

How Effective is the Use of Telehealth for Children with Autism Spectrum Disorders?

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ABSTRACT

This paper outlines the findings of a rapid literature review of the use and effectiveness of telehealth in autism spectrum disorders, to help redesign systems that can meet the expected increase in demand for disability services for children with the condition. Telehealth may present a feasible and reliable approach to the assessment of language for children with autism. Parents can use Applied Behaviour Analysis procedures to successfully treat autism spectrum disorders-associated behaviour problems. Telehealth decreases the need to miss school or work, and limits transportation requirement for families. The evidence suggests that a broader range of cognitive tests and wider range of clinical populations is essential. When planning both assessment and intervention via telehealth, it is vital to consider and acknowledge individual differences among the children.

Keywords

Telehealth, Autism Spectrum Disorders, Disability, Cost-effectiveness.

Introduction

Autism spectrum disorder (ASD) is a developmental disability that can cause significant social, communication and behavioural challenges [1]. In the United States, the ASD prevalence in children aged 8 years was 1 in 54 in 2016, 10% higher than in 2014 and 175% more than in 2000 [2]. ASD imposes significant emotional and economic burden on people with the condition and their families. Caring for children with a severe form of the disorders may be demanding, particularly where access to services and support are sub-optimal [3].

Rural and remote areas of Australia have limited access to ASD services. This is evident from reports [4-6] of families experiencing long waiting times, lack of choice of specialist services and the need to travel long distances. Difficulties in recruiting and retaining skilled and experienced professionals to work in these locations are one of the primary reasons. COVID-19 restrictions

may be creating even longer wait times for families to receive an in-person evaluation as well as follow-up care and intervention.

In many areas of disability services, such as speech pathology and adult autism, telehealth has been employed to reach a wider range of families to provide initial diagnosis and support therapists in delivering interventions. Telehealth is the use of telecommunications and information technology to provide access to health assessment, diagnosis, intervention, consultation, supervision, and information across distance [7].

This short paper outlines the findings of a qualitative literature review conducted on the use of telehealth in child health, focusing on ASD, to help redesign systems that can meet the expected increase in demand for disability services for children on the autism spectrum. Using Boolean search strings (including “and”, “or”, “filename”, “intitle” and “parentheses”) searches were conducted in multiple journals and other sources. Terms applied involved: telehealth, autism spectrum disorders, learning disability, autism, disability, waiting times, waiting list, and children. Manual reviews were also undertaken by following up references provided in relevant papers.

Feasibility and Reliability

Hodge et al. [8] have assessed the feasibility of telehealth to assess cognitive function in children with learning difficulties. Thirty-three children (median age = 9 years and 11 months) were recruited from the New South Wales Centre for Effective Reading, Australia, and assessed for intellectual ability. The intellectual ability index scores obtained by a psychologist sitting face-to-face with the children were compared with those recorded by another psychologist via telehealth using a web-based platform.

The results from the telehealth administration method were comparable to those yielded in the face-to-face method. The Spearman's correlation coefficients (r) showed high associations between the testing methodologies on the intellectual ability indices: verbal comprehension index ($r=0.982$), spatial index ($r=0.994$), fluid reasoning index ($r=0.991$), working memory index ($r=0.981$), processing speed index ($r=0.997$) and full-scale intelligence quotient ($r=0.991$).

Griffith University Autism Centre of Excellence has assessed the reliability and feasibility of telehealth language assessments with primary school-aged children with autism [9]. Clinical Evaluation of Language Fundamentals 4th Edition was used to assess the language skills of 13 children with autism aged 9-12 years who attended mainstream schools or support classes. A speech-language pathologist (SLP) delivered and scored four subtests of the assessment via telehealth from a remote location. A second SLP at the same location as the child co-scored the online subtests to provide a measure of reliability and delivered the remaining subtests. The local SLP completed checklists in both conditions to provide observations regarding behaviour. Parent feedback was elicited via survey.

The interrater reliability between the telehealth and face-to-face conditions was strong, with correlation coefficients ranging from 0.919 to 0.990 across the subtests and Core Language Score. There was good agreement between clinicians on all measures. The Wilcoxon Signed Rank test indicated no significant differences in children's behaviour between the telehealth and face-to-face conditions, although variation between individuals was observed. Parents provided generally positive feedback about the use of telehealth for the assessments.

