number of questions was reduced and combined to a total of forty questions. The finalized 40-item questionnaire comprised of different domains:

(1) Demographic information of participants

(2) Perspectives and satisfaction with tele-mode

(3) Knowledge, confidence, and acceptance of the clinicians’ concerning the tele-rehabilitation, and

(4) Their take on the future of tele-therapy in speech-language rehabilitation.

In the demographic domain, questions related to respondents' gender, age, educational qualification, work experience in tele-therapy, nature of the client population dealt, etc were included. The following domain comprised of 19 questions that surveyed participants' perspectives about the therapy service using tele-mode of service delivery and how satisfied they are with the same. The second domain included sixteen questions that are divided into three sub-categories. Aforementioned sub-categories aimed at surveying the knowledge, confidence and acceptance of respondent SLP's regarding various tele-rehabilitation related aspects. Last domain in the questionnaire enclosed five questions that required the respondents to comment on their take on future of tele-therapy in speech-language rehabilitation.

The survey consisted of multiple-choice, Likert scale, yes/no, select-all-that-apply, and open-ended type of questions. In the four-point Likert scale, 0 indicated 'Not at all'. Similarly, 1, 2, and 3 indicated - occasionally, frequently, and most frequently, respectively.

3.4 Data Tabulation and Analysis

Responses to the questionnaires were tabulated and, data apart from the open-ended questions, were entered into an excel spreadsheet. The statistical analysis was carried out using SPSS software (version 25.0). Descriptive analysis was performed to analyze the data on the basis of a mean, median, mode and, standard deviation. This allowed more transparent representation of data obtained from questions about respondent characteristics. Inferential statistical tests such as the Chi-Square Test of Independence were performed (McHugh, 2013). A mixed ANOVA test was carried out to compare the differences between groups with both "within-subjects" and "between-subjects" factors. The findings of the two open-ended questions were

qualitatively examined using thematic analysis. This augmented the researcher to identify and classify the responses into certain patterns or trends for ease of comparison.

Chapter IV

RESULTS

A total of a hundred and twenty-two participants responded to the survey questionnaire. However, eight respondents were eliminated from the survey as they did not fulfil all the inclusion criteria. After excluding these participants, the total number of responses considered for the data analysis was one hundred and fourteen. Both Postgraduates and Undergraduate groups included fifty-seven participants equally.

The current study aimed to assess the perspectives and opinions of the student clinicians on the service delivery in Speech-Language Pathology through tele-mode and to determine challenges faced by the student clinicians while rendering Speech-language pathology-related services through tele-mode. The study also intends to compare the responses between Undergraduate and postgraduate student clinicians.

The result of the present study shall be explained under following section:

1. Views/opinions on speech-language pathology service delivery through tele-mode by Speech-language pathology undergraduate student clinicians.
2. Views/opinions on speech-language pathology service delivery through tele-mode by Speech-language pathology postgraduate student clinicians.
3. Comparison of the responses in undergraduates and postgraduate students.

Table 1 demonstrates the demographic characteristic of the study participants. A total number of 114 student clinicians participated in the study. The mean ages of the undergraduate and postgraduate students were 21.39 and 23.64 years, respectively. Out of 57 Undergraduate students, 9 were males, 48 were females, and out of 57

Postgraduate students, 8 were males, and 49 were females. Gender distribution and mean age of students in both groups are represented in Table 1.

Table 1

Demographic characteristic of students

Groups	*No. of participants*	*Mean Age (in years)*	*SD*	Gender	
				No. of Male	No. of Female
Group I	57	21.39	0.999	9	48
Group II	57	23.64	1.297	8	49
Total	114			17	97

Table 2 depicts the characteristics related to tele-services provided by both the group of SLPs. The majority of undergraduate SLPs worked with the pediatric population (n = 51;89.5%) most frequently, and only a few SLPs from this group worked with other adult and pediatric populations, as shown in Figure 1. Whereas, the majority of the postgraduate SLPs worked with both adult and pediatric clients (n = 21;37%;) (see Figure 2).

The common types of patients dealt with by SLPs of both groups included both language and speech disorders. However, as depicted in Table 2, the PG group (group II) participants treated a greater variety of cases than group I (see Figure 3).

Table 2

Characteristics related to tele-services of both groups

	UG (group I)		PG (group II)	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Nature of the clients taken				
Only Pediatrics	51	89.5	17	30
Only Adults	0	0	1	2
Only Geriatrics	0	0	0	0
Pediatrics and adults	5	8.8	21	37
Pediatrics and Geriatrics	1	1.8	4	7
All the above	0	0	14	24
Type of disorders of clients				
Language	34	59.6	11	19
Speech	0	0	4	7
Both	23	40.6	42	74
Technologies used				
Only Google meet	3	5.3	4	7
Only Zoom	2	3.5	6	11
Only WhatsApp	10	17.5	5	9
Only Microsoft Teams	0	0	2	3
Only Phone call	0	0	0	0
Only Skype	0	0	0	0
Combination of technologies	42	73.5	40	70
Form(s)				
Synchronous	25	43.9	36	37
Asynchronous	1	1.8	0	0

Both	31	54.4	21	63

Respondent SLPs of both groups used various technology and platforms to provide service through tele-mode. The relative quantity of UG respondents reported the most commonly used platforms were WhatsApp, Google meet, and zoom applications for the tele-services (see Figure 4). As shown in Table 2, 70% (n=40) of the PG respondents used a combination of different software and technologies like Zoom app, WhatsApp, Google meet, etc as a platform to provide tele-services . Fewer respondents (n = 2;3%) from this group reported tele-therapy through other platforms like Microsoft Teams, as depicted in Table 2.

Figure 2

Nature of the clients taken by both group respondents

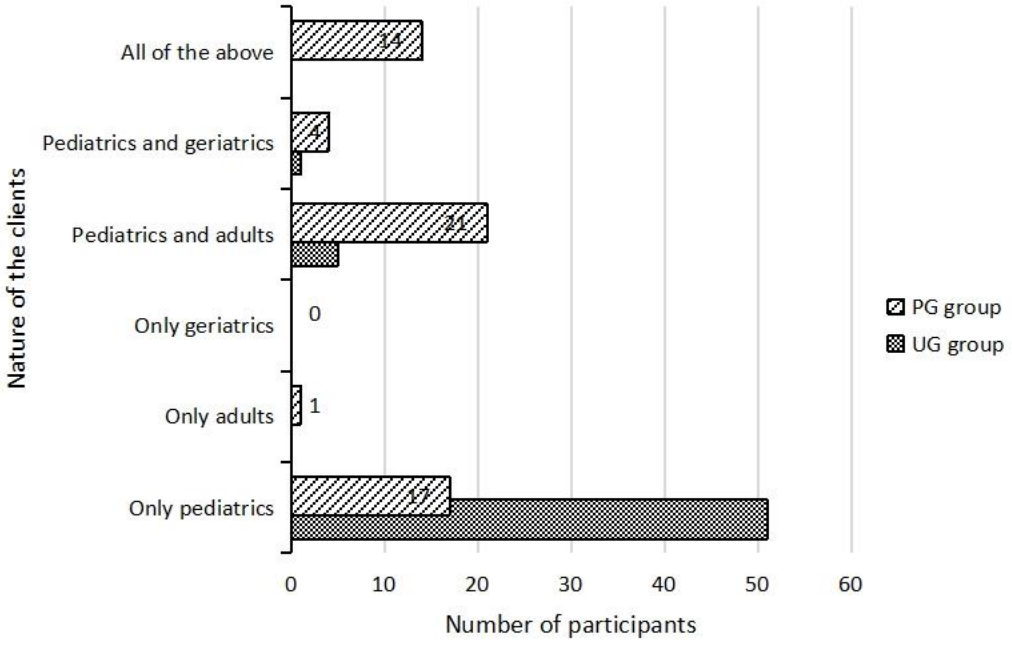


Figure 3

Type of disorders of clients taken by both group respondents

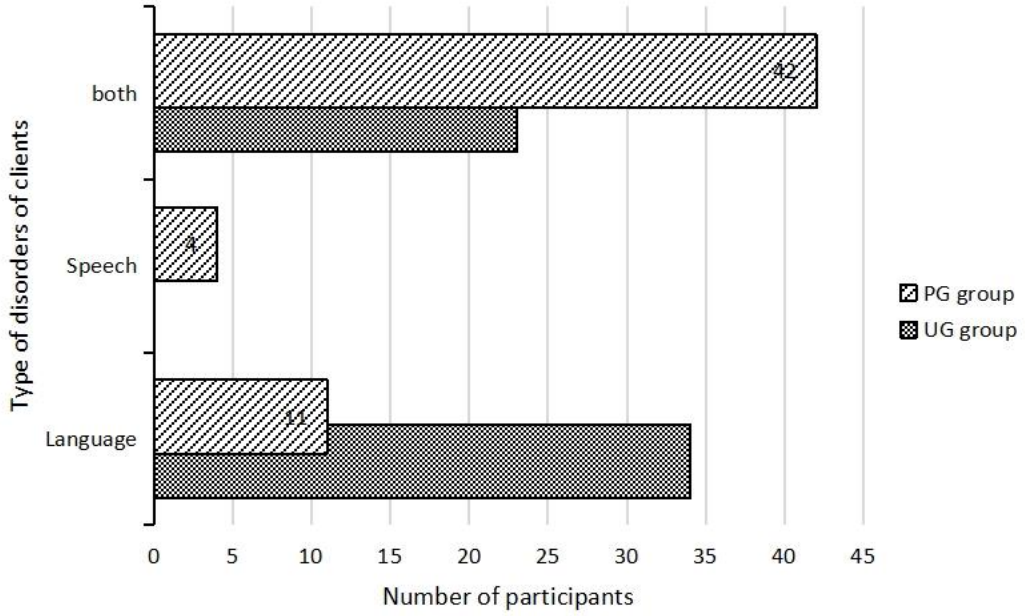
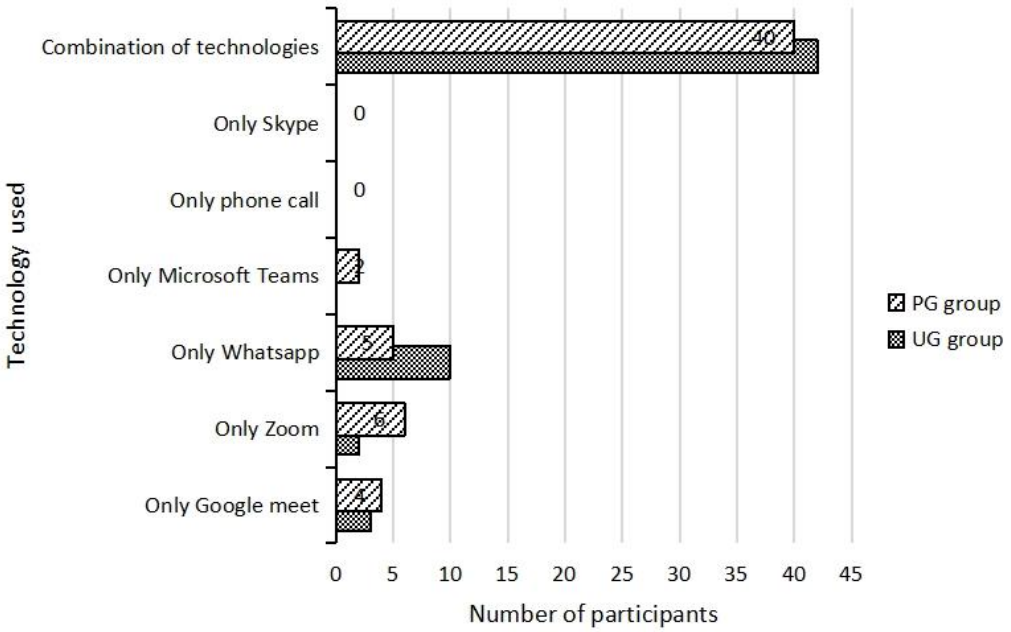


