The following information resources have been selected by the National Health Library and Knowledge Service Evidence Virtual Team in response to your question. In respect of the evolving global situation and rapidly changing evidence base, it is advised to use hyperlinked sources in this document to ensure that the information you are disseminating to the public or applying in clinical practice is the most current, valid and accurate. For further information on the methodology used in the compilation of this document—including a complete list of sources consulted—please see our National Health Library and Knowledge Service Summary of Evidence Protocol.

YOUR QUESTION

Using digital and assistive technologies to deliver services to people with a disability.

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IRISH AND INTERNATIONAL GUIDANCE

World Health Organization


The second objective of the action plan is to strengthen and extend rehabilitation, habilitation, assistive technology, assistance and support services, and community-based rehabilitation.

Health Service Executive (2020) Telepractice: a practical guide for Children’s Disability Teams

Telepractice refers to the use of technology to deliver services and supports at a distance. Methods of delivering telepractice may include, but are not limited to, email, telephone, videoconferencing and pre-recorded materials. Evidence tells us that telepractice can support family-centred approaches consistent with best practice. Using telepractice, children’s disability teams can deliver services in the child’s natural environment, such as the family home, and parents are supported to take the lead with their child. Telepractice services should be equivalent in quality to those delivered in-person, not considered as a ‘Plan B’, but seen as one of the ‘Plan A’ options for children’s disability services.

There will of course be occasions when face to face intervention is essential. Many different approaches to supporting children and families can be delivered through telepractice: individual therapy support, groups for children and for teenagers, parent support groups, parent skills development, siblings groups and much more. It can also be used for team meetings or meetings with other services. Information sessions for parents can be delivered by webinar, either live or recorded to be viewed at a time to suit the family. Children's disability teams continually demonstrate their flexibility and innovation. They will embrace the endless possibilities telepractice offers.

National Disability Authority

National Disability Authority (2018) Effective implementation and monitoring of telehealth and telecare in Ireland: learning from international best practice

“This paper aims to understand how current systems, services and structures of telehealth/telecare provision in other jurisdictions can be
applied to Ireland; 2. incorporate issues and evidence from the universal design perspective on TH/TC. Using the information from the earlier research phases, the systems in place in three jurisdictions were examined: Northern Ireland, Scotland and Spain.

The review of these jurisdictions looked at:

1. Where telehealth/telecare systems sit within the structure of health and social care.
2. How policy influences the development of these systems.
3. How roles and responsibilities are shared.
5. Costs relating to these services.

Northern Ireland – a telehealth system that was contracted to a consortium of private organisations over a period of six years, providing telemonitoring services across the country. Both in operation and procurement, it offers interesting lessons — for instance, the relationship between the national healthcare staff and these private providers, and how Ireland might use the competitive dialogue tendering process if seeking telehealth / telecare services on the open market. Northern Ireland also has a relatively separate telecare system which is provided by private organisations and evolved from the housing sector.

Scotland – an example of policy-driven development (top down) in telehealth and telecare where smaller-scale initiatives are being trialled and scaled up with a view to being implemented nationally. Many initiatives have been built on existing structures, for instance the Community Alarm scheme. Scotland also offers interesting evidence on the use of co-production in the design of services which is named as a key element in their strategy.

Spain – a well-established system of telecare is in place nationally and is mainly administered and funded through the regional / municipal authorities. Telecare is provided for in the country’s Dependency Law, while standards for setting up and operating telecare services are explicitly outlined (Normas Generales Del Servicio De Teleasistencia Domiciliaria and UNE 158401). Standards also include some design requirements for devices. This strong regulatory and standards environment offers interesting insight,“

University of Sydney (2020) Telepractice for children with complex disability Guidelines for quality allied health services

Telepractice is the delivery of assessment and therapy services at a distance by linking clinicians to clients, carers, or others, via technology such as web-
based videoconferencing. Telepractice delivery of therapy services to children with complex disability is consistent with the principles of choice and control which underpin contemporary disability services. People with disability have the right to make choices about their life, including the services they receive. Yet, the reality is that in many parts of rural and remote Australia, there are not disability services and supports available from which to choose. Telepractice has the potential to provide people with real choices, regardless of where they or their preferred AHPs are located. Telepractice guidelines in allied health rightly insist that telepractice services should be equivalent in quality to those delivered in-person (Speech Pathology Australia, 2014). Therefore, telepractice services should not simply be an option of last resort, but should be a quality option for disability services. As a first step towards exploring this issue, we conducted a research study funded by the auDA Foundation in 2016-17, and in partnership with Therapy Connect, a private allied health practice. We collected information about the allied health telepractice services received by four children with complex disabilities and their families living in rural or remote Australia. We found that AHPs, despite being geographically remote from children and families, could deliver services consistent with contemporary practice and supported children to achieve positive, functional outcomes. We identified the essential components of successful telepractice models needed to achieve real outcomes for children with disabilities. Key learnings from this research informed the development of guidelines for telepractice delivery of allied health services to children with complex disability. Quotes from parents and AHPs interviewed as part of this research are included to illustrate each point.

INTERNATIONAL LITERATURE

GENERAL


Existing studies have demonstrated that people with disabilities (PwD) face a range of technological and behavioural barriers to successful adoption of information and communication technology (ICT)-enabled health services. However, there has been little examination and no scholarly consensus on the relative impact of each factor. This study investigates the determinants
of ICT usage for health care among PwD. Using national-level disability survey data in Australia, several multivariate hierarchical regression models are deployed to predict the relationship between ICT-enabled health service adoption and the explanatory variables. In addition, several measures of the overall goodness-of-fit are estimated for each model. The results indicate that age, gender, income, level of education, language proficiency and geographical remoteness are significant predictors of ICT-enabled health care usage among PwD. It is also found that technological constraints have a stronger moderating effect than behavioural factors. This provides valuable insight for policymakers and private organisations on which approaches and interventions are most likely to narrow the digital disability divide.


