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Evaluation of Telehealth Efficacy in Improving Maintenance Phase of Stuttering Children

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Abstract

Background: Stuttering as a communication disorder can lead to serious problems in interpersonal communication and affect the quality of life of the affected person.
Objectives: The aim of this study was to investigate the effectiveness of telehealth in improving its treatment and its effect on maintenance phase of stuttering children.
Methods: In this study, all 6 - 12 year-old stuttering children referred to the Speech Therapy Center of Shahid Beheshti Hospital in 2018 were selected by purposeful sampling method and divided into two groups of experiment and control. Children were healthy and without any disorder. All 12 children received a three-month course of treatment with a speech and language pathologist (SLP) weekly one session. Maintenance phase included 8 sessions of 30 minutes over a period of six months.
Results: Six children in the experimental group received maintenance phase training exercises by the SLP in the form of audio and video files through the WhatsApp software. Average total satisfaction rating (4.22) the lowest satisfaction score (3.16) highest score (5). According to the total score of the questionnaire,17% of the parents were satisfied at a low rate, 33% of parents were satisfied with the average and 50% of parents were very satisfied.
Conclusions: In this study, the efficacy of telehealth on the maintenance phase of stuttering children has been evaluated. Results showed that telemedicine, with its ability to completely remove distance and travel as barriers for both patients and health care professionals is one option. Telemedicine can be a viable alternative to traditional in-person physician-based care for stuttering.

Keywords: Stuttering Children, Maintenance Phase, Telemedicine

1. Background

Childhood-onset fluency disorder, or developmental stuttering, occurs in 80% - 90% of patients around the age of six. The age range of stuttering is two to seven years old. The onset of stuttering may be gradual or sudden. In patients whose onset of stuttering is gradual, the first syllable of the word or phrase is often repeated (1). This disorder can cause many psychological, social and educational problems if not treated in childhood. Due to chronic stuttering problems in the children's future life, the best time to treating stuttering is at the beginning of childhood (2). In the case of people who stutter there are limitations that affect the availability and usefulness of treatment. One-third of patients suffer from problems such as distance, lack of access to public transportation and other socio-economic issues. Telehealth or telemedicine are two suitable methods in using telecommunication technology to provide health services and have been developed as a new option for dealing with access problems in the treatment of stuttering. The ability of telemedicine compared to face-to-face therapy has been proven in a number of health and medical sciences including speech pathology (3).

Information technology (IT) such as telehealth has brought tremendous advances in the field of medicine and the provision of health services. According to the majority of health care professionals, in cases where distance is an effective factor, the use of IT in the topics of treatment, prevention, research, evaluation and continuing education is a priority (4). The studies showed that telehealth provides

great potential for supplementing traditional delivery of services and channels of communication. The majority of the patients reported that they felt well supported in spite of not having a therapist physically present (5). Ekeland et al. (6) evaluated all of the telemedicine implementations that had taken place by 2010, and it was concluded that 64% of implementations suggested that telemedicine, was well implemented in diseases, especially chronic diseases. It seems that telemedicine is an effective model for providing health services, including assessment and treatment (7-14). O'Brian et al. (14) performed the Lidcombe program using webcam (as distance training) on three children with stuttering without face-to-face visit. The results showed that telemedicine is able to reduce stuttering to lower levels and be more practical and efficient than using a phone that is a weak technology. Telemedicine is supported as a reliable, cost-effective and efficient standard for stuttering in the Lidcombe program (15). Also, in another study, webcam services were described as appealing, and effective for adolescents (16). However, speech therapy for patients who stutter may require multiple sessions for a long time. Clinical efficacy is related to close relationship between the speech and language pathologist (SLP) and the patient. Remote intervention may be possible, but studies of the applications of speech-language pathology are rare (8).

Non-timely treatment of stuttering in children can have consequences such as social frustration, anxiety, depression and reducing self-esteem. Therefore, early intervention is very important for any SLP, especially when access to health services are difficult due to unfavorable conditions such as: travel expenses, lack of time, poor family education, low family income, Social constraints.

2. Objectives

Most studies included adults and a small number of studies with children, because of the importance and necessity of starting treatment in childhood so in this study the efficacy of telehealth on the maintenance phase of stuttering children has been evaluated. also tries to show the application and benefits of using telemedicine as a new treatment technologies.

3. Methods

This interventional study was performed on 12 children aged 6 to 12 years with stutter who diagnosis by psychiatrist. The sampling method was purposeful and patients were selected from stuttering children who refer to Shahid Beheshti Hospital in Kerman and none of them had any other disorder. All families they have been asked to hold the meeting through WhatsApp and the study objective was explained to this group of patients. Six of them chose to use WhatsApp and six chose face-to-face contact. Login criteria for children were (A) ages 6 - 12 years and (B) stuttering frequency greater than 2% SS (stuttering severity) during 10 minutes of conversation with a stranger. Exclusion criteria were (A) concomitant disorder; (B) treatment for stuttering during the preceding 12 months. Conscious written consent to participate in the study was obtained from all patients' parents.

