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Telerehabilitation Services for Communication Disorders During COVID-19 in a Tertiary Care Set-up: A Descriptive Report

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Abstract:
Speech and language therapy (SLT) services were suspended for a major part in the year 2020 due to COVID- 19 spread. Reinstating SLT services via alternate medium of Telerehabilitation (TR) was imperative to provide continued care for various disorders along with providing a support base for the caretakers during these difficult times. This paper presents a descriptive report of SLT services provided via TR in a tertiary care hospital for months of January till October 2021. The aim was to guarantee SLT services, maintenance of services provided, training caretakers and monitoring timely progress. A total of 30 cases were undertaken, of which 17 agreed for TR sessions (10 children and 7 adults) were given SLT using the asynchronous and synchronous modes of telerehabilitation on a weekly basis. Frequency analysis was performed for the demographic characteristics, number of sessions held. Qualitative observations were noted for comparative analysis on patient's clinical conditions, preference of mode of therapy, attitudes for in person therapy and TR. The findings of this study indicate that Tele rehabilitation may support diagnostic and therapeutic SLP services. The findings of this study also demonstrated that a combination of TR and in person therapy was most acceptable by the participants and was the preferred mode of service delivery as compared to TR alone in most cases. Despite the barriers found in the implementation of TR services, it showed that clinician's counselling skills, reduced travel cost, time effectiveness of TR have increased its potentiality.

1. Introduction:

COVID-19 pandemic greatly intensified the inequalities in accessing health services and information. Social distancing measures implemented to control the rapid spread of infection potentially increased the environmental barriers and disproportionately impacted persons with disabilities.(1) Adding to the existing issues, many individuals with disabilities also presented with co-existing health conditions such as poor built and nutritional status; compromised pulmonary functions making them more susceptible to contracting the virus; experiencing more severe symptoms upon infection; and leading to elevated levels of death. Rehabilitation thus was facing a unique challenge as COVID-19 circumstances magnified the access and resource barriers in healthcare provision and caused disruption in the continuity of care. According to the RPWD act (2016) and its emphasis in the COVID 19 circumstance, people with disabilities who required medical care were not to be denied those services, and health care providers needed to take proactive steps to resolve accessibility issues in order to close the gap in service delivery. As a "Disability-inclusive response to the COVID-19 problem," affirmative action was required. (1,2)

New regulatory policies were made during the pandemic at the national and hospital levels leading to social distancing and restricted exposure of children and elderly to social places; depriving them from essential health care services. Therefore, in times of global contagion like COVID-19 followed by global lockdown at various time periods, the entire rehabilitation process evolved in its delivery process with increasing support from advances in technology.

Primary speech and/or language impairments can have long-term and significant effects on the kid as well as the parent. Negative impact on academic skills of children have been widely reported due to these impairments.[3,4] There are many different practises (methods, approaches, programmes) that are specifically created to promote speech and/or language development or to remove barriers to participation in society that result from a child's difficulties, or both, for individuals who have been identified as having primary speech and/or language disorders, swallowing disorders.[5]. In the beginning, SLP services were provided to veterans with communicative problems like alaryngeal speech, articulation abnormalities, stuttering, aphasia, dysarthria, and auditory and voice issues utilising basic telephony.[6] Direct telephone communication for progress assessments and caregiver counselling were among the options offered. Recent research has improved upon this auditory-only method by remotely diagnosing neurogenic communication impairments using video and computer techniques.[7,8]

It was only in October 2020 that the Indian Speech and Hearing Association issued a final guideline and annexure outlining operational and ethical aspects of tele practice. These guidelines acknowledged the increasing demands placed on tele practice modules of service delivery, especially during the pandemic which imposed severe physical restrictions in patient care for rehabilitation services.