COVID-19 pandemic has forced a rapid adoption of telemedicine over traditional in-person visits due to social restrictions. While telemedicine improves access and reduces barriers to healthcare access for many, several barriers and challenges remain for persons with disabilities, and novel challenges have been exposed, many of which may persist long-term. The challenges and barriers that need to be systematically addressed include: Infrastructure and access barriers, operational challenges, regulatory barriers, communication barriers and legislative barriers. Persons with disabilities are a vulnerable population and little attention has been placed on their healthcare access during the pandemic. Access and communication during a healthcare encounter are important mediators of outcomes for persons with disabilities. Significant, long-term changes in technological, regulatory, and legislative infrastructure and custom solutions to unique patient and health system needs are required to address these barriers going forward in order to improve healthcare access and outcomes for persons with disabilities.

Layton et al (2020) Assistive technology as a pillar of universal health coverage: qualitative analysis of stakeholder responses to the world health assembly resolution on assistive technology

Purpose: The importance of assistive technology (AT) as a pillar of universal health coverage was recognized at the 71st World Health Assembly (WHA) through the passing of Resolution 71.8 on improving access to AT (May 2018). A systematic analysis was conducted on the responses made to the
Resolution by Member States and non-state actors, in order to provide a snapshot of global intent.

Methods: Qualitative content analysis was conducted on over 40 written "Statements" made by Member States and non-state actors in response to Resolution 71.8.

Results: The Resolution provides tangible guidance to the World Health Organisation (WHO) and its member states in order for them to meet commitments within the Convention on the Rights of Persons with Disabilities (CRPD). Statements made in response to the Resolution offer a unique plethora of multi-stakeholder views from differing global perspectives. Analysis identified a range of themes within two overarching themes: intersection of health, human rights and sustainable development; and international collaboration and support within an international agenda framework.

Conclusion: The content analysis synthesises complex global data and identifies directions to positively influence national and regional AT policy and delivery. The complexity of factors demonstrates the importance of an AT systems-thinking approach; that is, the development and application of organised knowledge, skills, procedures and policies related to assistive products. AT systems thinking will be essential for AT to be effectively deployed as a pillar of universal health coverage. Assistive technology is a key facilitator of health and well-being, playing a critical role in global efforts to improve population health outcomes and strengthening health systems.


The use of telehealth technologies to provide clinical services to families of children with autism and other developmental disabilities is a rapidly growing area of research. In particular, remote training of caregivers via video conferencing appears to be a promising approach for disseminating behaviour-analytic interventions. Although remote training offers a number of advantages, it brings a variety of challenges that are unique to this modality. The field would benefit from information on problems that practitioners may encounter when providing these services and how to train caregivers effectively. This paper reports on the experiences of 18 practitioners who provided caregiver training via telehealth from four different sites across a 4-year period. The authors describe a variety of technical and clinical issues that arose during service delivery, suggest strategies for preventing and remediating problems, and include case
descriptions and data to illustrate their experiences. This information may help prepare practitioners to deliver telehealth services and guide further research in this area.


As the world navigates the COVID-19 health crisis, behavior analysts are considering how best to support families while maintaining services and ensuring the health and safety of everyone involved. Telehealth is one service delivery option that provides families with access to care in their own communities and homes. In this article, we provide a brief summary of the telehealth literature in applied behavior analysis that provided coaching and training to families for individuals who displayed challenging behavior. These studies targeted functional assessment and function-based treatment for challenging behavior. We briefly summarize what is known relative to the assessment and treatment of challenging behavior via telehealth, place these results within a descriptive context of the decisions made by the research team at the University of Iowa, and discuss what we, as behavior analysts, should consider next to advance our understanding and practice of telehealth.

**Widehammar et al (2020) Attitudes is the most important environmental factor for use of powered mobility devices - users' perspectives**

Introduction: Different factors in the environment influence the use of powered wheelchairs or powered scooters, i.e. powered mobility devices (PMDs), but there is limited knowledge about how these factors interact and if any factor has a greater impact. According to the ICF the environment consists of five areas.

Aim: To describe users' experiences of how environmental factors from all ICF areas influence the use of PMDs.

Methods: Descriptive qualitative design including 14 interviews with PMD users, analyzed using inductive qualitative content analysis.

Findings: Use of PMDs means a conditional freedom depending on the interaction of several environmental factors. Regardless of environmental factor the societal attitudes were always present, directly or indirectly, and influenced the participants' feeling of being included and involved in society. The environmental factors and how they influence PMD use are described in four categories, comprising the following subjects: societal attitudes, the
service delivery process, accessibility to the physical environment and financial resources.
Conclusion: The findings show that societal attitudes influence all other factors, directly by others' people's attitudes, or indirectly by how legislation and guidelines are formulated, interpreted and applied. Therefore, a change of societal attitudes seems necessary to increase accessibility and participation for PMD users.


Background and Purpose: The increase in use of everyday information and communication technologies can lead to the need for health professionals to incorporate technology use competencies in practice. Information and communication technologies has the potential to improve participation in daily life among people with disability. The aim was to review and describe evidence of the use of information and communication technology, including mobile technology, for improving participation in everyday life. A secondary aim was to describe how study outcomes were related to participation.

Materials and Methods: A scoping review methodology was used to identify studies through databases as MEDLINE, CINAHL, Cochrane Library. Thereafter, the studies were screened and assessed for inclusion.

Results: Eleven studies were included. The most commonly used technology were videoconferencing and the telephone. Ten of the 11 studies reported a change in participation in everyday life. Participation was mainly described as involvement in a life situation or related to activities of daily living.

Conclusion: Delivering an intervention to improve participation through information and communication technology can be a valid option in rehabilitation. There is a need to measure and describe the intervention and its outcomes in relation to a definition of participation in future studies.

IMPLICATIONS FOR REHABILITATION The use of an information and communication technology application seems to be as good as the face-to-face intervention. There is a need for defining the concept of participation related to outcome measures in future studies.