Their treatment was done through the Speech restructuring method. Speech restructuring refers to a wide range of therapies that use a new speech pattern to reduce or control stuttering. Prolonged speech, which involves teaching a slow, stretched speech pattern that gradually turns into more natural-sounding speech, is an example of speech restructuring therapy. There were three assessment occasions: immediately Pretreatment, on entry into maintenance, 6 months after entry into maintenance.

Step One: Determine the severity of stuttering of patients by the Riley-fourth stutter (SSI-4) immediately pretreatment.

Step Two: Implementation of speech therapeutic interventions. The length of treatment sessions varies depending on its severity of the client's stuttering and their availability for scheduling by the speech therapist face to face with both groups. Treatment focused on increasing fluency and reducing or eliminating secondary stuttering behaviors, including emotion and cognition. Just like adults and teens, different types of treatment programs and exercise programs were used for this purpose. These were adapted to the level and needs of the child (17).

Step Three: Determine the severity of stuttering of the patients by the Riley-fourth stutter (SSI-4) before the onset of maintenance phase and after the end of the maintenance phase.

Step Four: Implementation of speech therapeutic interventions through the WhatsApp program for the experimental group and the implementation of traditional interventions for the control group. These interventions were conducted over a six-month period in same conditions in two groups.

Step Five: Comparison of the severity of stuttering before and after the maintenance phase in both groups.

Step Six: Satisfaction assessment of the parents in the experimental group. For this purpose, a questionnaire consisting of six questions was assessed by the researcher and its validity and reliability was confirmed by three psychiatric professors.

Step Seven: Analyzing the results based on statistical tests.

3.1. Statistics

In this study, due to the limited number of patients, samples were selected among stuttering children referred to Speech Therapy Center of Shahid Beheshti Hospital in Kerman during a three-month period. The study's main sources of information were:

3.1.1. Researcher-made Satisfaction Questionnaire

for the reliability of this tool, retest testing was used and the correlation coefficient was calculated. (r = 82% Pearson). Finally, parents' satisfaction was measured using Likert scale of five options.

3.1.2. Riley-Fourth Stutter (SSI-4) Questionnaire

The inter-rater reliability of the test in each part of the test is 0.94 to 0.98. The intra-rater reliability (retest) for each part is 0.92 to 0.98. Cronbach's alpha for the overall test is: (P = 0.001, α = 87%) (18).

4. Results

Twelve children participating in this study were four girls and eight boys (Table 1). According to the Box-Plot chart, distribution has no acceptable normality (Statistic = 0.11 df = 0.9, sig = 0.003).

So the Mann-Whitney test was used (Tables 2 and 3). There was no difference in the severity of stuttering in the maintenance phase between traditional face-to-face therapy and treatment through telemedicine.

To evaluate the parents' satisfaction of children who continued the maintenance phase with the telehealth method, parents were complete the questionnaire and Parental satisfaction analysis showed that average total satisfaction rating (4.22) The lowest satisfaction score (3.16) Highest score (5). According to the total score of the questionnaire, 17% of the parents were satisfied at a low rate, 33% of parents were satisfied with the average and 50% of parents were very satisfied.

5. Discussion

Most studies in Iran involved adults. This study was conducted on children and this is considered a new study. The results of this research indicated that there are no significant differences in treatment outcomes whether delivered face to face or telehealth. The same result was obtained in another study using tele-health facilities with adults who stuttered, either face to face or via webcam (19). Stuttering reduced in two groups and the patients in telehealth group reported high levels of satisfaction with the outcomes, parents of children participating in this study considered telehealth treatment method to be more favorable. As with the Sicotte et al. (8) report, all parents in this trial reported high satisfaction with their child's mastery after treatment and the treatment process. The parents expressed a number of reasons for their satisfaction with telehealth methodology that we are discussing here:

5.1. Convenient Access to SLP Services Specially for Those Who Care About Distance

According to participants, one of the benefits of telehealth is that they do not have to travel to a clinic and can make phone calls to the doctor at convenient times, such as at lunch. This of course increases accessibility (20). This method provides a promising service in patients' access to specialized services for problems such as stuttering, which are more difficult to manage and often require long-term support. O'Brian et al. (14) stated that Lidcombe standard delivery requires parents and children to be at the same clinic each week. This poses a problem for many families living remotely from speech pathology services (14). There are obstacles that limit accessibility and availability of treatments it affects one-third of the population, for reasons such as distance, lack of access to public transport and socio-economic factors (3). Telehealth may be useful for providing treatment in areas that do not have adequate speech therapy services. This is an effective and admirable service that improves the quality of care in remote areas (5).

5.2. Reduce Health Costs

Carey et al. (11) showed that such a model can be efficient in webcam technology, with free software downloads, are a more cost-effective approach for teens looking to control stuttering. Those who use webcams to access services have shown that they find it beneficial to reduce financial costs (19). There is increasing support for the use of this model of service by professional organizations because Telehealth provides access to health care services (5). The costs of private speech pathology are often costly, and the financial burden on family's needs to be considered (21).