In a review [10] to allow speech-language pathologists and other service providers to consider applicability of telehealth to their settings, services delivered via telehealth were found to be equivalent to services delivered face-to-face, and superior to comparison groups without telehealth sessions. A range of services were delivered via telehealth, including diagnostic assessments, early intervention, and language therapy.

Effectiveness

Application of telehealth to ASD decreases the time children and families wait to access care, which can lead to earlier initiation of interventions and more consistent therapy over the course of development [6]. Telehealth can provide diagnosis and

treatment options to a wider range of families who live in rural or underserved populations and can be a more cost-effective way to deliver educational and therapeutic intervention compared to in-home therapies. The technology has been shown to be effective in training therapists, teachers, and parents specialised in ASD therapeutic techniques which can be implemented at home and in the community [6].

In September 2015, an online platform trial commenced to deliver interactive group webinars and individualised online support sessions to disability workers providing services to children with ASD in regional, rural, and remote communities across New South Wales [4]. The trial delivered online interactive webinars over a 12-month period, focusing on a range of topics including social skills, sensory processing, and challenging behaviour. The project was open to allied health professionals and assistants, community and disability support workers, aboriginal health workers, early childhood educators, and any other professional who had worked with, or was currently working with children with ASD or with developmental delay aged from birth to eight years. In the 25 months to October 2017, over 150 workers across 22 Local Government Areas registered in the project. The evaluation involved online surveys of 102 participants to measure any changes in the perceived skills, knowledge, and confidence in their work with children and their families, and levels of occupational stress.

The evaluation [4] of the trial showed that the platform provided significant benefits for the workers that will improve their retention in their communities. Eighty-seven per cent of goals set by the clients for the therapy were either achieved or exceeded. Participants reported a significant increase in knowledge, skills, and confidence in their work with children on the ASD and their families after participating in the project, with no significant change in occupational stress. Participants rated the technology platform 'above average' for technology usability and audio quality. The services lowered the burden of travel cost for families and local support teams, enabling them to easily access autism-specific support from the comfort of their homes, offices, and schools.

Autism Queensland introduced an early intervention service in 2015, delivered via remote technology, focusing on parent coaching rather than direct intervention with the child [11]. During face-to-face therapy sessions, therapists often focus on interacting with the young person on the ASD and therefore have less time to spend coaching parents. During videoconferences, therapists can demonstrate actions, share documents, and guide parents in ways to interact with their children.

The evaluation [11] of the program used a generic method of qualitative enquiry, involving semi-structured interviews, to explore the experiences of four parents of children with ASD and eight service providers based in rural settings, and a metropolitan-based ASD-specialist (regarding their participation in remote technology and face-to-face services). Parents, service providers and the ASD-specialist perceived the remote technology to be beneficial in: upskilling of parents and local service provider;

reducing cost, time and travel; providing flexible, regular, ongoing support; enabling families to access support from home; and enhancing connections between team members. Both the family members and individuals on the spectrum reported high levels of satisfaction with the telehealth services. Parents noted it was easier to learn specific techniques during videoconferences, which assisted them to be more effective in supporting their children at homes. Both the family members and individuals on the spectrum reported high levels of satisfaction, and appreciated being able to access online therapy:

"She was helping me write some stories... she'd bring up on the screen, how to make a story for "Kohen" (not real name) and I learnt how to do that by watching her... Most people when they try and show you something, they do it, and then you think "Oh, how did she do that?" Whereas, I was watching and taking notes of what she was doing... We did two together and she asked me to make one [11]."

"It's the comfort I think, the comfort of the house. If I take Danny (not real name) somewhere, into a "therapy centre", it echoes. He screams the whole time, just listening to his echo. Whereas here, we could talk, and he was alright, because he was still in his own house... if he needed me, I could just duck off and fix him up [11]."

While the benefits were substantial, the participants were often frustrated by technical difficulties. All agreed that remote technology should augment rather than replace face-to-face contact.