Privacy has been identified as a primary concern among stakeholders—ie service recipients, advocates, administrators, family—when using
technology to provide residential services to individuals in need. This paper summarizes a study that distributed a survey to agencies that provide services and resources to people with various types of disabilities across the United States. The results led to several recommendations about how smart-home service providers can use technology in a way that promotes client privacy. In addition, we make several suggestions for how remote staff—individuals monitoring the information gathered by technology—can assist in the process of ensuring client privacy.


Purpose: This scoping review synthesizes research on the effects and processes of telehealth wheelchair and seating assessment and the perceptions of wheelchair users and healthcare providers of telehealth use for this purpose.

Materials and Methods: A systematic search and scoping review of peer-reviewed publications and theses was undertaken on telehealth AND wheelchair assessment. Five databases were searched. Data extraction and synthesis followed the process outlined by Arksey and O’Malley for scoping reviews.

Results: From an initial 1801 publications, nine studies published in 13 documents met the inclusion criteria. Study quality and study design varied considerably. The effect of telehealth compared to in-person assessment was insignificant (n = 2) indicating equivocal effectiveness. Telehealth assessment improved accessibility for some wheelchair users (n = 1). However, the process of telehealth that was applied to wheelchair assessment was inadequately described in all studies. It appeared that each stakeholder group appraised telehealth based on different criteria including accessibility, professional supportiveness and technical accuracy. No studies examined funder views.

Conclusions: Preliminary research suggests telehealth wheelchair assessment may be as effective as in-person assessment, is viewed favorably by wheelchair users and nonspecialist assessors, while expert assessors have some hesitations. However the strength of evidence is weak indicating the need for further research.

Implications for Rehabilitation: Telehealth assessment of wheelchair and seating needs has the potential to improve access and equity in provision of rehabilitation. Telehealth wheelchair and seating assessments are appraised positively by consumers and non-specialist assessors, but with
caution by specialist assessors. Advances in the description of wheelchair and seating assessment protocols are needed to more accurately determine equivalence between tele- and in-person assessment. High levels of engagement across all stakeholder groups are necessary to ensure optimal service delivery of telehealth wheelchair and seating assessment.


The provision of individualised treatment and care from health care services to patients with chronic conditions and multi-morbidities is under pressure because of an increasing elderly population. There is a need for services that are: 1 person-centred, 2 integrated and 3 proactive, and supported by digital technology. The research project 3P-Patients and Professionals in Productive Teams aims to study different patient-centred teamwork models in Norway and Denmark. This paper presents a study on patients' experiences and digital involvement in patient-centred care teams. Qualitative research methods were applied with interviews and demonstrations of technology use made at patient's homes. The results showed that the patients were satisfied with the patient-centred service models and had an increased feeling of safety. A constraint was information sharing between the patient-centred health care team and the patients. Most of them did not have access to read own medical information and mainly verbal information was shared between the patients and the health providers.


Background: People with disabilities need rehabilitation interventions to improve their physical functioning, mental status, and quality of life. Many rehabilitation interventions can be delivered electronically via telehealth systems. For people with disabilities in underserved areas, electronically delivered rehabilitation interventions may be the only feasible service available for them.

Objective: The objective of this study was to evaluate the current status of digital interventions for people with disabilities in remote and underserved areas.

Methods: A systematic review was conducted on this topic. Keyword searches in multiple databases (PubMed, CINAHL, and Inspec) were performed to collect articles published in this field. The obtained articles
were selected based on our selection criteria. Of the 198 identified articles, 16 duplicates were removed. After a review of the titles and abstracts of the remaining articles, 165 were determined to be irrelevant to this study and were therefore removed. The full texts of the remaining 17 articles were reviewed, and 6 of these articles were removed as being irrelevant to this study. The 11 articles remaining were discussed and summarized by 2 reviewers. Results: These 11 studies cover a few types of disabilities, such as developmental disabilities and mobility impairments as well as several types of disability-causing disorders such as stroke, multiple sclerosis, traumatic brain injury, and facio-scapulo-humeral muscular dystrophy. Most of these studies were small-scale case studies and relatively larger-scale cohort studies; the project evaluation methods were mainly pre-post comparison, questionnaires, and interviews. A few studies also performed objective assessment of functional improvement. The intervention technology was mainly videoconferencing. Moreover, 10 of these studies were for people with disabilities in rural areas and 1 was for people in urban communities. Conclusions: A small number of small-scale studies have been conducted on digital interventions for people with disabilities in underserved areas.

Gardner et al (2016) Perspectives of rural carers on benefits and barriers of receiving occupational therapy via Information and Communication Technologies

Introduction: People with a disability living in rural areas commonly experience difficulty in accessing therapy services. Information and Communication Technologies (ICT) may have the potential to provide occupational therapy services remotely through two-way visual interactions. The aim of this qualitative study was to understand the perspectives of carers of a person with a disability living in rural New South Wales (NSW) on the use of ICT for occupational therapy service delivery. Methods: Individual semi-structured telephone interviews were conducted with 11 carers of persons with a disability living in rural NSW. Participants were asked about their use of technology, therapy experiences and their attitudes towards using ICT to receive occupational therapy for their son/daughter. Data were analysed via constant comparison and thematic analysis. Results: Participants were willing to use ICT to enhance their current access to therapy based on their in-depth knowledge of their son or daughter and their prior experiences with therapy and technology. For ICT to work for
occupational therapy, participants identified the need for support and access prior to, during and between ICT sessions.

Conclusion: From the carers’ perspectives, ICT has the potential to increase access to occupational therapy services for people with a disability who live in rural NSW. Occupational therapists could benefit from eliciting the experiences, knowledge and willingness of rural carers to deliver therapy via ICT, thereby supplementing and enhancing in-person service delivery.

**Draper H et al (2013) Telecare, remote monitoring and care**

Telecare is often regarded as a win/win solution to the growing problem of meeting the care needs of an ageing population. In this paper we call attention to some of the ways in which telecare is not a win/win solution but rather aggravates many of the long-standing ethical tensions that surround the care of the elderly. It may reduce the call on carers’ time and energy by automating some aspects of care, particularly daily monitoring. This can release carers for other caring activities. On the other hand, remote and impersonal monitoring seems to fall short of providing care. Monitoring may be used to help elderly users retain independence. But it may also increase the amount of information which flows from users to carers, which can result in a form of function-creep that actually undermines independence.