Figure 4

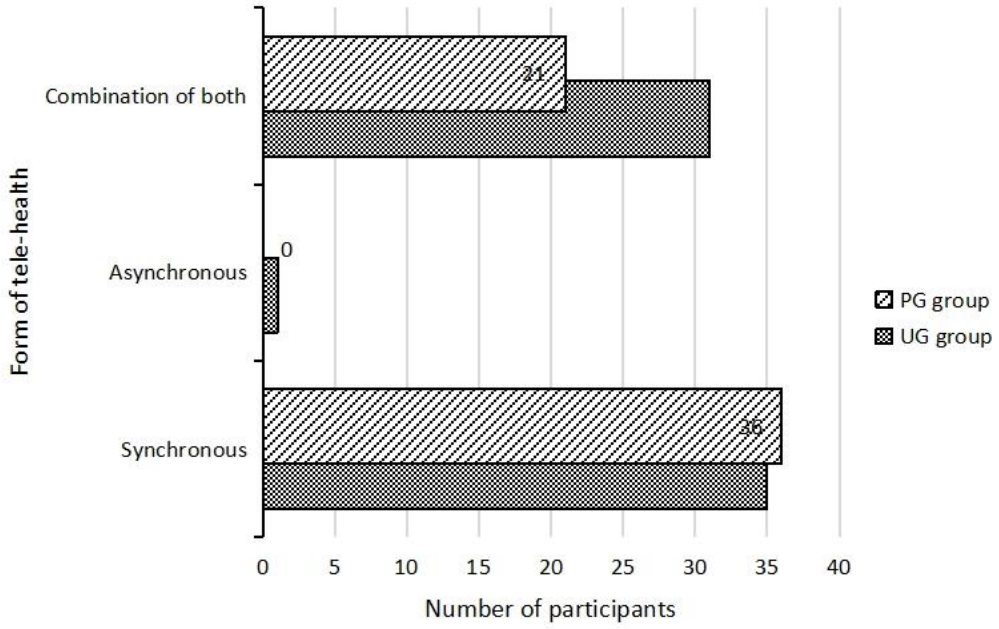
Technologies used for tele-services



Participant SLPs reported the use of different forms of tele-health systems during therapy. Synchronous (n = 25; 43.9%) or the combination of both synchronous and asynchronous methods (n = 31; 54.4%) were reported by student SLPs of the UG group. Similarly, the majority of the student SLPs of the PG group used a combination of both forms (n = 21;63%) majorly, followed by the synchronous form of tele-health system Figure 5 shows the different forms of tele-practice adapted by both groups.

Figure 5

Form(s) of tele-health adapted



4.1 Descriptive analysis of Domain wise responses

4.1a Descriptive analysis of Domain 1

Table 3 represents the participants' responses to each statement under the first domain to assess Perspectives and Satisfaction concerning tele-services among Undergraduate students of group I. In response to statement one, 56.1% of the respondents (n=32) said that tele-rehabilitation system (whole setup) is frequently easy to use. On asking about the second statement, 42 % (n=24) of the respondents frequently felt that they could convey themself efficiently through tele-mode. Only 20 respondents occasionally felt that their clients were equally responsive in tele-mode.

In response to the fourth statement, more than 35 % of the respondents most frequently responded that Tele-rehabilitation services allowed them to provide services without any geographical barrier. On asking the fifth and sixth statement, the majority of the partcipants occasionally spent more time on a patient through tele-mode than the conventional mode of therapy (47.4%) and used tele-rehabilitation services on a wide range of communication disorders (56.1%).The majority (47.4%) of the participants believed that their clients were not at ll motivated for tele-mode when compared to the face-to-face mode of speech-language therapy.

When asked about the flexibility of tele-mode, only 3 of the 57 participants didn't respond postively. However, rest of them held positive insight on tele-therapy's flexibility.More than half of the participants also accepted tele-mode to be a reliable form of service delivery. In response to the tenth statement, 63.2% of the students who most frequently felt that tele-rehabilitation ensure better public health during epidemics and pandemics. More than 79% of the respondents found it challenging to interpret clients' body language and other subtle signals through tele-mode.

In response to the twelfth statement, 44% of the respondents (n=25) frequently said that tele-mode service delivery is less convenient due to technical difficulties. In response to the thirteenth statement asking for the tracking progress of goals or monitoring accuracy/consistency of responses during tele-therapy, 33.3% of undergraduate respondents reported it occasionally difficult and 35.1% of them had reported "frequent difficulty". The majority of the respondents (40.4%) reported being satisfied with the level of clinician-patient rapport that they could build with tele-mode, only occasionally. In response to the fifteenth and sixteenth statements, 44% of the respondents were frequently satisfied with the outcome of service using tele-mode

classes and with the availability and the use of e-therapy resources during the e-sessions. Nevertheless, approximately 33% of the participants found the above statement as satisfying.

Twenty-three (40%) of the UG group respondents reported that they were frequently satisfied with their therapy skill enhancement during tele-rehabilitation. On asking about the statement eighteenth, the proportion of respondents of the UG group who were only occasionally satisfied with the quality of treatment offered through tele-mode was high (43.9%). However, the majority of the same group (65%) reported that they were frequently and above satisfied with the attitude of clients/caregivers about receiving speech therapy services via tele-practice.

Table 3

Undergraduates' responses to statements of domain 1

	Not at all *n (%)*	Occasionally *n (%)*	Frequently *n (%)*	Most frequently *n (%)*
1. I find the tele-rehabilitation system (whole setup) easy to use.	3(5.3)	18(31.6)	32(56.1)	4(7.0)
2. I feel that I can convey myself efficiently through tele-mode.	9(15.8)	22(38.6)	24(42.1)	2(3.5)
3. I feel that my clients are equally responsive in tele-mode as like face-to-face mode of speech-language therapy.	8(14.0)	20(35.1)	17(29.8)	12(21.1)
4. Tele-rehabilitation service allows me to provide services without any geographical barrier.	3(5.3)	12(21.1)	20(35.1)	22(38.6)
5. I spend more time on a patient through tele-mode than I would with the conventional mode of speech-language therapy.	10(17.5)	27(47.4)	15(26.3)	5(8.8)
6. I can use tele-rehabilitation services on a wide range of communication disorders.	6(10.5)	26(56.1)	22(38.6)	3(5.3)
7. I feel that the clients are motivated more for tele-mode than the face-to-face mode of speech-language therapy.	27(47.4)	24(42.1)	6(10.5)	0(0)
8. I feel that tele-mode of rehabilitation is flexible.	3(5.3)	20(35.1)	23(40.4)	11(19.3)

9. I feel that tele-mode of rehabilitation is a reliable form of service delivery.	2(3.5)	29(50.9)	18(31.6)	8(14.0)
10. I feel that tele-rehabilitation ensures better public health during situations like epidemics and pandemics.	0(0)	7(12.3)	14(24.6)	36(63.2)
11. I feel that it is difficult to interpret body language and other subtle signals of clients through tele-mode.	0(0)	12(21.1)	23(40.4)	22(38.6)
12. I feel that the tele-mode service delivery is less convenient due to technical difficulties that could come along.	0(0)	13(22.8)	25(43.9)	19(33.3)
13. I find difficulty tracking progress of my goals or monitoring accuracy/consistency of responses by the client during tele-therapy.	7(12.3)	19(33.3)	20(35.1)	11(19.3)
14. I am satisfied with the level of clinician-patient rapport that I can build with tele-mode.	10(17.5)	23(40.4)	19(33.3)	5(8.8)
15. I am satisfied with the outcome of my service using tele-mode of service delivery.	7(12.3)	19(33.3)	25(43.9)	6(10.5)
16. I am satisfied with the availability and the use of e-therapy resources during the e-sessions.	3(5.3)	19(33.3)	25(43.9)	10(17.5)
17. I am satisfied with my therapy skill enhancement during tele-rehabilitation.	5(8.8)	21(36.8)	23(40.4)	8(14.0)

18. I am satisfied with the quality of treatment offered through tele-mode.	6(10.5)	25(43.9)	22(38.6)	4(7.0)
19. I am satisfied with the attitude of clients/caregiver about receiving speech therapy services via tele-practice.	6(10.5)	20(35.1)	26(56.1)	5(8.8)

Note: n indicates the number of frequency; values within bracket indicate percentage

In table 4, the responses from the PG group to each statement are depicted. According to the analysis, 56.1% of the PG respondents frequently found the tele-rehabilitation system (whole setup) to be 'easy to use.' The same proportion from the group also frequently felt that they could convey themselves efficiently through tele-mode. In response to the third statement, a majority (38.6%) of the group participants occasionally felt that their clients are equally responsive in tele-mode like face-to-face speech-language therapy. When asked whether tele-rehabilitation service allowed them to provide services without any geographical barrier, 84% of the participants responded positively to tele-rehabilitation being advantageous in overcoming the barrier.