5.3. Reducing Degree of Dependence on the Therapist

Many parents say that their children speaks more correctly in the presence of speech therapist than at home, this method can help children to experience telemedicine and trust their parents as a health care provider. For parents, the Telemedicine was well-suited because they can practice health exercises at home, also Follow up therapy at home can reduce child anxiety due to being in the hospital environment. However, not having face-to-face contact

Table 1. Demographic Characteristics

Total Participants	Experimental Group		Control Number	
	Number	Mean Age	Number	Mean Age
Girls	2	6.5	2	7
Boys	4	8.5	4	7.7

Table 2. Mann-Whitney Ranks[a]

Treatment Method	Number	Mean Ranks	Sum of Ranks
Face to face	6	5.58	33.50
Telemedicine	6	7.42	44.50
Total	12		

[a] $P = 0.37$; $n_1 = 6$; $n_2 = 6$; $U = 12.50$.

Table 3. Mann-Whitney Test

	Severity of Stuttering
Mann-Whitney U	12.50
Wilcoxon W	33.50
Z	-0.895
Asymp.sig (2tailed)	0.37

with clients is not without risk. It seems that physicians need to be very vigilant to ensure the safety of remote intervention and to ensure the privacy and confidentiality of the client.

5.4. Attractiveness of Telemedicine Treatment for Children

The idea of using images alongside the voice makes it more attractive than simple form of telemedicine especially for children. It seems motivation throughout the treatment process may be enhanced by using images, voice, and …, which could make the training more appealing and rewarding. Another study shows Telemedicine is an attractive and cost-effective way to assess children at risk for diabetic retinopathy (22). Mobile devices are thought to be a practical platform for providing nutrition and physical activity training for children, it is important that parents are comfortable with technology. Engaging parents via technology or eHealth modalities (e.g., Web/mobile applications [apps], social media, telemedicine, interactive voice response, e-mail, e-learning) may be a useful template for family-related interventions and physical activity and other health behaviors in young children (23).

5.5. Ensuring Follow-up Treatment by the Family and Improving Parent-child Relations

Millard check the effect of parent-child interaction therapy (PCIT), Based on careful monitoring of parental therapy at home, it can lead to a significant reduction in children who stutter. This app explicitly aims to empower parents to manage their child's stuttering and increase confidence in their skills as well as strive to increase the child's mastery (24). Explaining stuttering as a multifactorial disorder helps parents understand how stuttering develops and the goal is to reduce any blame or guilt that parents often suffer. Addressing such feelings is important because they can disrupt the healing process and prevent parental change (25, 26). The most effective options for early intervention are stuttering through parental cooperation, in which the clinician acts as a facilitator., However Practicing regular treatment at home can also be challenging, especially if both parents are working, and if parents or siblings are separated (21). Another study examines the impact of telemedicine on parent participation in pediatric intensive care, the results show that all parents reported that telemedicine approaches had a positive effect on their confidence in child care and improved communication with the care team (26).

The present study demonstrated telemedicine is a practical tool to follow up services for people with stuttering after initial on-site intervention. It demonstrates that full assessment and treatment of stuttering in children can be accomplished successfully via telemedicine and appears to be an important supplement to existing care delivery models in the field of speech-language pathology (8). Telehealth can increase the efficiency and effectiveness of the cost of providing SLP services. In addition, telehealth meets the care needs of home patients with mobility impairments and allows for closer monitoring to determine the need for additional services or follow-up (27).

5.6. Limitations

To maintain ethical standards, it is important to seek evidence of the effectiveness of remote treatment models before using them. It seems that professional guidelines should be developed for telehealth care standards. This requires some privacy measures, but it is not always

clear how this is done. In regards to the security of videoconferencing software, ASHA (American Speech-Language-Hearing Association) states that "There is no standard that software programs meet all needs.... Security of treatment rooms and remote access to electronic documents to protect the privacy of the client and the patient at both sites must be considered". Therapy via telemedicine relies on the state legislature for repayment. Licenses generally require insurers, subscription programs, and health care organizations to pay for telemedicine same as face-to-face visits (28).

Telemedicine is a viable option for patients and health care professionals because of its ability to completely eliminate distance as a barrier. In this study children with stuttering who are treated by telemedicine or face-to-face visits are able to control some degree of stuttering. Telemedicine is a good way to replace the traditional face-to-face treatment of patient-therapist communication in stuttering management.

Footnotes

Authors' Contribution: Hamid Reza Samzadeh has delivered the title of this article and he proposed research methodology. Mohadeseh Iranpour is speech therapist and she has done speech therapy sessions with patients. Fatemeh Shekari did searches and translation of the article. Ali Soltaninejad performed statistical analysis. Mahin Eslami is diagnosed and referred the patients to speech therapist.

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Informed Consent: Conscious written consent to participate in the study was obtained from all patients' parents.

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