**Forducey (2012) Telehealth for persons with severe functional disabilities and their caregivers: facilitating self-care management in the home setting**

Persons with severe functional disabilities are the highest users of health care services. Caring for the needs of this population represents a significant percentage of our national health care costs. A growing body of research has demonstrated the efficacy of self-management strategies and caregiver engagement for effective long-term care for individuals with chronic medical conditions. Economic forces over the past decade have led to new challenges and resulted in major changes in health care delivery resulting in shortened length of inpatient stays and greater limits on the length of outpatient treatment. Telehealth is an innovative method for health care delivery and a means of meeting this new challenge. This article highlights the findings of 3 pilot studies on the use of telecommunications technologies in promoting self-care management and enhancing health care outcomes in persons with severe disabilities and their family caregivers. The importance of matching technology to the needs of this population, lessons learned from these investigations, and future directions for research are addressed.
INTELLECTUAL DISABILITIES

**Pellegrino et al (2020) Using telehealth to teach valued skills to adults with intellectual and developmental disabilities**¹⁹
Telehealth uses electronic information and telecommunication technologies to deliver long-distance clinical services. It has successfully been used by clinical professionals to teach family and staff members to provide evidence-based assessment and treatment procedures. There is no research to date, however, evaluating the use of telehealth to directly teach individuals with intellectual and developmental disabilities (IDD). Thus, we evaluated the efficacy of a telehealth intervention using total task chaining with least-to-most prompting delivered via videoconference to 2 adults with IDD. Both participants demonstrated low independent responding during baseline with enhanced written instructions present. During intervention, which included vocal and model prompting, both participants met the mastery criterion for each skill in fewer than 15 sessions, which maintained after 2 weeks. Finally, both participants expressed satisfaction with the goals, procedures, and effects of the intervention. We discuss the broader scope of the intervention for individuals with disabilities when face-to-face services may not be feasible.

**Spivack (2020) Teledentistry: remote observation of patients with special needs**²⁰
While telemedicine has been adopted and is used increasingly in patient care, the dental profession is still in the relatively early stages of utilizing technology in similar ways. The number of patients with intellectual and developmental disabilities is increasing in number and complexity, calling for new approaches to assist with access to care. The current article outlines the benefits of new technology in the evaluation of all patients but particularly the more complex population that has been diagnosed with a disability. Three case examples illustrate the value of technology in remote patient observation and offer ideas for use and further research.

**Tassé et al (2020) Using technology and remote support services to promote independent living of adults with intellectual disability and related developmental disabilities**²¹
Background: The use of remote support technologies is a newer form of service that can contribute to increased independence while giving adults...
with intellectual and developmental disabilities a sense of home safety. This research reviewed the use of remote support services, which is a waiver service that includes smart home technologies and remote support staff that can be called upon, when needed.

Method: Using focus groups and telephone interviews, the present authors asked users of remote support services about their experience, including what they liked most and least about their experience with these technologies.

Results: Overall, increased independence and a sense of security and home safety were identified as the two principal benefits. Remote support technologies may be a part of the solution to addressing the lack of direct support professionals available to provide in-home care.

Conclusions: The present authors discuss the benefits of remote support technologies and offer recommendations for future research regarding remote support technologies and the potential benefits of this newer form of support service.

Bramley (2019) Using telemonitoring to support personal care planning for adults with learning disabilities

Introduction: We report on an evaluation of the Just Right approach for planning care for adults with learning disabilities and how it can support culture change. Just Right combines installing a telemonitoring system with training for care managers in person-centred care planning and the interpretation of charts that summarise activity data for their setting. By providing insights into the needs of individuals Just Right allows existing care provision to be reviewed to ensure it is 'just right'. The Just Right approach can also potentially identify over-care and resources that can released.

Methods: A mixed-methods approach was used, triangulating qualitative and quantitative baseline and follow-up data. Qualitative data were collected before and after implementation from focus groups on barriers, enablers, success outcomes and impacts. A theory of change was developed. Detailed data on individual adults with learning disabilities were collected before and after installation of equipment using a linked online survey completed by their care managers.

Results: Nine commissioning local authorities were recruited with 33 care providers serving 417 adults with learning disabilities. Issues relating to implementation included staff acceptance, culture, consent, safeguarding, local authority engagement, interpretation of data and residential setting. Changes to care were identified for 20.3% of individuals, with 66% of
providers not identifying any changes because Just Right confirmed that they were providing the right level of support.

Discussion: By combining telemonitoring and person-centred care planning, Just Right provides a holistic approach and necessary information for conversations amongst stakeholders about the care needs of adults with learning disabilities. Depending on how it is introduced, and the nature of conversations held, the Just Right approach can potentially change culture, leading to improved outcomes.

**Guerra et al (2019) Feedback and Strategies From People With Intellectual Disability Completing a Personalized Online Weight Loss Intervention: A Qualitative Analysis**

Coaching log notes for 15 participants from a 24-week blended online and telehealth randomized controlled trial were analyzed using thematic analysis and analyst triangulation to determine the factors that facilitated participant adherence to weight loss strategies, use of technology, and motivational interviewing. Several participants reported that restricting processed carbohydrates, limiting portion size, and maintaining healthy substitutions were effective nutritional strategies. Participants were less successful with adherence to their exercise goals, often due to time constraints and a lack of support. Results suggested consistent caregiver support improved participants’ adherence to weight loss strategies and use of technology. Future programs should address obesity among people with intellectual and developmental disabilities by offering a range of interventions that are customized to their specific weight loss needs.

**Lee et al (2019) Family carers’ experiences of participating in a weight management programme for overweight children and adolescents with intellectual disabilities: An exploratory study**

Aim: To gain insight into the experiences of family carers participating in a weight management programme via mHealth tools for overweight children and adolescents with intellectual disabilities.