Telerehabilitation (TR) is the method through which using communication technologies, rehabilitation services can be provided at a distance using either an asynchronous or a synchronous mode of communication. The American Telemedicine Association (ATA) defines TR as “the delivery of rehabilitation services via information and communication technologies.”[9] It also stated that tele rehab “encompasses a range of rehabilitation and habilitation services that include assessment, monitoring, prevention, intervention, supervision, education, consultation, and counselling.”[10] TR in speech-language pathology services mainly focus on auditory and visual modes of communication, which otherwise involves physical contact and manipulation. This service module, although in place since more than a decade now, is still not widely used and is relatively new to the field of speech language pathology especially in India.

TR sessions are typically conducted through interactive communication methods like videoconferencing, in which real-time, two-way audio and visual signals are sent between locations. TR can also employ alternative non-video conferencing methods such asynchronous mode or the Store-and-forward method, which records information from one place in real time (usually as video or still photos) and sends it to the distant location later. [11]This technique is especially useful when the conditions on part of the person providing the service or the one receiving it is not optimal for a synchronous transmission. It provides the benefit of continuing service care in spite of other limitations.

Over the past few decades, researchers have investigated whether it can lower costs, improve geographic accessibility, or stretch scarce resources to support its widespread applicability and use. When applied to human rehabilitation, TR has been demonstrated to provide potential benefits that outweigh these objectives, [12] especially in resource limited and wide geographically placed countries like India.

Telemedicine has significant prospects for healthcare in general and for rehabilitation services in particular, according to a number of systematic reviews in clinical rehabilitation services and prospective research.[13–15] However, the effectiveness of TR to enhance health and therapeutic outcomes is still a developing field of study that can be especially useful in a resource-constrained nation like India, where rehabilitation is compromised by a lack of access to and a lack of resources for services and skilled professional care. According to reports, effective TR implementation strategies call for investing in technology, changing workplace culture, and training users to ensure optimal use. [16,17]

2. Aim

The aim of the present qualitative study was to describe the various assessment and therapeutic approaches provided to patients via TR reporting to a Tertiary Care Hospital for speech, language and swallowing rehabilitation.

3. Objectives

The objective was to sufficiently outline facilitators and barriers to TR, along with the preferred mode of therapeutic services.

4. Methodology

It was a retrospective qualitative study of patients who came to the outpatient department of a tertiary care hospital for consultation for any speech, language and swallowing disorders on a predetermined day of the week by means of convenient sampling during the duration of January 2021 to October 2021. Patients included in the study were those who consented, had an availability of mobile/ laptop and adequate digital capabilities. Patients excluded consisted of cases who were referred only for assessment, children with poor sitting tolerance and pediatric dysphagia cases.

A total of 30 cases were undertaken, of which 17 agreed for TR sessions (10 children and 7 adults), all of whom were taken up at least once in 6 sessions on an in-person basis. Before enrolling the patient in TR, availability of required equipment, along with digital capabilities of the caretaker or the patient along with adequate network was taken into consideration.

During first 2 sessions, the SLT observed the patient and noted his/ her and the caretaker in terms of their interactive behaviours, engagement between them during a specified task, different behaviours exhibited by the patient such as primary means of communication (being verbal or non-verbal), compliance to therapy, listening skills, ability to attend and sustain attention to an activity, following commands, sitting compliance, disruptive/ self-destructive behaviours if any. This information was supplemented by interview-based assessments with family and any investigation reports, if available. The SLT discussed concerns and identified therapeutic techniques and strategies that could help ameliorate the impairment or disorder, regime of exercises if any were given, activities that could be incorporated by the patient or the caretaker into the naturally occurring routines. The orientation to TR included demonstration of the use of the applications, connecting, installing, adjusting, accessing, recording and sending across data.

Each session was 30-45 minutes in duration. A minimum of one session per week was scheduled for initial 7 sessions, after which based on the SLT's assessment of the caretaker's competency to carry out

the techniques, the progress was recorded. The progress of the individual patients was measured based on the difference in the scores obtained on formal tests prior to starting therapy and after 7 sessions were completed (the duration of which ranged between 2- 2.5 months). The formal tests varied depending on the disorder presented, which were also supplemented with the SLT's descriptive report of the presenting skills in terms of language, speech and swallowing as presented at the time of consultation and after 7 sessions.