In response to the fifth statement, the majority found only occasionally (36.8%) that they would have to spend more time on a patient through tele- mode than they would with the conventional mode of speech-language therapy. Twenty-two (38.6%) of the PG students reported that frequently they could use telerehabilitation services on a wide range of communication disorders. As the response to seventh and eighth statements, a large proportion (49.1%) of the respondents reported that they occasionally (28% reported frequently and above) felt that the clients are motivated more for tele-mode than the face-to-face mode of speech-language therapy and 75%

of PG respondents reported that tele-mode of rehabilitation is frequently flexible. On asking about statement nine, 56.1% of the respondents frequently felt that tele-mode of rehabilitation is reliable service delivery.

Fifty of the 57 participants (88%) most frequently found tele-rehabilitation to be ensuring better public health during situations like epidemics and pandemics. Another set of responses obtained for statements eleven and twelve revealed that the majority of PG students (75% of them) frequently found it difficult to interpret body language and other subtle signals of clients through tele-mode and found the tele-mode service delivery to be less convenient due to technical difficulties that could come along. The majority (49.1%) of the study respondents of this group reported only occasional difficulties tracking the progress of my goals or monitoring accuracy/consistency of responses by the client during tele-therapy.

Another response set obtained for the fourteenth statement revealed that most of the participants (44%) were only satisfied frequently with the level of clinician-patient rapport they could build with tele-mode. However, most participant (56% and above) in group reported being satisfied frequently with the outcome, availability and the use of e-therapy resources, therapy skill enhancement, and the quality of treatment offered using tele-mode of service delivery (as depicted in table 4 statement 15-18). On asking of statement nineteen, a higher percentage (64%) of the respondents positively reported that they were satisfied with the attitude of clients/ caregivers about receiving speech therapy services via tele-practice.

Table 4

Postgraduates' responses to statements of domain 1

	Not at all *n (%)*	Occasionally *n (%)*	Frequently *n (%)*	Most frequently *n (%)*
1. I find the tele-rehabilitation system (whole setup) easy to use.	1(1.8)	16(28.1)	26(56.1)	14(24.6)
2. I feel that I can convey myself efficiently through tele-mode.	6(10.5)	20(35.1)	26(56.1)	5(8.8)
3.I feel that my clients are equally responsive in tele-mode as like face-to-face mode of speech-language therapy.	7(12.3)	22(38.6)	19(33.3)	9(15.8)
4. Tele-rehabilitation service allows me to provide services without any geographical barrier.	2(3.5)	7(12.3)	16(28.1)	32(56.1)
5. I spend more time on a patient through tele-mode than I would with the conventional mode of speech-language therapy.	11(19.3)	21(36.8)	12(21.1)	13(22.8)
6. I can use tele-rehabilitation services on a wide range of communication disorders.	6(10.5)	18(31.6)	22(38.6)	11(19.3)
7. I feel that the clients are motivated more for tele-mode than the face-to-face mode of speech-language therapy.	13(22.8)	28(49.1)	11(19.3)	5(8.8)
8. I feel that tele-mode of rehabilitation is flexible.	3(5.3)	11(19.3)	28(49.1)	15(26.3)
9. I feel that tele-mode of rehabilitation is a reliable form of service delivery.	2(3.5)	19(33.3)	26(56.1)	10(17.5)

10. I feel that tele-rehabilitation ensures better public health during situations like epidemics and pandemics.	0(0)	1(1.8)	6(10.5)	50(87.7)
11. I feel that it is difficult to interpret body language and other subtle signals of clients through tele-mode.	0(0)	13(22.8)	24(42.1)	20(35.1)
12. I feel that the tele-mode service delivery is less convenient due to technical difficulties that could come along.	2(3.5)	10(17.5)	29(50.9)	16(28.1)
13. I find difficulty tracking progress of my goals or monitoring accuracy/consistency of responses by the client during tele-therapy.	5(8.8)	28(49.1)	19(33.3)	5(8.8)
14. I am satisfied with the level of clinician-patient rapport that I can build with tele-mode.	4(7.0)	23(40.4)	25(43.9)	5(8.8)
15. I am satisfied with the outcome of my service using tele-mode of service delivery.	2(3.5)	21(36.8)	29(50.9)	5(8.8)
16. I am satisfied with the availability and the use of e-therapy resources during the e-sessions.	4(7.0)	17(29.8)	24(42.1)	12(21.1)
17. I am satisfied with my therapy skill enhancement during tele-rehabilitation.	1(1.8)	18(31.6)	25(43.9)	13(22.8)
18. I am satisfied with the quality of treatment offered through tele-mode.	1(1.8)	24(42.1)	27(47.4)	5(8.8)
19. I am satisfied with the attitude of clients/caregiver about receiving speech therapy	0(0)	21(36.8)	30(52.6)	6(10.5)

services via tele-practice.

4.1b Descriptive analysis of Domain 2

The second domain has sixteen questions that assess the respondents' knowledge, confidence, and acceptance concerning different aspects of tele-rehabilitation. Table 5 shows the responses from the undergraduates (Group I) for each of the statements of Domain 2.

In response to statement one, the 47.4% of the UG student respondents claimed that they know various tele-rehabilitation options available for Speech-language therapy services. Furthermore, approximately 49% of them were well aware of the basic troubleshooting needed for tele-therapy.

More than 67 % of the respondents reported being familiar with the protocol required for tele-therapy. The majority (above 50%) of the respondents agreed that they frequently were aware of the ethical and legal issues with tele-rehabilitation services. On asking of fifth, sixth and seventh statements, the respondents also reported being frequently confident about the usage of tele-mode, patients' progress, and the execution of therapy techniques and strategies through tele-mode (42.1%, 56.1%, 42.1%, respectively). In response to the eighth statement, 26 out of 57 Undergraduates (56%) felt confident using tele-rehabilitation software like Zoom, Google meet, Skype, etc., demanding real-time video streaming of themselves during tele-therapy.

Tele-rehabilitation was rated as an acceptable form of delivery of speech-language pathology treatments by half of the respondents (50.9 %) as frequently. For the 10th statement, 38.6% of the participants from this group

occasionally found it easy to switch to tele-mode from face-to-face mode of service delivery. In response to the eleventh statement, most respondents, 27(47.4%), believed tele-rehabilitation is a cost-effective platform. A significant proportion (80.8%) of respondents depicted tele-rehabilitation as a quicker platform for reaching patients.

When asked about the use of sophisticated technology in tele-therapy, the majority of them (47.4%) said it was not required to have advanced technology in order to get a satisfactory patient outcome. In reaction to previous remarks in this sector, several people said that teletherapy is only effective and comfortable on rare occasions when compared to traditional techniques. However, around 70% of respondents said that tele-therapy may be a suitable alternative for those who are technologically proficient. Further, about 50% of the respondent felt frequently the comfort of providing tele-services in Speech Language Pathology.

Table 5

Undergraduates' responses to statements of domain 2

	Not at all *n (%)*	Occasionally *n (%)*	Frequently *n (%)*	Most frequently *n (%)*
1. I have knowledge of various tele-rehabilitation options available for Speech-language therapy services	3(5.3)	23(40.4)	27(47.4)	4(7.0)
2. I am well aware of the basic troubleshooting needed for tele-therapy.	2(3.5)	20(35.1)	28(49.1)	4(7.0)
3. I am familiar with the protocol required for tele-therapy.	5(8.8)	14(24.6)	33(57.9)	5(8.8)
4. I am aware of the ethical and legal issues with tele-rehabilitation services.	7(12.3)	18(31.6)	28(49.1)	4(7.0)
5. I feel confident in using tele-mode for speech-language pathology service delivery.	5(8.8)	20(35.1)	24(42.1)	8(14.0)
6. I feel confident about my patients' progress through tele-therapy.	6(10.5)	20(35.1)	26(56.1)	5(8.8)
7. I feel confident in executing therapy techniques and strategies through tele-mode.	5(8.8)	21(36.8)	24(42.1)	7(12.3)
8. I feel confident using the tele-rehabilitation software like Zoom, Google meet, Skype, etc., that demand real-time video streaming of myself during tele-therapy.	1(1.8)	15(26.3)	26(56.1)	15(26.3)

9. Tele-health is an acceptable delivery mode of speech-language pathology services.	4(7.0)	17(29.8)	29(50.9)	7(12.3)
10. It was easy for me to switch to tele-mode from face-to-face mode of service delivery.	17(29.8)	22(38.6)	14(24.6)	4(7.0)
11. I feel that tele-rehabilitation is a cost-effective platform.	2(3.5)	13(22.8)	27(47.4)	15(26.3)
12. I feel that tele-rehabilitation is a quicker platform for reaching patients.	2(3.5)	9(15.8)	23(40.4)	23(40.4)
13. I feel that tele-therapy applications may not require advanced technology for achieving a good patient outcome.	8(14.0)	20(35.1)	27(47.4)	2(3.5)
14. I feel that service delivery through the tele-therapy method is as effective as the traditional methods	10(17.5)	25(43.9)	19(33.3)	3(5.3)
15. I feel that tele-therapy may be a good option for people who have technological proficiency.	1(1.8)	16(28.1)	20(35.1)	20(35.1)
16. I usually feel comfortable offering therapy through tele-mode.	9(15.8)	20(35.1)	19(33.3)	9(15.8)

Table 6 shows the responses to the 16 statements that assessed the participants' knowledge, confidence, and acceptance of tele-rehabilitation in the Postgraduate group (group I). More than half of the participants said they were familiar with the different tele-rehabilitation alternatives available for speech-language therapy (52.6 %), troubleshooting (56.1 %), and the tele-therapy protocol (56.1 %). Only 21 of the 57

participants (36.8%) were occasionally (50%) aware of the ethical and legal problems surrounding tele-rehabilitation services.