Background: Many weight reduction programs fail to show positive and sustainable impacts due to not involving parents, who are usually unavailable to attend school-based health programs. The mHealth interactive interventions were carried out in September 2015–August 2016, engaging carers to monitor and sustain their children’s healthy lifestyle behaviours at home being one way to achieve this.
Design: Qualitative research design to conduct focus group discussion with family carers involved in a school-based weight management programme via the mHealth interventions.

Methods: An exploratory study was used to examine family carers’ views of participating in a weight management programme. Focus group interviews examined the in-depth experiences of 20 family carers in providing social support and monitoring lifestyle behaviours via the mHealth interactive interventions.

Results: Twenty family carers were recruited and four themes emerged: (a) improving family carer-child interactions and communications; (b) gaining useful and practical health information from experts; (c) supporting each other via an mHealth platform; and (d) appreciating the collaborative effort between school personnel and family carers. Family carers stressed the usefulness of the mHealth interactive interventions in monitoring and sustaining the children’s healthy lifestyle behaviours at home.

Conclusion: The mHealth interactive interventions for increasing family carers’ involvement and monitoring were well received. The findings provide new insights into using mHealth interventions in future weight management programmes involving parental participation in the home environment.

Martens (2019) Agreement Between Structured Descriptive Assessments and Functional Analyses Conducted Over a Telehealth System

This study examined whether experimental functional analyses (FAs) conducted by parents at home with coaching via telehealth would produce differentiated results, and compared these results to the functions identified from structured descriptive assessments (SDAs) also conducted by parents at home via telehealth. Four boys between the ages of 4- and 8-years old with intellectual and developmental disabilities and their parents participated. All assessments were conducted in the children’s homes with their parents serving as intervention agents and with coaching from remote behavior therapists using videoconferencing technology. Parent-implemented FAs produced differentiated results for all 4 children in the study. Overall, analyzing antecedent-behavior (A-B) and behavior-consequence (B-C) relations from the SDA videos identified only half of the functions identified by the FAs. For children whose SDA results were differentiated, analyzing A-B relations correctly identified 4 of 5 functions. Analyzing B-C relations correctly identified 5 of 6 functions identified by the experimental FA, but overidentified attention for all children. Implications for
conducting functional analyses and interpreting structured descriptive assessment via telehealth are discussed.


Introduction: Individuals with Intellectual and Developmental Disabilities (IDD) experience broad impairments that affect their functional performance and consequently result in the need for supervision and assistance on a daily basis. The literature contains effectiveness studies of functional interventions provided to adolescents and adults with IDD. However, existing differences in participant characteristics, study design, and type of functional intervention limit the ability to derive clinical evidence-based decisions. This scoping review sought to explore the breadth and depth of evidence related to interventions designed to promote everyday performance of adolescents and adults with IDD.

Methods: We conducted an electronic and hand search that yielded 1568 papers, after an extensive selection process reduced to a sample of 24 studies.

Results: A three-step extraction process of the 24 studies revealed 16 studies used functional training and technology-based approaches to teach individuals with IDD functional skills. Seven studies used functional training without a technology component, and two studies used functional training while comparing technology-based to non-technology based approaches. Overall, it appeared that functional training with the use of technology, especially Video Modelling (VM) and Prompting, were the most frequently and effectively used interventions to promote everyday performance. Gaps in research include limited studies on middle and older aged adults with moderate to severe IDD, minimal use of self-chosen goals or activities and use of technology as a continuous support.

Conclusion: Our findings show a lack of studies for individuals age 30 and above with severe IDD. Additionally, this scoping review highlight that everyday functional performance of adolescents and adults with IDD can be enhanced with the usage of technology based functional interventions utilising VM and prompting methods.
Sheehan (2017). Digital mental health and intellectual disabilities: state of the evidence and future directions\textsuperscript{27}

The use of digital technologies in the management of mental illness, and more generally in the promotion of well-being and mental health, has received much recent attention and is a focus of current health policy. We conducted a narrative review to explore the opportunities and risks of digital technologies in mental healthcare specifically for people with intellectual disability, a sometimes marginalised and socially excluded group. The scope of digital mental health is vast and the promise of cheaper and more effective interventions delivered digitally is attractive. People with intellectual disability experience high rates of mental illness and could benefit from the development of novel therapies, yet seem to have been relatively neglected in the discourse around digital mental health and are often excluded from the development and implementation of new interventions. People with intellectual disability encounter several barriers to fully embracing digital technology, which may be overcome with appropriate support and adaptations. A small, but growing, literature attests to the value of incorporating digital technologies into the lives of people with intellectual disability, not only for promoting health but also for enhancing educational, vocational and leisure opportunities. Clearly further evidence is needed to establish the safety and clinical efficacy of digital mental health interventions for people with and without intellectual disability. A digital inclusion strategy that explicitly addresses the needs of people with intellectual disability would ensure that all can share the benefits of the digital world.

Perry et al (2012) Targeted support and telecare in staffed housing for people with intellectual disabilities: impact on staffing levels and objective lifestyle indicators\textsuperscript{28}

Background: Increased provision of out-of-family residential support is required because of demographic changes within the intellectual disabilities population. Residential support now has to be provided in a climate requiring both financial constraint and high quality service outcomes. The aim was to evaluate the quality of life consequences of living with less intensive staff support, resulting from the introduction of more targeted staff allocation coupled with telecare.

Methods: The study comprised 91 participants who lived in 33 settings. The targeted support/telecare intervention was implemented at staggered intervals in 25 of these settings (63 participants). Data on a range of
participant and setting descriptors, quality of care, and a range of objective lifestyle indicators were collected at four points in time over 2 years. Impact of the intervention was evaluated using within-group comparisons over time.
Results: Comparison between pre- and post-intervention showed that staffing levels were significantly reduced by 23%, whereas they were constant in the absence of intervention. One health indicator improved in the absence of intervention and another improved following intervention. There were no significant changes in any other lifestyle indicators (safety, money, social and community activity, independence or choice).
Conclusions: A combination of targeted support and telecare had no adverse short-term effect on participants' quality of life, but reduced staff input so it seems that they have a role to play in the strategic development of out-of-family placements for adults with intellectual disabilities. Further research is needed to explore in more detail how efficiency is achieved in practice.