5. Results

Frequency analysis was performed for the demographic characteristics, number of sessions held. Qualitative observations were performed for comparative analysis on patient's clinical conditions, outcomes pre and post TR, in person therapy, attitudes for in person therapy and TR.

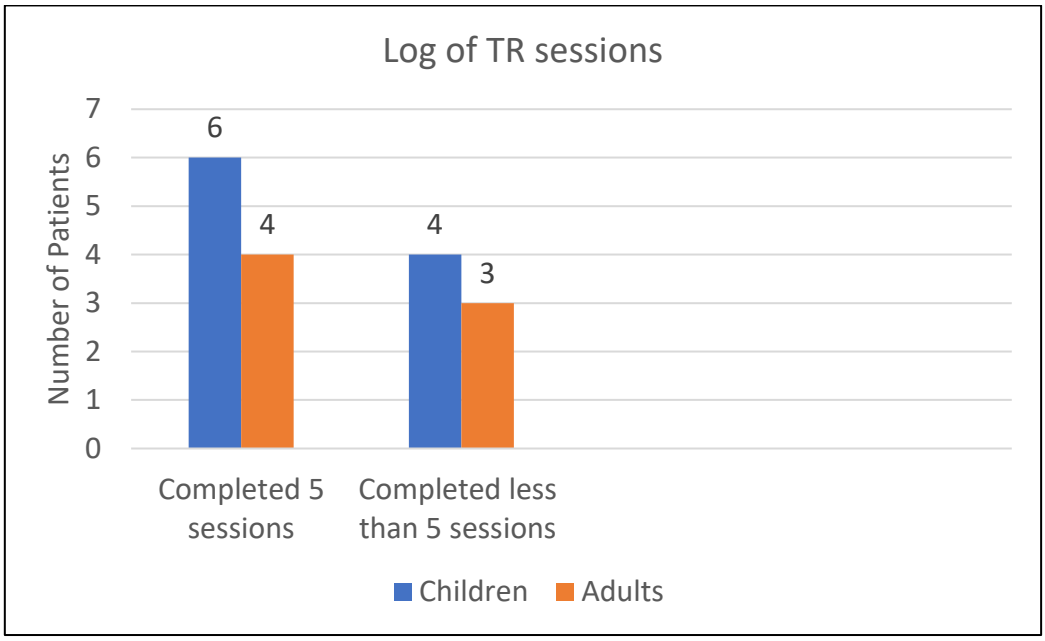
17 patients underwent TR of which 10 were children and 7 were adults. The details of their diagnosis is described in Table 1.

Table 1: Frequency distribution of patient based on their diagnosis

Patient distribution According to diagnosis			
Children		Adults	
DSL due to ASD	3	Fluency disorder	3
DSL due to CP	1	Dysarthria with dysphagia	2
DSL due to ADHD	1	Aphasia	2
DSL with HI	1		
Dysphonia	1		
Articulation disorder	2		
Speech disorder due to Cleft lip and palate	1		
**** DSL: Delayed Speech and Language, ASD: Autism Spectrum Disorder, ADHD: Attention deficit Hyperactive Disorder, HI: Hearing Impairment.**			