The majority of them reported that they frequently felt confident in using the tele-mode of service delivery, patient progress, and execution of therapy techniques. Another significant proportion, more than 50% reported frequent feeling of confidence using the tele-rehabilitation software like Zoom, Google meet, Skype, etc. For the ninth statement , the respondents (49.1%) reported that they frequently find tele-rehabilitation as an acceptable delivery mode of speech-language pathology services. However, 38.6% of the participants found that only occasionally, tele-therapy was easy for them to switch to, from the conventional mode and it was above 50% of respondents, reported frequently easy to switch to tele-mode.

In response to the eleventh, twelfth and thirteenth statements, most of the responses indicated tele-rehabilitation is a cost-effective, quicker platform for reaching patients, and does not require advanced technology for achieving a good patient outcome. The responses to the statements such as the fourteenth one, revealed that the postgraduate group included respondents who felt that occasionally (42.1%) the service delivery through the tele-therapy method is as effective as the traditional methods and also the one who found the effectiveness to be frequently (42.1%) as much as the other methods. On asking the fifteenth statement, 50.9% of the respondents most frequently believed tele-therapy may be a good option for people with technological proficiency. Moreover, 56.1% respondents frequently felt comfortable offering therapy through tele-mode.

Table 6

Postgraduates' responses to statements of domain 2

	Not at all *n (%)*	Occasionally *n (%)*	Frequently *n (%)*	Most frequently *n (%)*
1. I have knowledge of various tele-rehabilitation options available for Speech-language therapy services	2(3.5)	18(31.6)	30(52.6)	7(12.3)
2. I am well aware of the basic troubleshooting needed for tele-therapy.	0(0)	17(29.8)	26(56.1)	14(24.6)
3. I am familiar with the protocol required for tele-therapy.	4(7.0)	18(31.6)	26(56.1)	9(15.8)
4. I am aware of the ethical and legal issues with tele-rehabilitation services.	6(10.5)	21(36.8)	18(31.6)	12(21.1)
5. I feel confident in using tele-mode for speech-language pathology service delivery.	0(0)	15(26.3)	28(49.1)	14(24.6)
6. I feel confident about my patients' progress through tele-therapy.	1(1.8)	15(26.3)	33(57.9)	8(14.0)
7. I feel confident in executing therapy techniques and strategies through tele-mode.	1(1.8)	20(35.1)	22(38.6)	14(24.6)
8. I feel confident using the tele-rehabilitation software like Zoom, Google meet, Skype, etc., that demand real-time video streaming of myself during tele-therapy.	0(0)	7(12.3)	23(40.4)	27(47.4)

9. Tele-health is an acceptable delivery mode of speech-language pathology services.	0(0)	9(15.8)	28(49.1)	20(35.1)
10. It was easy for me to switch to tele-mode from face-to-face mode of service delivery.	5(8.8)	22(38.6)	18(31.6)	12(21.1)
11. I feel that tele-rehabilitation is a cost-effective platform.	0(0)	5(8.8)	27(47.4)	25(43.9)
12. I feel that tele-rehabilitation is a quicker platform for reaching patients.	1(1.8)	1(1.8)	30(52.6)	25(43.9)
13. I feel that tele-therapy applications may not require advanced technology for achieving a good patient outcome.	8(14.0)	18(31.6)	23(40.4)	8(14.0)
14. I feel that service delivery through the tele-therapy method is as effective as the traditional methods	4(7.0)	24(42.1)	24(42.1)	5(8.8)
15. I feel that tele-therapy may be a good option for people who have technological proficiency.	0(0)	6(10.5)	22(38.6)	29(50.9)
16. I usually feel comfortable offering therapy through tele-mode.	3(5.3)	13(22.8)	26(56.1)	15(26.3)

4.1c Analysis of Open-ended Questions

The third domain, titled "Future of Tele-therapy in Speech-Language Rehabilitation," featured two open-ended responses, two yes/no responses, and a Likert response type. Thematic analysis was carried out to evaluate the results of open-ended

questions. The first open-ended question (Question 1 of Domain 3) asked the participants about the possible barriers of tele-therapy in speech-language pathology. The second open-ended question (Question 2 of Domain 3) expected the participants to list out few solutions for the barriers mentioned above for tele-therapy.

'Themes were identified by integrating the responses obtained from both UG and PG participants. Therefore, numerous comments were considered to ascertain themes. They were further divided into three broad themes. For the first question, the categories extracted were client-related, clinician related and technology-related. Whereas, for the second question, the categories were client-related, clinician related and institution/organization related. The tables from 7 to 10 display the results of the same.

Possible barriers to Tele-rehabilitation

As responses to the second question, various solutions were listed out by participants of both groups. However, one participant from postgraduates and five participants from the undergraduates gave irrelevant remarks such as 'Do not know' / Nil. Such responses were excluded. Results presented in Table 7 and 8 suggest that both undergraduates and postgraduate participants perceived (a) technology-related issues as the most significant barrier to tele-rehabilitation, followed by (b) client related issues and then by (c) clinician related issues such as difficulty managing the pediatric population, inattentiveness of pediatric clients, lack of knowledge and skills required for tele-rehabilitation, and so on.

Table 7

Possible barriers of tele-therapy according to Undergraduate group (group I)

Themes	No. of Comments	Examples
Client related		
Poor attention span	8	"Not able to sustain attention of clients"
Co-operation and support	4	"Caregiver's involvement is very important, knowledge and accessibility to technology"
Lack of knowledge and skills required with technology	3	"Inadequate parental/caretaker support"
Difficulty following the demonstrations and goals.	3	"Sometime it's difficult to convey and demonstrate the strategies and activities to the parents"
Greater screen time	3	"Hard to give therapy for pediatric cases who have multiple comorbidities"
Comorbidity	3	"Lack of awareness of the parents about the activities"
Lack of Awareness	2	
Clinician related		
Difficulty dealing with younger population	16	"I think tele-therapy is somewhat useful in case of adult clients rather than pediatrics".
Difficulty building rapport with clientele	8	
Effectiveness of therapy	7	"Good client clinician rapport building might be hindered."
Lack of knowledge and skill	6	

Lack of resources	5	"Network issues hinder from the effective examination of the child's articulatory movements, the stereotypic movements of ASD children etc"
Difficulty tracking progress	3	"Lack of knowledge about resources available and limitations in using those resources even if known."
		"Lack of Indian based resources for pediatric therapy cases"
		"Difficult to track child's progress"
Technology related		
Network connectivity issues	30	"Require good system and connectivity"
Other technical problems	10	"Technical glitches"
Unavailability of devices	6	"Limited Access to Smartphone"
Irregular data speed	2	

Table 8

Possible barriers of tele-therapy according to Postgraduate group (group II)

Themes	No. of Comments	Examples
Client related		
Lack of knowledge and skills required with technology	8	"Lack of caregivers knowledge on technology"
Difficulty following the demonstrations and goals.	4	"Difficulty in following instruction."
Unwillingness	3	"Clients are often confused"
Poor economy	3	"Poor economy of the client"
Poor follow up	3	"Achieving the goals is something that I find is difficult as most of the time."
Clinician related		
Difficulty with client population with attention deficits and children	16	"Hard to deal with those with major attention deficit issues"
Lack of knowledge and skill	7	"Lack of clinicians' knowledge of e-resources available for teletherapy"
Difficulty building rapport with clientele	7	"Difficulty to build rapport with young children who
Effectiveness of therapy	7	

Lack of resources	6	have fair to poor sitting tolerance”
Difficulty tracking progress	2	
Greater expenses	2	“We can't implement the effective therapy techniques”
		“Clinicians can't track progress”
Technology related		
Network connectivity issues	31	“Lack of availability of gadgets for people in rural areas”
Other technical problems	9	
Poor troubleshooting skills	5	“It isn’t that flexible, difficult to use with rural population”
Unavailability of devices	4	
Irregular data speed	3	“Unable to help with technical barriers that the client may face”
Poor flexibility as compared to face-to-face	2	
		“The technological limitations such as network coverage, the quality of equipment used such as clarity of cameras, knowledge of how to use technology such how to start the WhatsApp call, how to share screen, how to record and send videos”
		“It isn’t that flexible”

Solutions for barriers

Most of the undergraduate students stressed the importance of counseling to the parent as a solution to the barriers of tele-therapy, followed by training the clinicians, availability of interesting e-resources, the introduction of free and accessible software, and inclusion of certificate courses and workshops. In addition to these the undergraduates suggested that solutions also lie at the institutional or organizational level, where the stability and availability of the network should be taken care of.

The findings revealed that postgraduate participants felt that educating and training clinicians and clients about tele-service delivery is one of the most effective ways to overcome all the tele-barriers. They also highlight the changes that could be done at the institutional or organizational level such as, providing free access to a reliable network, development of various engaging and appropriate e-resources, development of freely available and user-friendly software /applications, and also the development of guidelines and protocols for the easy application of tele-services in the field of speech and hearing. Apart from that, the participants stressed the need to provide a client orientation session on the many elements of tele-therapy and thorough counseling on the subjects.