Taber-Doughty et al (2010). Standard care and telecare services: comparing the effectiveness of two service systems with consumers with intellectual disabilities

Background: Onsite standard care and remote telecare supports were provided to adults with intellectual disabilities living in integrated community settings and evaluated in terms of effectiveness as consumers completed a series of novel household activities.
Methods: Using an alternating treatment design with baseline and follow-up conditions in this single-case study, investigators compared the prompting effectiveness provided by onsite standard care staff and a remote telecare provider.
Results: While both types of supports resulted in consumers completing tasks, results indicated consumers achieved slightly more independence when prompted by the telecare support provider. Additionally, telecare supports resulted in greater duration for task completion per consumer.
Conclusions: Although consumers completed tasks with greater independence using telecare supports, caution should be used when interpreting results due to the small number of participants. The potential for this technology certainly exists in supporting consumers in their own homes thus, suggestions for future investigations are provided.
CHILDREN

Boutain et al. (2020) Evaluation of a telehealth parent training program in teaching self-care skills to children with autism

The present study used synchronous video conferencing to remotely deliver a behavioral skills training-based (BST) parent training program to 3 parents of children with autism in the family home. Parents were taught to implement graduated guidance to teach their children several important self-care skills. Parents did not correctly implement graduated guidance after receiving detailed written instructions only. After parents received the BST parent training package, however, all parents implemented graduated guidance with near-perfect levels of fidelity, and all children completed the targeted self-care skills with substantially higher levels of accuracy and independence. Furthermore, parents reported high levels of satisfaction with graduated guidance, the telehealth BST training package, and their children's ability to complete self-care skills.

McCarthy (2020) Comparison of Caregiver Engagement in Telepractice and In-person Family-Centered Early Intervention

Telepractice—specifically, the use of high-speed internet and interactive videoconferencing technology to deliver real-time audio and video communications between the family and the practitioner—is gaining acceptance as an alternative means of providing family-centered early intervention to families of children who are deaf and hard of hearing. This study examined whether caregivers' reported perceptions of self-efficacy and involvement differed when early intervention was delivered in-person and through telepractice. The Scale of Parental Involvement and Self-Efficacy (SPISE) was used to evaluate perceptions of two groups of caregivers: one that received early intervention in-person (n = 100) and a group who received services through telepractice (n = 41). Results indicated that mode of delivery of services was not related to caregivers' perceptions of their self-efficacy or involvement. Further analysis revealed that although certain caregiver or child characteristics did influence some aspects of caregivers' beliefs about their self-efficacy or involvement, the effect of those variables was similar across both modes of delivery.
Wingo et al (2020) Lessons learned from a blended telephone/e-health platform for caregivers in promoting physical activity and nutrition in children with a mobility disability

Background: Children with physical disabilities report higher rates of sedentary lifestyle and unhealthy dietary patterns than non-disabled peers. These behaviors can increase comorbidities, caregiver burden, and healthcare costs. Innovative interventions are needed to assist caregivers of children with physical disabilities improve health behaviours.

Objective: The purpose of this pilot study was to test the usability and preliminary efficacy of an e-health and telecoaching intervention compared to telecoaching alone.

Methods: Parent/child dyads (n = 65) were randomized into either the e-health and telephone group (e-HT) or the telephone only group (TO). All participants received regular calls from a telecoach, and the e-HT group received access to a website with personalized weekly goals for diet and physical activity, and access to resources to meet these goals. At the conclusion of the intervention, participants in the e-HT group were asked to complete a semi-structured interview to discuss the usability of the e-health platform.

Results: Fifty of the 65 randomized dyads (77%) completed all baseline measures and had at least one intervention call. Forty families (80% of those that started the intervention) completed the study (50% spina bifida, 24% mobility limitation, diagnosis not reported). Age of the children ranged from 6 to 17 years old. Both groups had high adherence to scheduled phone calls (e-HT (n = 17): 81%, TO (n = 23): 86%); however no significant differences in dietary intake or physical activity were seen within or between groups. Primary themes to emerge from qualitative interviewers were: the platform should target children rather than parents, parents valued the calls more than the website, and schools need to be involved in interventions.

Conclusions: E-health interventions are a promising way to promote healthy behaviors in children with physical disability, but technology must be balanced with ease of use for parents while also engaging the child.


Purpose: To describe the characteristics and effectiveness of pediatric telerehabilitation interventions offered to children 0-12 years old or to their families.
Methods: A systematic review was conducted on randomized control trials published between 2007 and 2018 involving at least one rehabilitation professional who provided services remotely. Information was extracted about key study, participants and intervention characteristics. The percentage of outcomes that improved were computed per study, and per intervention characteristic.

Results: Out of 4472 screened articles, 23 were included. Most studies were published after 2016 and evaluated outcomes related to the child’s behavior (n = 12, 52.2%) or to the parent (n = 10, 43.5%), such as parental skills or stress. Overall, 56.1% (SD: 38.5%) of evaluated outcomes improved following telerehabilitation. A great diversity of population and teleintervention characteristics was observed. Effective interventions tended to target parents, centered around an exercise program, used a coaching approach, focused on improving children’s behavioural functioning, lasted >8 weeks and were offered at least once a week.

Conclusions: Intervention characteristics that appear to yield better outcomes should inform the development of future telerehabilitation studies, especially in populations for whom telerehabilitation is currently understudied: eg children with physical functioning difficulties. Future trials should compare telerehabilitation interventions to well-described evidence-based face-to-face interventions, and document their cost-effectiveness.