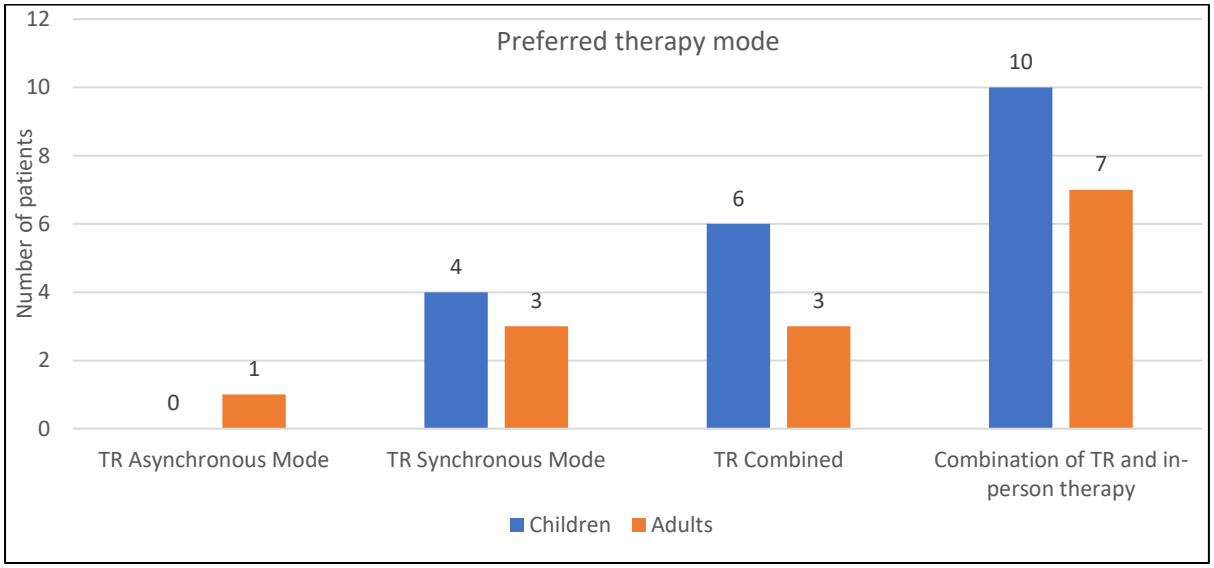
Of the 10 children, 6 of them (2 having DSL due to ASD, 1 with dysphonia, 2 with articulation disorder, 1 with speech disorder due to CLP) completed more than 6 sessions of TR with 4 children those who had DSL due to ASD,CP, ADHD, HI completing less than 5 sessions. For adults, 4 (3 fluency disordered adults and 1 adult with aphasia) completed more than 5 sessions of TR with all of them proceeding to complete more than 10 sessions via TR. 3 adults of which 2 had dysphagia and 1 had aphasia completed less than 5 sessions via TR and requested to shift to in person therapy module. The entire data is visually represented in Figure 1 given below.

Figure 1: Log of TR sessions attended by 17 patients.



Evaluating the preferred mode of therapy after parental and care giver feedback, all the participants preferred a combination of TR and in person therapy module. Most of the parents of children i.e 6 of them preferred a combination of synchronous and asynchronous mode of TR with only 4 parents preferring exclusively synchronous mode of TR. IN adults, 3 adults; 1 patient having dysarthria with dysphagia and 1 patients having aphasia and 1 with fluency disorder preferred a combined mode of synchronous and asynchronous TR. 2 patients with fluency disorder preferred an exclusive synchronous mode of TR. Figure 2 gives a brief account of these results.

Figure 2: Preferred mode of therapy.



6. Discussion:

6.1 Children:

In the current study, assessments held via tele practice provided the added benefit of allowing the clinician to observe the child and parent interaction in a routine activity in real time to have a wholistic

view of the functional abilities of the child. Asynchronous means were most apt for testing articulation skills by means of store and forward method wherein the parent recorded the child's speech at different levels (word, phrase, sentence, continuous speech) and were later analysed by the clinician to formulate appropriate goals. Instrumental analysis could not be administered via tele practice due to lack of required technology in the current study. The severity of the condition, the level of support needed by the patient, the resources at hand, the policies of the particular institution, and the availability of educational programmes all have shown to influence the intensity and duration of conventional therapies requiring in-person therapy. The length and intensity of usual therapy sessions are quite important in determining the results.[18]

Parent counselling played the central role in achieving success with TR in this study irrespective of the educational status of the parent. Prior experience with tele practice either with previous rehabilitation services or for educational purposes served as an added impetus that led to more acceptance of TR across different disorders owing to factors of familiarity with the system and appropriate knowledge of troubleshooting. The parent's lack of enthusiasm to attend more sessions, the disorder's severity, the need to coordinate the mother's household and professional obligations with TR schedules, and the implementation of the prescribed treatment plan were the main obstacles encountered.[19]

Sitting compliance and listening skills were found to be a major decisive factor in the successful implementation of synchronous TR. Children whose parents consistently followed the home program provided to them to improve these skills between successive sessions were found to respond better to TR. The child's interest was maintained throughout the TR session with the use of regular pauses, visual schedules, and motoric exercises. The degree of the disorder's severity, the amount of language delay or speech deviation, the ease with which the parent could play with the child, the child's compliance with the parent's instructions, and the parent's expectations from TR were all found to be factors in the child's improvement of skills.