Table 9

Possible solutions to tele-therapy barriers according to Undergraduate group (group I)

Themes	No. of Comments	Examples
Client related		
Counselling	9	"Training for the parents".
Educating and training of clients	2	"Support from family"
Troubleshoot training	2	"Counselling the caregivers about need for telepractice"
Family support	1	"Troubleshooting network"
Clinician related		
Training and educating on technological aspect	16	"Get proper training on the whole process of tele therapy"
Adapting other form of tele-therapy	7	"By trying to make tele sessions more interactive and interesting especially for the children"
Providing orietation session	7	"Occasionally there must be interactions offline between the patients and clinicians if possible."
Interesting therapy activities	7	"Students should be oriented and guided properly as to how to carry out an online telesession."
Occasional offline	6	
Difficulty tracking progress	2	
Greater expenses	2	

Organizational/Institutional Related		
Better network services	27	"May be improving stability of the internet"
More engaging tele-resources	10	"Making the session more interesting by including videos and animations."
Providence of quality equipment(s)	4	"User friendly apps"
Introduction of free and accessible software	3	"Workshop can be provided to use the technologies"
Inclusion of certificate courses and workshops	3	

Table 10

Possible solutions to tele-therapy barriers according to Postgraduate group (Group II)

Themes	No. of Comments	Examples
Client related		
Educating and training of clients	5	"Counselling regarding use of technologies and troubleshoot methods to caregivers in the initial sessions before starting tele-therapy"
Counselling	5	
Seeking technical help from others	4	
Troubleshoot training	3	"Caregiver or parent training session for device use with software"
Clinician related		
Training and educating on technological aspect	11	"Certificate courses must be integrated in curriculum"
Providing clients with orientation session	4	"Demonstration of software and its uses prior to the sessions"
Adapting asynchronous form of tele-therapy	4	
Planned, distraction-free and structured sessions	4	"Planned sessions and chunking it for shorter and effective sessions"
Weaning the dependency on offline sessions	3	"Train parents to be self-sufficient; wean dependency on therapists"

Organizational/Institutional Related		
Better network services	9	"May be improving stability of the internet"
More engaging tele-resources	7	"Making the session more interesting by including videos and animations."
Providence of quality equipment(s)	4	"User friendly apps"
Free data and resources	4	"Workshop can be provided to use the technologies"
Introduction of free and accessible software	4	"Providing different resources engaging resources"
Inclusion of certificate courses and workshops	4	
Setting guidelines and criteria	4	
Providence of quality equipment(s)	3	
Public education	2	

The remaining statements of the last domain (Question nos. 3, 4, and 5) were examined, and the findings are presented in the tables11 and 12. When asked if they wanted to continue with tele-therapy for speech-language pathology in the future, the majority of the undergraduate students (54%) said no. In the case of postgraduate students, however, the situation was reversed, with 80.7% reported they would. The trend was different in response to statement 5 of domain 3. About 83% of the participants said they would suggest tele-therapy to other Speech-Language Pathologists in the future as against 50% of UG participants. In response to statement 4,

a larger percentage of undergraduate students (58%) disagreed that tele-therapy has to be expanded further to be as effective and profitable as traditional face-to-face speech-language therapy. On the other hand, about 88%t of postgraduates also disagreed with the assertion (See Table 12).

Table 11

Responses of statement number 3 and 5 of domain 3

Statements	Groups	Yes *n (%)*	No *n (%)*
I would like to continue with tele-therapy for speech-language pathology in the future.	UG *(Group I)*	26(45.6)	31(54.4)
	PG *(Group II)*	46(80.7)	11(19.3)
I would recommend tele-therapy to other Speech-language pathologists.	UG *(Group I)*	29(50.9)	28(49.1)
	PG *(Group II)*	47(82.5)	10(17.5)

Note: n is the number of respondents

Table 12

Responses of statement number 4 of domain 3

Statement	Group	Strongly disagree *n (%)*	Disagree *n (%)*	Neutral *n (%)*	Agree *n (%)*	Strongly agree *n (%)*
I agree that tele-therapy needs to expand further so that it is as effective and profitable as traditional face-to-face speech-language therapy.	UG *(group I)*	11(19.3)	22(38.6)	16(28.1)	3(5.3)	5(8.3)
	PG *(Group II)*	26(45.6)	24(42.1)	0(0)	6(10.5)	1(1.8)

Note: n is the number of respondents

4.2 Domain-wise comparison of responses between groups:

4.2a Comparison of responses between groups in Domain 1

Almost all questions had a clear consensus across undergraduate and postgraduate students, with the exception of few. In domain 1, the p value was statistically significant for the statement 7 between groups (*p=0.009*), where majority (47.4%) of undergraduates (group I) as compared to postgraduates (group II) replied that they do not feel that clients are more motivated for tele-mode than face-to-face mode of speech-language therapy. Furthermore, for statement 10, the p value was statistically significant between both groups (*p=0.007*), with only 36 (63.2%) of Undergraduates as compared to 87.7% of postgraduates, responded that they commonly believe that tele-rehabilitation provides improved public health during epidemics and pandemics. That is, 99% of participants in group I agreed that tele-rehabilitation is a

reliable and feasible option for promoting public health during epidemic and pandemic situations.

Table 13

Group comparison for each statement of Domain 1

Sl. No.	Statements	P value
1.	I find the tele-rehabilitation system (whole setup) easy to use.	0.063
2.	I feel that I can convey myself efficiently through tele-mode.	0.560
3.	I feel that my clients are equally responsive in tele-mode as like face-to-face mode of speech-language therapy.	0.873
4.	Tele-rehabilitation service allows me to provide services without any geographical barrier.	0.282
5.	I spend more time on a patient through tele-mode than I would with the conventional mode of speech-language therapy.	0.196
6.	I can use tele-rehabilitation services on a wide range of communication disorders.	0.110
7.	I feel that the clients are motivated more for tele-mode than the face-to-face mode of speech-language therapy.	0.009*
8.	I feel that tele-mode of rehabilitation is flexible.	0.294
9.	I feel that tele-mode of rehabilitation is a reliable form of service delivery.	0.289
10.	I feel that tele-rehabilitation ensures better public health during situations like epidemics and pandemics.	0.007*
11.	I feel that it is difficult to interpret body language and other subtle signals of clients through tele-mode.	0.925
12.	I feel that the tele-mode service delivery is less convenient due to technical difficulties that could come along.	0.400
13.	I find difficulty tracking progress of my goals or monitoring accuracy/consistency of responses by the	0.228

	client during tele-therapy.	
14.	I am satisfied with the level of clinician-patient rapport that I can build with tele-mode.	0.335
15.	I am satisfied with the outcome of my service using tele-mode of service delivery.	0.353
16.	I am satisfied with the availability and the use of e-therapy resources during the e-sessions.	0.928
17.	I am satisfied with my therapy skill enhancement during tele-rehabilitation.	0.244
18.	I am satisfied with the quality of treatment offered through tele-mode.	0.239
19.	I am satisfied with the attitude of clients/caregiver about receiving speech therapy services via tele-practice.	0.094

*Note: *Statistical significance at $p<0.05$*

4.2b Comparison of responses between groups in Domain 2

The relationship between the responses and the respondent group was investigated in domain 2 as well. Except for statements 9, 10, and 11, no other statements had any significant association with both groups, according to the current study. The result for statement 9 showed a marginal association (*$p=0.05$*) between the two groups as depicted in Table 14. In the instance of statement 10, a larger number of postgraduates supported the notion of transitioning from face-to-face to tele-mode service delivery, compared to a smaller proportion of undergraduates. To the statement of tele-rehabilitation being a cost-effective platform, 91% of PG respondents believed that tele-therapy is a cost-effective platforms as against 73% of our respondents.

Table 14

Group comparison for each statement of Domain 2

Sl. No.	Statements	P value
1.	I have knowledge of various tele-rehabilitation options available for Speech-language therapy services	0.618
2.	I am well aware of the basic troubleshooting needed for tele-therapy.	0.199
3.	I am familiar with the protocol required for tele-therapy.	0.460
4.	I am aware of the ethical and legal issues with tele-rehabilitation services.	0.090
5.	I feel confident in using tele-mode for speech-language pathology service delivery.	0.054
6.	I feel confident about my patients' progress through tele-therapy.	0.121
7.	I feel confident in executing therapy techniques and strategies through tele-mode.	0.164
8.	I feel confident using the tele-rehabilitation software like Zoom, Google meet, Skype, etc., that demand real-time video streaming of myself during tele-therapy.	0.057
9.	Tele-health is an acceptable delivery mode of speech-language pathology services.	0.005*
10.	It was easy for me to switch to tele-mode from face-to-face mode of service delivery.	0.011*
11.	I feel that tele-rehabilitation is a cost-effective platform.	0.045*
12.	I feel that tele-rehabilitation is a quicker platform for reaching patients.	0.052
13.	I feel that tele-therapy applications may not require advanced technology for achieving a good patient	0.259

	outcome.	
14.	I feel that service delivery through the tele-therapy method is as effective as the traditional methods	0.299
15.	I feel that tele-therapy may be a good option for people who have technological proficiency.	0.063
16.	I usually feel comfortable offering therapy through tele-mode.	0.070

*Note: *Statistical significance at p<0.05*

4.2c Comparison of responses between groups in Domain 3

In domain 3, all statement responses except for two open ended questions were evaluated for their association with the groups. The results revealed that all the three statements included were statistically significant with p value less than 0.05 as depicted in the table 15 .

Table 15

Group comparison for each statement of Domain 3

Sl. No.	Statements	P value
1.	I would like to continue with tele-therapy for speech-language pathology in the future.	0.000*
2.	I agree that tele-therapy needs to expand further so that it is as effective and profitable as traditional face-to-face speech-language therapy.	0.003*
3.	I would recommend tele-therapy to other Speech-language pathologists.	0.000*

*Note: *Statistical significance at p<0.05*

4.2d Overall comparison between groups

Table 16 demonstrates total Domain-wise mean comparison among both the groups. In both, Domain 1 and 2, mean score was higher for Postgraduate students than Undergraduate students.

Table 16

Overall comparison of Mean and SD for Domain 1 and 2 between groups

Domain	Group	Mean n (n%)	Std. Deviation n (n%)
Domain 1	UG *(Group I)*	30.75 (54%)	8.78 (15%)
	PG (*Group II)*	34.01 (60%)	7.42 (13%)
Domain 2	UG *(Group I)*	26.22 (55%)	8.77 (18%)
	PG *(Group II)*	31.03 (65%)	7.50 (16%)

Note: n is denotes domain total and n% denotes percentage of domain total

4.3 Test of normality

The data for the continuous variables of the study was subjected to the Shapiro-Wilks test for normality to see whether the data fulfilled the criteria of normality. With regard to both groups, the results indicated that the data follows a normal distribution ($p>0.05$). Hence, Mixed ANOVA was performed to analyze within subject effects and between-subject effects.