In the United States, telehealth was introduced to train parents of children with ASD to implement applied behaviour analysis (ABA). Lindgren et al. [12] determined whether the intervention can successfully treat at lower cost the challenging behaviour in young children with autism and other developmental disabilities. They compared data on the outcomes and costs using three service delivery models: in-home therapy, clinic-based telehealth, and home-based telehealth. Participants were 107 young children (aged 21 – 84 months, mean = 49.9 months) diagnosed with autism or other neurodevelopmental disorders.

Group 1 included children with ASD (n=16) or other developmental disabilities (n=36) who were treated in their homes by behaviour consultants between 1996 and 2009. The consultants trained the child's parents to conduct functional analysis (FA) and functional communication training (FCT) to replace problem behaviour with appropriate social communication. Group 2 comprised children with confirmed ASD (n=23) who were treated in 2009 to 2012 as part of a study to train parents to conduct FA and FCT when coached via telehealth at a regional clinic near their home. Group 3 included children with ASD (n=32) who were treated in 2012 to 2014 as part of a randomised controlled trial of FCT treatment conducted by parents who received telehealth coaching at home. Lindgren et al. [12] analysed data on the 94 children who completed treatment. Costs were based on the number of weekly visits needed to complete FA and FCT multiplied by the costs per child per week in each of the three models. All 3 service delivery

models demonstrated successful reductions of problem behaviour by training parents to conduct FA and FCT. The mean percentage reduction in problem behaviour was >90% in all 3 groups after treatment. Treatment acceptability based on parent ratings was high for all groups. Average weekly treatment costs per child were lowest for home telehealth (\$155), compared with clinic telehealth (\$218) and in-home therapy (\$275). Both telehealth models were significantly less costly than in-home therapy.

In Ontario, Canada, a hybrid telehealth program, combining self-directed internet-based instruction with remote coaching, was created in 2014 to introduce parents of children with ASD to Reciprocal Imitation Training (RIT). Wainer et al. [13] used a single-subject multiple-baseline design to evaluate the effect of the intervention on changes in parent and child behaviour. Five young children and their parents participated in the evaluation, based on: (a) children between the ages of 24-72 months, (b) a diagnosis of ASD by an independent licensed professional in the families' community, (c) internet access in the families' homes throughout the duration of the study, (d) no previous participation in a formal parent training study, (e) the same parent available for all baseline, data collection, and coaching sessions, and (f) parent reports of deficits in social imitation skills.

Wainer et al. [13] showed that parents improved in their use of the intervention techniques and their children demonstrated concurrent increases in spontaneous imitation skills. Parents indicated that the intervention and telehealth service delivery model were acceptable, useable, and effective. The computed Cohen's d (1.04) suggested a strong effect in the change from participant scores on the RIT knowledge from the start ($m = 11.60$, $sd = 3.78$) to the completion ($m = 15.20$, $sd = 3.11$) of the self-directed portion of telehealth program. This analysis indicates that a hybrid telehealth program for disseminating training in a naturalistic imitation intervention to parents of young children with ASD is effective and increases access to interventions for those on lengthy waitlists or living in areas with limited services.

Conclusion

Evidence from the review indicates that telehealth can be an alternative to face-to-face cognitive assessment. Telehealth may present a feasible and reliable approach to the assessment of language for children with autism spectrum disorders in some circumstances as a primary or adjunct service model. Parents can use Applied Behaviour Analysis procedures to successfully treat autism spectrum disorders-associated behaviour problems, regardless of whether treatment is directed by behaviour consultants in person or via remote video coaching. Telehealth is generally received well from those who receive training and treatment, decreases the need to miss school or work, and limits transportation requirement for families without transportation or for individuals with ASD who have difficulty with transition. Further, there is potential for multiple specialty providers to work with an individual, providing a greater level of interprofessional care and collaboration.

The evidence also suggests that a broader range of cognitive tests and wider range of clinical populations is essential. When planning both assessment and intervention via telehealth, it is vital to consider and acknowledge individual differences among the children. Key limitations of telehealth include possible risk to maintaining privacy and confidentiality, difficulty providing supplementary written materials to families, potential for technical issues, potential problems in establishing rapport and trust with families, and difficulty detecting more subtle presentations of ASD. Further research is required particularly regarding the use of telehealth directly with children with ASD.

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