6.2 Adults:

Most adults preferred an in-person assessment session as compared with care takers of children. They reported at a later stage during therapy that having an in-person session initially helped them develop a rapport with the clinician as also gave them a better level of comfort than directly starting with TR.Checklists for assessing attitudes towards fluency disorders, impact on quality of life were the easiest to administer via the synchronous mode, however on most occasions the patient or the care taker requested for a simultaneous presentation of the checklist on the screen via screen sharing to aid in understanding the questions asked. Delay in obtaining response was the main barrier encountered in the asynchronous mode of assessment, causing an overall delay in the evaluation process and initiating therapy.

The role of caretaker for patients suffering from language disorders after neurological insults or due to neurodegenerative conditions was most salient. The predominant factors of motivation for ameliorating the condition of the patient, regularity and consistency, following the therapy techniques at home and work environment led to improvement in scores on assessments after 5 sessions. Flexibility in the scheduling of TR was also observed to be important in successful continuation of the sessions.

6.3 Preferred Therapy module:

Synchronous TR provided the benefit of observing the adult in his comfort environment and during observation of his meal times which was more representative of his functional skills than those observed in a clinical set-up. For swallowing therapy, TR provided with options to try different and varied food textures and consistencies with ease, however these had to be done with a lot of caution owing to the lack of physical presence of the clinician for monitoring purposes.

Asynchronous methods were helpful in carrying out home programs by provision of resources based on the targets in the language of the patient, along with video recordings of the exercises to be carried out. It was also useful as an intermediate means of continuing therapy when synchronous means were not feasible to be accessed by the patient due to non-availability of smart phone, care taker during the scheduled TR session, appropriate network. The patients and caregivers found it convenient to refer to videos sent by the clinician during carrying out tasks. Monitoring of progress of the patient was done by analyzing videos taken by the caretakers of the tasks performed during daily routine activities and structured tasks. Feedbacks were provided by the clinician and the patient / caretaker in written modality via social messaging applications.

Combination of TR and in person therapy module was found to be most acceptable in both the adult and child population. The parents / caretakers/ patients reported ease of following the targets when they were initially demonstrated by the clinician during the in-person session, rather than direct introduction during the TR session. Especially in case of children, the parents found it more beneficial to observe the clinician during activities and the way different behaviours of the child were managed by the clinician as it served to be a good model to imitate at home. Video recordings of in-person session were taken by the parents/ care takers during administration of particular therapy techniques/ exercises/ manoeuvres as reference for continuing those at home.

Asynchronous means were preferred by mothers of young children (below 5 years) and with increased severity as compared to older children who had only mild deficits. Provision of therapy resources for practice in the mother tongue of the child, home program charts, list of targets worked upon , ideas on incorporating daily routines and basic activities as therapy materials and embedding therapy program in daily lives were reported to be most useful by the parents in implementation of the targets.