4.4 Within- and between-subject effects of Domains and Groups of Speech-Language Pathologists

The results indicated that the scores for Domain 1 percentage and Domain 2 percentage are statistically significant ($F = 8.866$, $p <0.05$). As the raw scores for Domain 1 and Domain 2 were not comparable, percentage values from Table 16 were

considered. The differences between the groups were also investigated, and it was found that there was statistical significant difference between the two groups ($F = 7.998$, $p<0.05$). Furthermore, interaction effects were studied which revealed that there was an interaction effect observed between domains and groups and, the values were statistically significant (*p=0.026*). Figure 6 shows that the responses of undergraduates *(group I)* were similar across both domains. Both group respondents, on the other hand however, scored better in domain 2 than in domain 1.

Table 17

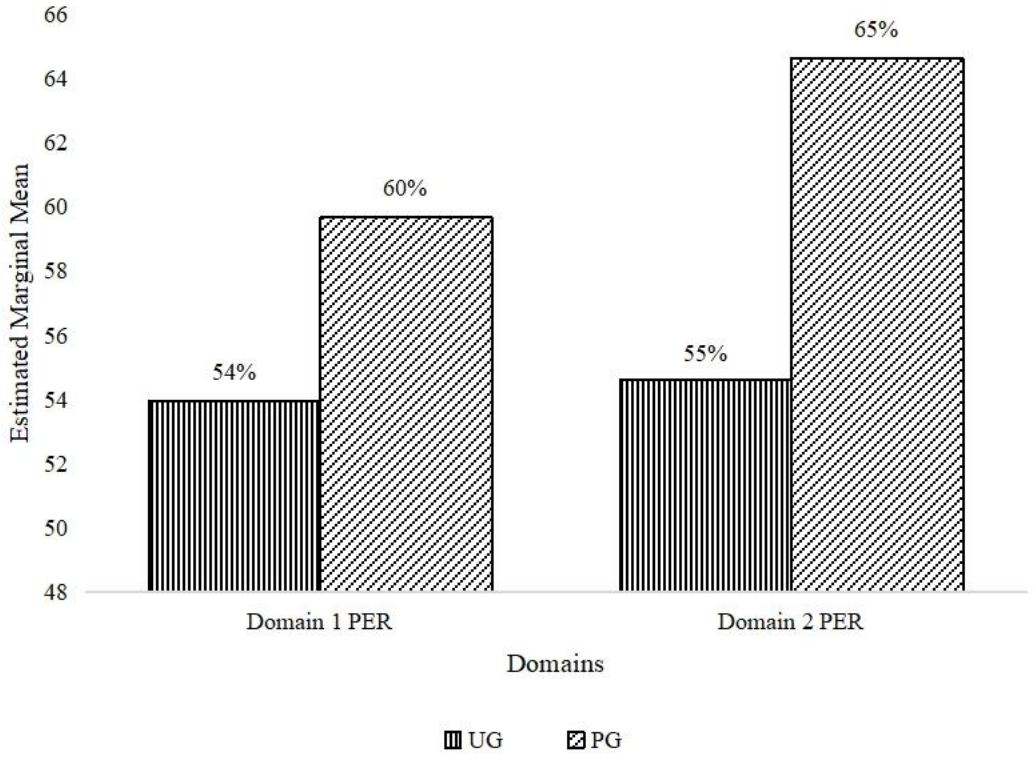
Results of mixed ANOVA for Domain and group comparison

Levels	F	P value	Effect size
Domain	8.866	0.004*	0.073
Groups	7.998	0.006*	0.067
Domain*Group	5.087	0.026*	0.043

*Note: *Statistical significance at p<0.05*

Figure 6

Percentage values for Domain-wise scores of groups and interaction effects of domains and group



4.5 Summary

The findings of this study revealed that more than half of undergraduate students SLPs *(group I)* participated in this study had better perception and satisfaction towards tele-service delivery in Speech-Language Pathology through tele-mode. More number of participants of the same group, found that the tele-mode to be an acceptable mode to provide Speech-Language Pathology service and they felt knowledgeable and confident in adapting it as modality to the service. These results were consistent with postgraduate group as well. However, in general, postgraduates outperformed undergraduates in both Domain 1 and 2.

Both groups listed out common barriers such as network issues, clients' age, lack of skills and knowledge etc. The participants also highlighted many client-related, clinician-related and organizational related solutions to the barriers of tele-rehabilitation.

Chapter V

DISCUSSION

Tele-practice makes it possible to provide treatments in unusual settings and circumstances during the pandemic and other than that, it was regularly followed in countries like the USA since 2005 onwards. Many advantages of tele-practice make it a viable option in the event of a natural disaster since it allows for uninterrupted clinical services. Tele-practice use has risen as a result of this premise during the global COVID-19 outbreak. According to a 2020 review of the PubMed database, less than 1% of all papers on tele-practice were published in the 1990s, with the remaining 82% published between 2010 and 2020. This large increase in the number of papers published over the last 30 years reflects evolving practice trends and the rapid expansion of tele-practice in recent years (Kraljević et al., 2020).

The focus of the current research was to explore the perspective of student SLPs on tele-mode service delivery in Speech-Language Pathology. This study's findings are discussed, along with supporting and conflicting research and probable explanations. The results of the present study are discussed under the following:

1. Domain-wise views/opinions on speech-language pathology service delivery through tele-mode by two groups of SLP student clinicians
2. Comparison of the responses between undergraduates and postgraduate student clinicians.

5.1a Views/opinions of groups on tele-therapy – Domain 1 and 2

In the current survey, 54% of undergraduate students (group I) and 60% of postgraduate students (group II) said they were satisfied with the treatment provided via tele-mode of service delivery and had positive perceptions about it. Approximately 54 percent of the undergraduates and an even more significant proportion of the postgraduates (64.6%) claimed that they were confident, accepting, and educated about telerehabilitation in Speech-Language Pathology.

Following some initial scepticism, the SLPs who participated in tele-practice reported beneficial outcomes (Tucker, 2012). These findings of participants' perceptions of tele speech-language pathology are most likely the outcome of a belief that it is beneficial and would improve access to therapies that might otherwise be scarce or inaccessible to clients. The pandemic leaves SLPs with no choice but to adapt to technological dependencies. However, the rest of the participants from both groups disagree on this view. This disagreement could be associated with their anticipation of a negative outcome, such as inability to execute therapy sessions efficiently or challenging changes to their traditional therapy. Likewise, Fleming et al. (2009) have identified potential negative consequences of telehealth services for healthcare personnel.

The Technology Acceptance Model of Davis (1989) offers a different viewpoint on these findings. When consumers are confronted with new technology, this model argues that various factors influence their decision on how and when they use it. Davis speculated that beliefs influence behaviour. Therefore, the participants' beliefs about the tele speech-language pathology's utility appeared to be outweighed by the perceived obstacles. The current study's findings regarding the satisfaction

are consistent with the findings of previous studies that the clients and their parents, along with the SLPs, were overwhelmingly satisfied with tele-practice (Johnson et al., 2010; Molini-Avejonas et al., 2015; Hill & Miller, 2012). The higher level of confidence expressed by both groups in this study is a conclusion that has also been confirmed by earlier investigations (Freckmann et al., 2017). However, according to these studies, SLPs' comfort and confidence with technology are not significant factors influencing their readiness to use tele-practice but were aided by clinicians adopting tele-practice and learning how to apply their current abilities in a different situation.

The current study findings also acknowledge other studies reporting a lack of comfort with and access to adequate technology by the SLPs (Rao & Yashaswini, 2017; Tucker, 2012). In the same research, Tucker (2012) notes that some people are naturally uneasy with technologies and will take considerable time to practice and get comfortable with the tele-mode of service delivery. Furthermore, both undergraduates and postgraduates of the current study found tele-practice to be an acceptable mode of therapy services and a good option for people with technological proficiency. This finding is in line with a few prior studies (Tucker, 2012). However, individual's attitude toward tele-practice was a crucial determinant in their acceptance of teletherapy. SLPs and other health professionals have cited the negative attitudes of the clinician as one of the most critical barriers to tele-practice acceptance (Hill & Miller, 2012; Freckmann et al., 2017).

5.1b Views/opinions of groups on tele-therapy – Domain 3

As mentioned in an earlier chapter, domain three consists of three different questions/statements, such as open-ended, yes/no type, and Likert type. For the

open-ended statements, results revealed various barriers and solutions as mentioned by each of the respondents of the groups.

The majority of participants from both groups emphasized network-related issues as the most significant barrier to tele-rehabilitation, followed by clinician-related issues and then followed further by client-related issues like difficulty managing the paediatric population, inattentiveness of paediatric clients, and, lack of knowledge and skills required for tele-rehabilitation. The findings of the present study are in agreement with the results of a previous study done by Hill and Miller (2012); Molini-Avejonas et al. (2015); Tucker (2012). Barriers mentioned by these researchers included issues with technology, telecommunication connections, a lack of appropriate resources for telehealth, reduced access, higher cost, longer time to obtain an outcome, and technological limitations.

Other findings from this study revealed that few participants found it challenging to build efficient alliances or rapport with their clients through tele-mode of service delivery. However, in their study, Freckmann et al.'s (2017) study discovered that therapeutic alliance through teleconference was evaluated as positively as face-to-face setting, even when the image or audio quality was unsatisfactory.

A few postgraduates (group II) in the current study also commented, *"Achieving the goals is something that I find difficult most of the time."* This view is possibly due to a lack of knowledge and skills that are explicitly required for tele-therapy. However, this finding contradicts the past research findings of Grogan-Johnson et al. (2010), who found that the children achieved equal improvement regardless of the therapy technique employed during the trial. It is also

to be noted that the previous study (Grogan-Johnson et al., 2010) here included children between 4-12 years, and the participants from the current study could have commented it concerning children younger than four years.

