

Critical Review:

Does telehealth delivery of the Camperdown Program improve fluency measures for individuals who stutter?

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This critical review examines the current evidence regarding whether telehealth delivery of the Camperdown Program is effective in improving fluency measures for adults and adolescents who stutter. A search of the literature yielded four relevant papers, of which three were repeated measures designs and one was a randomized controlled trial design. These studies provide suggestive evidence that telehealth delivery of the Camperdown Program is effective with adolescents who stutter and compelling evidence that telehealth delivery is as effective as face-to-face delivery for adults who stutter. Clinical implications and recommendations for future research are discussed.

Introduction

Telehealth is the delivery of health care services through the use of information technology and telecommunication (O'Brian, Packman, & Onslow, 2008). As technology has advanced, the use of telehealth has been encouraged as an alternative to in-clinic delivery models by the World Health Organization (Lowe, O'Brian, & Onslow, 2014). The American Speech-Language-Hearing Association (ASHA) has deemed telehealth appropriate for delivery of speech-language pathology services (Mashima & Doarn, 2008). For individuals with difficulty accessing in-clinic services, due to disability, remoteness, transportation problems, or conflicting schedules, telehealth has the potential to provide an alternative means of accessing services (Lowe et al., 2014).

The application of telehealth in the treatment of individuals who stutter is of particular interest due to this population's need for long-term maintenance and follow-up and the scarcity of specialized stuttering treatment centres (Mashima & Doarn, 2008). Telehealth may be of additional benefit in Canada, given its relatively large landmass and comparatively small population (Packman & Grant, 2011).

The Camperdown Program (O'Brian, Carey, Onslow, Packman, & Cream, 2010) is a speech restructuring intervention developed by the Australian Stuttering Research Centre for adults and adolescents who stutter. This intervention aims to improve fluency measures by changing speech production components, such as respiration, articulation, and phonation (Carey, O'Brian, Onslow, Block, Jones, & Packman, 2010). The clinician teaches clients to use a new speech pattern that reduces the possibility of

stuttering (O'Brian et al., 2010). Although the Camperdown Program has been shown to reduce stuttering frequency while reducing treatment time by 80%, access to this intervention is still hindered by other factors, such as distance or conflicting commitments (O'Brian et al., 2008). Therefore, telehealth delivery of the Camperdown Program may further benefit individuals who stutter by increasing accessibility, provided its effectiveness in improving fluency measures is not compromised.

Objectives

The primary objective of this paper is to critically evaluate the current literature addressing the effectiveness of telehealth delivery of the Camperdown Program in improving fluency measures for adults and adolescents who stutter. The secondary objective of this review is to provide evidence-based clinical implications for use of telehealth delivery of this intervention with this population.

Methods

Search Strategy

Relevant research studies were found through an online search of the databases Scopus, PsycINFO, and PubMed. The following key terms were used: (camperdown) AND ((telehealth) OR (webcam)) AND ((fluency) OR (stuttering)). No limits were placed on the search.

Selection Criteria

Research studies that investigated the telehealth delivery of the Camperdown Program were selected for inclusion. Studies were required to utilize either adolescent or adult participants who stutter. Studies

comparing telehealth delivery to face-to-face delivery were included as well as studies investigating telehealth delivery alone. Studies investigating telehealth delivery of any other fluency interventions were excluded.

Data Collection

Four articles addressing the effectiveness of telehealth delivery of the Camperdown Program for adolescents or adults who stutter were found and included in this review. Two of these studies are repeated measures phase I trials, one is a repeated measures phase II trial, and one is a randomized controlled non-inferiority trial.

Results

Repeated Measures, Phase I Clinical Trials

O'Brian, Packman, & Onslow (2008) explored the potential feasibility of telehealth delivery of the Camperdown Program with adults who stutter. A total of 10 adults participated, all of whom were unable to participate in in-clinic delivery of treatment. Exclusion criteria were well described and appropriate for this population.

Outcome measures, which included stuttering frequency (%SS), speech naturalness (9-point scale), and self-reported stuttering severity (9-point scale), were appropriate and well-established fluency measures. Additional measures not of relevance to the present question were also collected. There was an average %SS reduction of 82% between pre-treatment and immediate post-treatment and 74% between pre-treatment and 6 months post-treatment, as measured by an independent, blinded speech-language pathologist. However, the authors noted considerable individual variation, with one participant exhibiting a %SS reduction of only 19% at 6 months post-treatment. Self-reported stuttering severity decreased from a typical stuttering severity of 5 at pre-treatment to 2 at both immediate post-treatment and 6 months post-treatment. The authors found that the average naturalness score of the participants was 4.2 as compared to 3.4 for age and gender matched controls, representing a difference of less than 1 on the naturalness scale.

The strengths of this study include the blinding of raters for %SS and naturalness and the use of age and gender matched controls for naturalness. A significant limitation is the lack of statistical tests in analyzing the outcome measures. Additional limitations are the small sample size, the lack of a control group for %SS and self-reported stuttering

severity, and the lack of long-term outcomes beyond 6 months post-treatment.