6.4 Facilitators and Barriers

Numerous research have established the viability of telerehabilitation for the assessment and follow-up of aphasic problems in poststroke patients; some of these studies also showed good reliability between in-person and remote consultation.[19,20]. Another study by Agostini et al. compared the effectiveness of face-to-face therapy with telerehabilitation for treating lexical deficiencies in aphasia, and they discovered no changes in the percentages of correctly answered questions between the two types of therapy.[21] This data supported earlier studies' predictions that TR was feasible for stroke patients who have aphasia. [10]

In numerous trials involving individuals with language disorders brought on by neurological injury, participants expressed comfort and contentment with the use of telepractice, and some even indicated that they would use it again in the future. Cost reductions, efficiency, and the capacity to access resources remotely were also listed as potential advantages of telepractice [22] which also agrees with the results of the current investigation. Due to a lack of Internet connectivity in their houses, another study

participant who had motor speech impairment claimed that telepractice would not be effective for them. (23)

Due to its extensive reach and affordable possibilities, TR has become a vehicle for change as a result of the ease with which smart phones and internet connectivity are available. A continuum of difficulties are encountered in developing nations due to the availability and accessibility of stable technology, including inadequate and underdeveloped infrastructure, caregivers' lack of digital literacy, cultural concerns, and financial ramifications, which are also seen in the current study.[26,27] Considerations regarding formulating guidelines and institution specific protocols for developing a sustainable model of TR delivery was also deemed important for training purposes. An immediate need for development of virtual therapy resources in regional languages along with certification courses in the field of TR for ASLP's was strongly felt at the end of this study.

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The introduction and widespread use of virtual meeting platforms during the pandemic period have increased the potential availability of these services and the simplicity with which they can be used, despite these obstacles to the clinical implementation of tele rehab services. Alongside these developments, there is an expanding corpus of research on the use of telerehabilitation applications in speech and language pathology. This research is providing more and more evidence that telerehabilitation is a valid and trustworthy method for providing speech and language therapies. In this article, we review the evidence as it relates to the assessment and treatment of acquired neurologic speech and language disorders in adults.

Depending on the patient's age and needs, direct interventions concentrate on treatment either one-on-one or in a group. Indirect interventions, which enable adults who are already present in the individual's environment to assist communication, are frequently thought to be more realistic in approach. By encouraging pleasant interactions between patients and caregivers, they help the individual communicate in the best possible atmosphere.(5)

An ideal balance between these two factors serves the purpose of improving the efficiency in planning of the services to effect maximum progress along with other important factors such as caretaker support, patient motivation, consistency in carrying out the home program, generalization of learnt skills to functional communicative situations.

Table 2 : TR Outcomes – Facilitators and Barriers

Sr no	*Facilitators*	*Barriers*
1	Availability of Smart phones, laptop.	Severity of disorder
2	Ease of access to internet	Lack of training/confidence of the parent in handling the child.
3	Educational Level	School / Work commitments on part of the patient or the caretaker
4	Socio Economic Condition	Fluctuating health conditions of the patient or the care taker.
5	Caretaker readiness and acceptance of TR	Connectivity issues (due to remote location and poor network)
6	Time effectiveness	Unavailability of device to access TR (sibling requiring the device for online schooling, only the working parent having a smart phone)
7	Elimination of travel to the clinic.	Delayed response to asynchronous mode of TR.
8		Unavailability of required resources for therapy in the natural environment.

7. Conclusion:

Advances in videoconferencing and networking technologies present numerous opportunities to deliver both traditional and innovative rehabilitation services to patients at home, at school, in the workplace, and in the community. This study aimed at providing a descriptive account of TR undertaken across different disorders of communication and swallowing in children and adults. The findings of this study indicate that Tele rehabilitation may support diagnostic and therapeutic SLP services. Understanding how communication is influenced by several variables of caretaker/patient acceptance of TR, level of technical expertise, ease of access to technology and internet connectivity, availability of resources, implementation of home program is important in advancing the use of TR for speech-language treatment. The findings of this study also demonstrated that a combination of TR and in person therapy was most acceptable by the participants and was the preferred mode of service delivery as compared to TR alone in most cases. Despite the barriers found to impede the clinical implementation of TR services, this study showed that technological advances with the introduction and widespread implementation of virtual meeting platforms in the pandemic period have increased the potential availability of these services and the ease with which they can be applied. These benefits have the potential of enhancing the quality of rehabilitation care services who visit for therapy on a regular basis or who are discharged after an in-patient service. TR can be considered as a valid and reliable vehicle for delivering speech and language services.

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