Postgraduate participants (group II) in the current study also raised their concerns regarding the expenses being more for tele-sessions than the face-to-face service delivery. This concern though valid can be overlooked in case of a pandemic where the direct and face-to-face mode of service delivery is not appreciated. Dunkley et al. (2010) acknowledged these concerns in their study and considered personal financial situations one of the barriers to tele-practice. However, as suggested in the previous researches, tele-practice may be cost-effective, flexible, and dependable when the right technical technology is available (Mohan et al., 2017).

Another common theme extracted in the study was the effectiveness of tele-therapy. A significant number of participants from both groups are doubtful about tele-therapy being as effective as the conventional face-to-face method. Lack of training and awareness of tele-practice could be one of the main reasons for such responses from the participants. The group included participants who began tele-practice in the circumstances like a global Pandemic, leaving them with no choice but to start service delivery through tele-mode. It also means that no or very few orientation sessions and training and guidance are given about the same. Organizational telerehabilitation courses may be held to raise therapist awareness, enhance their attitude toward the efficacy of tele-practice, and update their knowledge and skills (Vrinda & Reni, 2020).

Lack of co-operation and support and unwillingness reported from the client's side is another barrier reported commonly by both the groups. It could be due to the fear of privacy and security being at risk with novel technologies and software. Another possible speculation is that tele-practice also requires the client's family to be involved to a greater extent than the face-to-face modality of therapy services, which is not favourable to many client parties due to various personal reasons. Another probability is the funding limitations from organizations or government that could lead to some unwillingness towards the technologies by the clients (Dunkley et al., 2010).

As a response to the second question of Domain three, the group participants listed various solutions or facilitators of tele-practice. The undergraduates (group I) emphasized counselling the parents as a remedy to the tele-therapy obstacles, followed by training the clinicians, availability of exciting e-resources, the introduction of free and accessible software, and the inclusion of certificate courses and workshops on tele-rehabilitation. These results are consistent with previous research (Hill & Miller, 2012; Freckmann et al., 2017; Mohan et al., 2017) who reported patient education, professional courses, workshops, digital evaluation and treatment materials, funds to build telehealth services, formal training, proper guidelines and so on serving as solutions to various barriers of tele-mode of delivery.

However, postgraduate participants (group II) had additional comments to add to the previously mentioned solutions by the other group, such as the need for an orientation session, development of guidelines and protocols for the easy application of tele-services in the field, planning and structuring the therapy, and so

on. The findings closely line up with those stated in the surveys by Hill & Miller (2012) and ASHA (2002). However, the solutions mentioned above suggest that, in the current study, SLPs have primarily learned to use tele-practice via personal experience rather than formal training and due to the necessity imposed by the pandemic.

When asked if they would like to continue using tele-therapy as their service delivery modality, most undergraduate students (group I) responded no. However, the scenario was different among postgraduate students (group II), with 81% indicating they would. This disinterest in continuing the tele-mode as a mode for therapy services among the majority of undergraduate students (group I) and a few yet significant number of postgraduate students (group II) is possibly due to various barriers encountered by these individuals during their course of tee-therapy. Over time, these barriers need to be examined and required changes to the exact needs to be carried out for both groups to develop a stronger willingness to continue using tele-therapy as their service delivery modality (Mohan et al., 2017).

In addition, half of the participants in both groups stated they would recommend tele-therapy to other Speech-Language Pathologists in the future. The spurt in tele-mode as service delivery in the current time could be the reason for a greater percentage of future recommendations. Moreover, there is a notable difference in the number of undergraduate participants (group I) ready to continue with tele-mode and the number of participants recommending tele-therapy to other SLPs. The participants who are ready to recommend but not continue it by themselves might be believing that these modalities may be utilized, enjoyed, and executed by relatively web-savvy and computer-literate speech-language

pathologists if not themselves (Tucker, 2012). These assumptions remain consistent with Tucker's (2012) study's respondents who believed that technological concerns would become less of an issue in the future as technology develops.

A more significant percentage of undergraduate students (group I) (38.6%) and postgraduate students (45.6 %) disagreed that tele-therapy must be expanded further to be as postgraduate group (group II) disagreed that tele-therapy must be expanded further to be as effective and profitable as traditional face-to-face speech-language therapy. It is important to correlate this to the fact the advantages offered by the face-to-face modality of service delivery outweighs all of the possible barriers to it. However, in the case of tele-mode, certain barriers such as cost of technologies, the economy of clinicians and clients, direct access to execute certain therapy techniques and so on remain challenging to overcome. On the other hand, however, there are research reports highlighting the possibility of tele-practice being as successful as face-to-face treatment delivery in terms of evaluation and management to an extent (Mohan et al., 2017; Bridgman, 2014; Grogan-Johnson et al., 2013)

5.2b Comparison of the responses between undergraduates (group I) and postgraduate students (group II)

According to the current study, except for the statements asking about their perceptions on client motivation (statement 7) and the role of tele-rehabilitation in public health (statement 7), neither group agreed on other statements from Domain 1. The groups differed in responses to statements 7 and 10, which might be attributed to factors such as the individuals' experience, exposure, abilities, degree of motivation, etc. These characteristics differ within and between postgraduates

(group II) and undergraduate participants (group I). The PG group is assumed to be greater in all the above mentioned factors than the undergraduate group participants. This assumption is consistent with previous research findings (Venkatraman et al., 2020)

There is a need to shed light on statements where both groups had consensuses, such as when groups believed that clients were less motivated for tele-mode than face-to-face speech-language therapy. However, as Dunkley et al. (2010) stated, SLPs may not perceive this motivation of clients to use Information technology because they mistakenly assume rural populations have limited access to it. Although the majority of both groups agreed that tele-rehabilitation might help improve public health during epidemics and pandemics, a significant number (12%) of UG (group I) did not. Therefore, this statement is more frequently agreed by PG (group II) significantly than UG (group I). Even though all participants were performing traditional face-to-face treatment before the COVID 19 epidemic, most of them immediately changed to a tele-mode of giving services during the pandemic (Vrinda & Reni, 2020).

The groups also had a significant association concerning three statements in Domain 2, which highlighted the acceptance, idea of transitioning from face-to-face to tele-mode service delivery, and cost-effectiveness of tele-mode of service delivery. For the acceptance and ease of transitioning from one mode to other, groups adapted the tele-mode due to the global crisis. The adaptation of telepractice in response to the COVID-19 pandemic was essentially required, and the shift happened quickly with almost no other alternatives (Kraljević et al., 2020; Vrinda & Reni, 2020).

Furthermore, the undergraduate group (group I) scored poorer than postgraduates (group II) in the aspects mentioned above. The second group includes people of an age range greater than group I, who are assumed to be better at digital literacy and are reasonably computer savvy. It makes it much easier for such individuals to adjust to changes quickly and easily adapt to the tele-mode of service delivery (Kraljević et al., 2020; Yashaswini & Rao, 2018). Another point of consensus among the participants was the cost-effectiveness of tele-mode service delivery. This conclusion is consistent with previous research (Hill & Miller, 2012; Molini-Avejonas et al., 2015; Johnson et al., 2010). However, amongst both groups, PG particpants (group II) found tele-mode to be more frequently cost-effective than the undergraduate group (group I). The reason behind this difference is completely dependent on individual factors such as convenience and access to technologies, better internet server, bettter session setup etc (Dunkie et al., 2010). These aspects of tele-practice require financial contributions from both client and clinician to an extent. It is highly possible that the participants from postgraduate group might be already pre-equipped with requirements of tele-therapy in a better way than most of undergraduates of the first group leading us to the current findings.

All three statements in domain three included in the study were statistically significant, having a p-value less than 0.05. This goes hand in hand with speech-language pathologists (SLPs) who must adopt new approaches to their professional functioning due to pandemic-related constraints. Moreover, the fact that face-to-face speech therapy has its own set of challenges, such as geographic constraints, travel expenditures, and so on, makes tele-therapy an acceptable and

feasible alternative in various scenarios (Venkatraman et al., 2020; Grogan-Johnson et al., 2010; Constantine, 2015).

Even though both groups' reaction patterns were similar in all domains, the postgraduate group (group II) outperformed the undergraduate group (group I). A variety of factors may have an impact on their responses. Clinicians' ability, experience, and attitude, for example, might all have a role. Undergraduates, in comparison to postgraduates (group II), lag in these areas. Advanced training during a master's degree program may have improved the likelihood of the participants in the PG group being more proficient or having a better outcome in this area (Venkatraman et al., 2020, Yashaswini & Rao, 2018).

On the other hand, both groups of respondents performed better in domain 2 than in domain 1. This implies that participants in both groups thought they were more informed, accepting, and confident about tele-therapy than satisfied and positive about it. This might be owing to the fact that the information and abilities that the group claims to be strong at are the product of self-training and personal experience, as well as their digital literacy. Furthermore, the acceptance and implementation of tele-therapy are now inevitable and widespread, making it possible to gain information and skills on an informal basis. Whereas the possibility is not the same for the satisfaction quotient. Satisfaction is mostly determined by the outcome of the service provided, and according to previous researchers, face-to-face therapy, in comparison to tele-therapy, has a better outcome, making it more satisfactory than the latter (Venkatraman et al., 2020; Tucker, 2012; Grogan-Johnson et al., 2010).

Chapter VI

SUMMARY AND CONCLUSIONS

Over the last few years, the perception of tele-practice has shifted significantly. Tele-practice has been understudied in Indian SLP settings at Indian context until recently. However, due to its relevance in responding to the COVID-19 pandemic, it has received increasing attention in recent years. Telemedicine solutions are used to augment and improve current healthcare. It provides patients and clinicians with additional options and accessibility to solutions. Understanding how SLPs perceive and utilize tele-practice in their service may aid the profession in establishing strategies for providing high-quality tele-practice services that meet the needs of an increasing number of clients. In countries like India, research in this area is extremely lacking.