Implications for Rehabilitation Despite a great variety in practices, telerehabilitation might be as effective as face-to-face interventions, across disciplines, for a variety of clinical outcomes. Telerehabilitation might be more effective when coaching approaches are used, especially to achieve outcomes related to children’s behaviour or parental skills. Further research is required to better understand the characteristics of effective telerehabilitation interventions, and to determine how these characteristics may differ for specific populations and outcomes.

Ekberg et al (2019) Using physical objects with young children in ‘face-to-face’ and telehealth speech and language therapy

Purpose: Speech language therapists increasingly are using telehealth to enhance the accessibility of their services. It is unclear, however, how play-based therapy for children can be delivered via telehealth. In particular, modalities such as videoconferencing do not enable physical engagement between therapists and clients. The aim of our reported study was to understand how physical objects such as toys are used in similar and different ways across videoconferenced and in-person therapy.
Methods: We used conversation analytic methods to compare video-recorded therapy sessions for children delivered across in-person and telehealth settings. Utilising a broader corpus of materials, our analysis focused on four client-therapist dyads: two using videoconferencing, and two who met in-person.

Results: Both videoconferencing and in-person sessions enabled routine affordances and challenges for delivering therapy. Within in-person therapy, therapists made access to objects contingent upon the client producing some target expression. This contingency usually was achieved by restricting physical access to these objects. Restricting access to a toy was not necessary in videoconferenced therapy; therapists instead used techniques to promote engagement.

Conclusions: When delivering play-based therapy via telehealth, our study demonstrates how practitioners adapt the intervention to suit the particular medium of its delivery.

Implications for Rehabilitation: Telehealth enhances equitable access for those who cannot physically access rehabilitation services. Telehealth modalities can create practical challenges, however, when delivering interventions such as play-based therapy. Practitioners should intentionally adapt telehealth interventions to suit the particular telehealth modality they are using.

Ferguson (2019). Telehealth as a Model for Providing Behaviour Analytic Interventions to Individuals with Autism Spectrum Disorder: A Systematic Review

Interventions based on applied behaviour analysis are considered evidence based practice for autism spectrum disorders. Due to the shortage of highly qualified professionals required for their delivery, innovative models should be explored, such as telehealth. Telehealth utilises technology for remote training and supervision. The purpose of our study was to systematically review the literature researching telehealth and ABA. We analysed intervention characteristics, outcomes and research quality in 28 studies and identified gaps. Outcomes were favourable with all studies reporting improvements in at least one variable. Quality ratings were significantly low. Implications for future research and practice are discussed in light of identified methodological downfalls.

People with disabilities living in rural and remote areas often have insufficient access to the allied health services that they require. Telepractice has emerged as a promising solution, yet little is known about whether it is possible to deliver quality disability therapy services via technology or of the considerations required to achieve positive outcomes. Multiple case studies using mixed methods were conducted to achieve in-depth examination of the telepractice services received by four children with disabilities and their families living in rural and remote Australia. Data analysis indicated that telepractice services were highly acceptable to parents and teachers and supported children to achieve positive outcomes for a variety of functional goals related to speech-language pathology and occupational therapy. Findings indicated that quality telepractice can deliver services consistent with contemporary disability expectations. Of critical importance were the skills of allied health professionals to facilitate person-centred practice and strong therapeutic relationships with children, parents, and other stakeholders to achieve positive outcomes for children. Our findings indicate that telepractice is a legitimate option for therapy service delivery that has the potential to provide people with disabilities increased choice and control over the services they receive.

Tschamper (2019) Parents’ experiences of videoconference as a tool for multidisciplinary information exchange for children with epilepsy and disability

Background: Children with epilepsy and disability are in need of long-term multidisciplinary help and support. The information exchange between the child’s providers of support is challenging. Scant attention has been paid to the parents’ experiences of the information exchange.
Design: A qualitative study with a phenomenological-hermeneutical research approach.
Method: Children with epilepsy and disability had undergone a multidisciplinary assessment in a hospital in the tertiary health service followed by information exchange with each child’s local support service using videoconference. Five parents were interviewed individually within a week after the videoconference. The COREQ checklist was used in the process of reporting on the empirical material.
Results: The increased local participation in the videoconference and the knowledge translation between the professionals made the parents save time, as they did not have to explain the written reports to each provider locally. The impact of technology created an emotional distance to the person on the screen and the information exchanged that some enjoyed while others disliked. The quality of the relationships to the professionals seemed to be crucial for the parents to feel safe talking about sensitive tasks.

Conclusion: The parents prefer videoconference as a tool for information exchange to traditional face-to-face meetings as it enables discussions between professionals that might prevent treatment misunderstandings. They experience the method as time-saving and patient-centred.

Relevance to Clinical Practice: Professionals should be aware of the possible side effects of the impact of technology that might affect the interaction and the information exchange in a negative way. The findings are likely to be transferable beyond the current context face-to-face intervention. There is a need for defining the concept of participation related to outcome measures in future studies.


The application of telehealth technology to conduct functional analysis (FA) and functional communication training (FCT) is emerging for children with developmental disabilities and behaviour support needs. The current study was designed to extend FA + FCT for self-injurious behaviour by using telehealth in home with parents as interventionists receiving real-time remote coaching. Two families with school-aged boys with developmental disabilities associated with intellectual disability participated, one with cerebral palsy and the other with autism spectrum disorder. Results indicated that parent-implemented FA + FCT via telehealth was effective for reducing self-injurious behaviour and increasing mands (communication requests) for both children. Both families successfully implemented the FA + FCT protocol with 95% overall fidelity via telehealth-supported coaching. Results are discussed in terms of their relationship to previous research, limitations and future directions.

Background: The quality of parenting a child receives has a major impact on development, wellbeing and future life opportunities.

Aims: This study examined the efficacy of Triple P Online - Disability (TPOL-D) a telehealth intervention for parents of children with a disability.

Methods: Ninety-eight parents and carers of children aged 2-12 years diagnosed with a range of developmental, intellectual and physical disabilities were randomly assigned to either the intervention (51) or treatment-as-usual (47) control group.