Overall, this study provides slightly suggestive evidence for the efficacy of telehealth delivery of the Camperdown Program in improving fluency measures for adults who stutter.

Carey, O'Brian, Onslow, Packman, & Menzies (2012) explored the potential feasibility of telehealth delivery of the Camperdown Program with adolescents who stutter. A total of 3 adolescents participated, all of whom had independently approached the Australian Stuttering Research Centre for therapy. Exclusion criteria were not specified.

Outcome measures, which included stuttering frequency (%SS), speech naturalness (9-point scale), and self-reported stuttering severity (9-point scale), were appropriate and well-established fluency measures. Additional measures not of relevance to the present question were also collected. There was an average %SS reduction of 83% at 1 day post maintenance entry, 93% at 6 months post maintenance entry, and 74% at 12 months post maintenance entry, as measured by an independent, blinded speech-language pathologist. All three participants showed reductions in their typical and worst self-rated stuttering severity scores, with average typical severity ratings below 3 at all assessments after maintenance entry. The authors reported that all three participants achieved naturalness scores within the same range as their age and gender matched controls. Although they provided the naturalness scores for the three participants and their matched controls, the authors did not clarify what the range was or how it was determined.

The strengths of this study include the blinding of raters for %SS and naturalness and the use of age and gender matched controls for naturalness. A significant limitation is the lack of statistical tests in analyzing the outcome measures. Additional limitations are the small sample size, the lack of a control group for %SS and self-reported stuttering severity, and the lack of clarity surrounding the exclusion criteria. Although the authors used matched controls for naturalness, a limitation is the lack of clarity regarding how the matched control scores were used for comparison.

Overall, this study provides slightly suggestive evidence for the efficacy of telehealth delivery of the Camperdown Program in improving fluency measures for adolescents who stutter.

Repeated Measures, Phase II Clinical Trial

Carey, O'Brian, Lowe, & Onslow (2014) further explored the potential feasibility of telehealth delivery of the Camperdown Program with adolescents who stutter. A total of 14 adolescents participated, none of whom had previously participated in the Phase I trial by Carey and colleagues (2012). Exclusion criteria were well described and appropriate for this population.

Outcome measures, which included stuttering frequency (%SS), speech naturalness (9-point scale), and self-reported stuttering severity (9-point scale), were appropriate and well-established fluency measures. Additional measures not of relevance to the present question were also collected. The authors used appropriate paired t-tests to compare the pre-treatment group averages to the 12 month post maintenance entry group averages for each outcome measure. This analysis revealed a significant decrease in %SS from pre-treatment to 12 months post maintenance entry as well as a significant decrease in self-reported stuttering severity from pre-treatment to 12 months post maintenance entry. However, the authors noted considerable individual variation in %SS, with 3 of the 16 participants showing no significant change on this measure. Appropriate paired t-tests also revealed no significant difference in speech naturalness between the participants and age and gender matched controls.

The strengths of this study include the blinding of raters for %SS and naturalness, the use of appropriate statistical tests, and the use of age and gender matched controls for naturalness. The limitations are the small sample size and the lack of a control group for %SS and self-reported stuttering severity. Although the authors ensured that participants had not participated in the previous Phase I clinical trial, a limitation is the lack of clarity regarding how the participants were recruited.

Overall, this study provides suggestive evidence for the efficacy of telehealth delivery of the Camperdown Program in improving fluency measures for adolescents who stutter.

Randomized Controlled Trial

Carey, O'Brian, Onslow, Block, Jones, & Packman (2010) investigated whether the Camperdown Program would result in equivalent improvements with telehealth delivery as compared to an established active treatment of face-to-face delivery. A total of 36 adults participated, all of whom had independently approached the speech-language pathology clinic at La Trobe University for

stuttering treatment. The authors used independent stratified random sampling based on stuttering severity and past speech-restructuring treatment. Exclusion criteria were well described and appropriate for this population. Both groups received the standard Camperdown Program, although some modifications were made to the telehealth delivery group to allow for this delivery model.

Outcome measures, which included stuttering severity (%SS), speech naturalness (9-point scale), and self-reported stuttering severity (9-point scale), were appropriate and well-established fluency measures. Additional measures not of relevance to the present question were also collected. Appropriate tests of difference (ANCOVA) revealed no significant group differences in %SS at 9 months post-randomization, or 1 day, 6 months, and 12 months post-treatment. Appropriate tests of difference (ANOVA F-test) revealed no significant differences in the listener-rated naturalness score between groups. Appropriate tests of difference (two-sample paired t-tests) revealed similar decreases in self-reported stuttering severity for both groups. The two-sample paired t-tests were appropriate for this measure, because the authors were using pre-treatment to post-treatment differences for each group to compare the two groups.