The purpose of this study was to assess the perspectives and opinions of undergraduate (group I) and postgraduate students (group II) in Speech-Language Pathology on tele-mode service delivery. A survey-based research design was employed that included groups of undergraduate and postgraduate student speech-language pathologists with varying educational degrees and some experience in tele-mode speech service delivery. Each groups included 57 respondents, having experience of at least 10 tele-sessions under their credit.

Based on a comprehensive assessment of literature for the current study, a 40-item questionnaire named "Perspectives of Students in Tele-Service Delivery in Speech-Language Pathology" was constructed (Appendix). These questions/statements were further divided into areas such as (a) clinicians' perspectives and satisfaction with tele-mode, (b) clinicians' knowledge, confidence, and acceptance of tele-rehabilitation,

and (c) clinicians' outlook on the future of tele-therapy in speech-language rehabilitation. Multiple choice, Likert scale, yes/no, select-all-that-apply, and open-ended items were included in the survey. The number “0” on the four-point Likert scale meant "not at all." Similarly, 1, 2, and 3 denoted a frequency of occurrence of occasionally, frequently, and most frequently, respectively.

The questionnaire formed was circulated through the personal contact of the researcher. Each of the participants were given a brief description about the study along with the link to the questionnaire to be responded to. The data collected was examined, and the findings indicated that more than half of the undergraduate Speech-Language Pathology students (54%) who took part in the survey had a more positive view and satisfaction with tele-service delivery in Speech-Language Pathology. The tele-mode was judged to be an acceptable form of providing service by a larger number of participants in the same group, and they felt educated and confident in adopting it as a modality to the service. These findings were also consistent in the postgraduate group,where they reported that 60% of the time they were satisfied with tele-mode. In Domain 2, 55% of the undergraduate respondents (group I) were confident and accepting regarding the tele-rehabilitation as against 65% of the participants from postgraduate group (group II). However, Postgraduates, on the other hand, outperformed undergraduates in both domains.

Both groups identified common barriers such as network difficulties, clients' age, a lack of skills and expertise, difficulty in building rapport, lack of e-resources, among many such barriers. Many client-related, clinician-related, and organizational-related solutions to tele-rehabilitation obstacles were also mentioned by the participants such as, clinician and client training, development of engaging

e-resources, orientation sessions, counselling regarding benefits of tele sessions to the client and/or their caregivers, better network services and so on.

Clinical Implication of the present study

- The utilization of the results obtained in the present study can be done to identify the various barriers encountered and to execute the appropriate the solutions for the same. This will enhance the quality of service provided through tele-mode of service delivery in Speech-Language Patholoy.
- The results obtained highlights the lack of training and more practical education of tele-therapy. This shall encourage for a more formal inclusion of tele-practice in clinical training programs.

Limitation of the present study

- The sample size considered in the study (no. of participants in each group) was insufficient.
- The sample was primarily concentrated on south Indian student SLPs and students who are currently pursuing their degree at a particular institute.
- The results of the study is limited to SLP studnet clinicians (who are under training) and not generalized to practicing SLPs.
- This study did not look into facilitators of tele-practice that is available to each of the participants, such as quite therapy rooms, availibilty of advanced technology, free internet, training etc. This could be a factor that enhanced positive perception on tele-pratcice in few of the participants.

- Th reliability on the results of the current study remains questionable as there is no assurance of the participants reading all the 40 questions and responding it genuinely. Questionnaire with lesser number of questions are advisable.

Future direction

1. The current study may be conducted on a broad scale, including SLPs from throughout India as participants. This would give a clearer picture of the utilization of tele-practice region-wise, as well as identify areas where further study and awareness of tele-practice is needed.
2. Future research could look into other concerns, such as the ethical and environmental implications of using tele-practice. This is extremely significant, especially if the use of tele-practice continues to rise as a result of recent events.
3. Furthermore, this survey may be repeated every three to four years to see whether the opinions on telehealth have evolved or if the aforementioned solutions have been adopted. To offer complete data on the clinical usage of telehealth in SLP, future research should overcome the current study's limitations.

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APPENDIX- A

Questionnaire

Perspectives of Students in Tele-Service Delivery in Speech-Language Pathology

This questionnaire has been developed as a part of the survey-based study. The study aims at getting feedback from the masters students on tele-rehabilitation. Masters student of speech and language pathology are requested to fill the questionnaire. It will take around 10-15 minutes to answer the questions. Kindly answer all the questions. Your time and effort is very much appreciated. All the data that you provide will be kept confidential and anonymous.
Thank you in advance.

* Required

1. I agree that my participation in this study is voluntary and I am aware that my participation doesn't fetch me any direct reward. *

   Mark only one oval.

   ◯ Yes
   ◯ No

Demographic data

2. Your name *

3. Email id *

4. Gender *

   Mark only one oval.

   ◯ Female
   ◯ Male
   ◯ Prefer not to say

5. Age *

6. Year of Undergraduate or Postgraduate program *

Mark only one oval.

- ◯ 3rd year BASLP
- ◯ Internship
- ◯ 1st MSLP
- ◯ 2nd MSLP

7. Approximate no. of sessions taken through tele-mode till date. *

Mark only one oval.

- ◯ Less than 10 sessions
- ◯ More than 10 sessions

8. Nature of the client population based on age. *

Check all that apply.

- ☐ Pediatrics
- ☐ Adults
- ☐ Geriatrics
- ☐ All the above

9. Type of cases taken/taking through tele-mode. For eg., SLD-HI, ASD, Cerebral palsy, Aphasia, Dysarthria etc. *

10. Technology used in the provision of services via tele-mode. Eg., Google Meet, WhatsApp, ZOOM meetings etc. *

11. Form(s) of telehealth system used for the therapy *

Mark only one oval.

- ◯ Synchronous (refers to service in real-time)
- ◯ Asynchronous (refers to the "store and forward" technique)
- ◯ Both

Perspectives and Satisfaction

In the scale, 0 shall be indicative of 'Not at all'. Similarly 1, 2, and 3 shall be indicative of occasionally, frequently and most frequently, respectively.

12. 1. I find the tele-rehabilitation system (whole set-up) easy to use. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

13. 2. I feel that I can convey myself efficiently through tele-mode. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

14. 3. I feel that my clients are equally responsive in tele-mode as like face-to-face mode of speech-language therapy. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

15. 4. Tele-rehabilitation service allows me to provide services without any geographical barrier. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

16. 5. I spend more time on a patient through tele-mode than I would with the conventional mode of speech-language therapy. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

17. 6. I can use tele-rehabilitation services on a wide range of communication disorders. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

18. 7. I feel that the clients are motivated more for tele-mode than the face-to-face mode of speech-language therapy. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

19. 8. I feel that tele-mode of rehabilitation is flexible. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

20. 9. I feel that tele-mode of rehabilitation is a reliable form of service delivery. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

21. 10. I feel that tele-rehabilitation ensures better public health during situations like epidemics and pandemics. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

22. 11. I feel that it is difficult to interpret body language and other subtle signals of clients through tele-mode. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

23. 12. I feel that the tele-mode service delivery is less convenient due to technical difficulties that could come along. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

24. 13. I find difficulty tracking progress of my goals or monitoring accuracy/consistency of responses by the client during tele-therapy. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

25. 14. I am satisfied with the level of clinician-patient rapport that I can build with tele-mode. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

26. 15. I am satisfied with the outcome of my service using tele-mode of service delivery. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

27. 16. I am satisfied with the availability and the use of e-therapy resources during the e-sessions. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

28. 17. I am satisfied with my therapy skill enhancement during tele-rehabilitation. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

29. 18. I am satisfied with the quality of treatment offered through tele-mode. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

30. 19. I am satisfied with the attitude of clients/caregiver about receiving speech therapy services via telepractice. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	most frequently

Knowledge, Confidence, and Acceptance

In the scale, 0 shall be indicative of 'Not at all'. Similarly 1, 2, and 3 shall be indicative of occasionally, frequently and Most frequently, respectively.

31. 1. I have knowledge of various tele-rehabilitation options available for Speech-language therapy services *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

32. 2. I am well aware of the basic troubleshooting needed for tele-therapy. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

33. 3. I am familiar with the protocol required for tele-therapy. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

34. 4. I am aware of the ethical and legal issues with tele-rehabilitation services. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

35. 5. I feel confident in using tele-mode for speech-language pathology service delivery. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

36. 6. I feel confident about my patients' progress through tele-therapy. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

37. 7. I feel confident in executing therapy techniques and strategies through tele-mode. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

38. 8. I feel confident using the tele-rehabilitation software like Zoom, Google meet, Skype, etc., that demand real-time video streaming of myself during tele-therapy. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

39. 9. Tele-health is an acceptable delivery mode of speech-language pathology services. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

40. 10. It was easy for me to switch to tele-mode from face-to-face mode of service delivery. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

41. 11. I feel that tele-rehabilitation is a cost-effective platform. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

42. 12. I feel that tele-rehabilitation is a quicker platform for reaching patients. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

43. 13. I feel that tele-therapy applications may not require advanced technology for achieving a good patient outcome. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

44. 14. I feel that service delivery through the tele-therapy method is as effective as the traditional methods *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

45. 15. I feel that tele-therapy may be a good option for people who have technological proficiency. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

46. 16. I usually feel comfortable offering therapy through tele-mode. *

Mark only one oval.

	0	1	2	3	
Not at all	◯	◯	◯	◯	Most frequently

Future of tele-therapy in Speech-Language rehabilitation

47. 1. What are the possible barriers of tele-therapy in speech-language pathology? *

48. 2. List out few solutions for the above-mentioned barriers for tele-therapy. *

49. 3. I would like to continue with tele-therapy for speech-language pathology in the future. *

Mark only one oval.

- ◯ Yes
- ◯ No

50. 4. I agree that tele-therapy needs to expand further so that it is as effective and profitable as traditional face-to-face speech-language therapy.

Mark only one oval.

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Neutral
- ◯ Agree
- ◯ Strongly agree

51. 5. I would recommend tele-therapy to other Speech-language pathologists. *

Mark only one oval.

- ◯ Yes
- ◯ No

Thank you :)