The strengths of this study include the randomization, the use of the same speech-language pathologist for both groups, the blinding of raters for %SS and naturalness, the use of appropriate statistical tests, and the reasonable sample size. Although one limitation could be the lack of treatment condition blinding of the participants and therapist, it is unlikely that this blinding could be effectively included in this design. Although an additional limitation could be the inclusion of participants with past fluency therapy other than speech-restructuring therapy, the randomization partially controlled for these differences.

Overall, this study provides compelling evidence for the efficacy of telehealth delivery of the Camperdown Program in improving fluency measures for adults who stutter and the equivalence of telehealth and face-to-face delivery.

Discussion

Research addressing the use of telehealth for delivery of the Camperdown Program to adults and adolescents who stutter is still in the early stages. However, despite the relatively limited research available on this topic, the evidence available is

compelling that telehealth delivery of the Camperdown Program is effective for adults and suggestive that it is effective for adolescents. All four studies included in this review found that telehealth delivery of the Camperdown Program resulted in decreased stuttering severity (%SS) and self-reported stuttering severity. Additionally, all four papers concluded that participants in the telehealth delivery achieved naturalness ratings within an acceptable range of their age and gender matched controls. The most persuasive evidence in this critical analysis is the randomized controlled trial conducted by Carey and colleagues (2010). This study found that telehealth delivery was as effective in improving fluency measures for adults who stutter as the already well-established face-to-face delivery of the Camperdown Program. The research designs of the other three studies (repeated measures phase I and II trials) are appropriate for exploring the potential feasibility of telehealth delivery and for laying the necessary groundwork for more research. These studies achieved the objective of determining that there is evidence to support telehealth delivery of the Camperdown Program and therefore that further research on this topic is warranted.

Of the four studies reviewed, two were limited by a lack of statistical analyses for the outcome measures reported on. While the studies conducted by O'Brian and colleagues (2008) and Carey and colleagues (2012) showed improvements in fluency measures, the authors failed to use statistical tests to validate these results. Consequently, these results should be interpreted cautiously as it is unclear whether the improvements are statistically significant. While these studies provide the clinically relevant conclusion that fluency measures improved through telehealth delivery of the Camperdown Program, they provide slightly suggestive evidence and require additional research to support their findings.

Although all four research studies in this review reported positive outcomes, there are limitations inherent to this area of research which should be acknowledged. One limitation is the small sample sizes for three of the four studies. These studies had sample sizes of 3, 10, and 14 participants, which limits the ability to generalize the results to the larger population. This limitation speaks to the nature of research with this population as the group conducting the research, the Australian Stuttering Research Centre, has a significant presence in stuttering research. While the ability to recruit larger sample sizes in this population is a common difficulty, it limits the interpretation of results and should be considered when making clinical decisions.

A second shared limitation of the studies included in this critical review is that they were all conducted by the Australian Stuttering Research Centre. This is the same research group that developed the Camperdown Program. These researchers have an interest in the success of the intervention they developed, regardless of delivery mode. Additionally, the lack of evidence from other independent researchers calls into question whether the results of these studies could be replicated. Consequently, there is a limitation in the ability to generalize the results to clinical environments outside of this research group.

Given these existing limitations, further research into the effectiveness of telehealth delivery of the Camperdown Program is necessary. Independent replication of the positive outcomes reported by the Australian Stuttering Research Centre is warranted to substantiate these findings and allow for generalization to other clinicians and clinical environments. Additional randomized controlled trials, in which telehealth delivery is compared to face-to-face delivery or no treatment, should also be investigated to strengthen the current evidence. This is of particular importance in determining the effectiveness of telehealth delivery with adolescents who stutter, given that current evidence is suggestive. These studies should aim to recruit larger sample sizes and employ appropriate statistical tests to allow for generalization to the larger population and improved statistical power respectively.

Conclusion

This critical review of the limited research on the effectiveness of telehealth delivery of the Camperdown Program provides compelling evidence that telehealth delivery is effective in improving fluency measures for adults who stutter and suggestive evidence that it is effective for adolescents who stutter. From the current research available, telehealth delivery may even be as effective as face-to-face delivery, while providing the advantage of increased accessibility.

Clinical Implications

As the use of telehealth continues to expand, speech-language pathologists will be faced with the clinical decision of whether telehealth delivery is appropriate for the intervention and population being considered. For speech-language pathologists working with individuals who stutter, it is important to understand whether telehealth delivery can be effective for interventions such as the Camperdown Program. This importance is a result of this population's need for

long-term maintenance and follow-up as well as the potential for barriers to access, such as remoteness, distance, and conflicting commitments.

Despite the limited research on the effectiveness of telehealth delivery of the Camperdown Program, the existing research is unanimously positive. There are no indications that telehealth delivery is ineffective or even less effective than face-to-face delivery in improving fluency measures. Given the rise of technology in homes as well as consistent technological advances, the cost and effort associated with telehealth is quite low. Additionally, there are no known risks associated with telehealth delivery of the Camperdown Program. While additional research on this topic is recommended, telehealth delivery of the Camperdown Program should be explored as a viable intervention approach for interested clients.

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