Results: At post-intervention parents receiving the TPOL-D intervention demonstrated significant improvements in parenting practices and parenting self-efficacy, however a significant change in parent-reported child behavioral and emotional problems was not detected. At 3-month follow up intervention gains were maintained and/or enhanced. A significant decrease in parent-reported child behavioral and emotional problems was also detected at this time.

Conclusions: The results indicate that TPOL-D is a promising telehealth intervention for a mixed-disability group.

**Simacek et al (2017) Communication Intervention for Young Children with Severe Neurodevelopmental Disabilities Via Telehealth**

Young children with neurodevelopmental disorders such as autism spectrum disorders (ASD) and Rett syndrome often experience severe communication impairments. This study examined the efficacy of parent-implemented communication assessment and intervention with remote coaching via telehealth on the acquisition of early communication skills of three young children with ASD (2) and Rett syndrome (1). Efficacy of the intervention was evaluated using single-case experimental designs. First, functional assessment was used to identify idiosyncratic/potentially communicative responses and contexts for each child. Next, parents implemented functional communication training (FCT). All of the children acquired the targeted communication responses. The findings support the efficacy of telehealth as a service delivery model to coach parents on intervention strategies for their children’s early communication skills.

Background: There has been growing interest in using telehealth to increase access to parent-mediated interventions for children with ASD. However, little is known about how parents engage with such programs.

Objective: This paper presents program engagement data from a pilot study comparing self-directed and therapist-assisted versions of a novel telehealth-based parent-mediated intervention for young children with autism spectrum disorders (ASD).

Methods: Parents of young children with ASD were randomly assigned to receive a self-directed or therapist-assisted version of ImPACT Online. Parent engagement and satisfaction with the different components of the program website were examined using the program’s automated data collection and a post-treatment evaluation survey. We examined the relationship between program engagement and changes in parent knowledge and implementation and participant characteristics associated with program engagement.

Results: Of the 27 parent participants, the majority were female (26/27, 96%), married (22/27, 81%), with a college degree or higher (15/27, 56%), and less than half were not employed outside of the home (10/27, 37%). The mean chronological age of the child participants was 43.26 months, and the majority were male (19/27, 70%) and white (21/27, 78%). Most of the families (19/27, 70%) resided in a rural or medically underserved area. Parents logged into the website an average of 46.85 times, spent an average of 964.70 minutes on the site, and completed an average of 90.17% of the lesson learning activities. Participants in the therapist-assisted group were more likely to engage with the website than those in the self-directed group: $F_{2,24}=17.65, P<.001$. In total, 85% of participants completed the program, with a significantly greater completion rate in the therapist-assisted group (N=27): $\chi^2_{1}=5.06, P=.03$. Lesson learning activities were visited significantly more often than the supplemental activities (all $P<.05$). Multiple regression controlling for pretreatment performance indicated that program completion (beta=.51, $P=.02$) predicted post-treatment intervention knowledge, and program completion (beta=.43, $P=.03$) and group assignment (beta=-.37, $P=.045$) predicted post-treatment intervention fidelity. Partial correlations indicated that parent depressive symptoms at pretreatment were negatively associated with program completion ($r=-.40, P=.04$), but other key parent and child demographic factors were not.
treatment measures of website usability ($r = .65$, $P < .001$), treatment acceptability ($r = .58$, $P = .002$), and overall satisfaction ($r = .58$, $P = .002$) were all related to program completion.

Conclusions: Parent engagement and satisfaction with ImPACT Online was high for both self-directed and therapist-assisted versions of the program, although therapist assistance increased engagement. Program completion was associated with parent outcomes, providing support for the role of the website in parent learning. This program has the potential to increase access to parent-mediated intervention for families of children with ASD.

NEUROLOGICAL AND COGNITIVE DISORDERS

**Brandt et al (2020) Information and communication technology-based assistive technology to compensate for impaired cognition in everyday life: a systematic review**

Purpose: A systematic review was performed evaluating the effectiveness of Information and Communication Technology-based Assistive Technology (ICT-based-AT) to compensate for impaired cognition in everyday life activities. Materials and methods: The study was registered in PROSPERO, registration number CRD42018114913. Six databases were searched (years 2008-2019). Inclusion criteria: Randomized controlled trials (RCTs) or cohort studies; people with impaired cognition due to non-degenerative diseases; and evaluation of ICT-based-ATs’ effectiveness regarding activity and participation, including prospective memory, execution of tasks and satisfaction with task execution. Each study’s level of evidence and quality were assessed using “JBI Levels of Evidence” and the “JBI Meta-Analysis of Statistics Assessment and Review Instrument”, respectively. Results: About 3,153 publications were located, of which 12 were included. The levels of evidence were: 1.c (RCT) ($n = 7$), 1.d (pseudo-RCT) ($n = 1$) and 3.e (observational study without control group) ($n = 4$). Three studies had high quality (2 RCT/1 cohort), eight acceptable (5 RCT/3 cohort) and one low (RCT) quality.

Conclusions: Smartphones, personal digital assistants (PDAs), and other devices with calendars and reminder alarms can improve prospective memory, especially for people with acquired brain injury (ABI). Furthermore, PDAs and similar products with prompts can improve execution of tasks for people with cognitive impairment due to different diagnoses. Products should be tailored to the users’ needs and the users trained in product use. Further studies concerning children, older people and people with
intellectual and developmental disability are required; as well as studies on cost-effectiveness and the effectiveness of related services.

Implications for Rehabilitation: In order to support activity and participation in everyday life for people with prospective memory problems, especially people with acquired brain injury, they should be offered information and communication technology-based products, such as smart phones, mobile phones, personal digital assistants or similar mainstream products equipped with reminding software. People with cognitive impairment having difficulties executing tasks independently should be offered PDAs and mobile telephones and similar products with prompting software, e.g. audio-verbal, picture and video-based task-sequencing prompts. The ICT-based products should be individually tailored, and the person should be trained in using the selected product.

**Waerling et al (2020) A systematic review of impairment focussed technology in neurology**

Objective: We provide an overview of some biomedical technologies able to relieve everyday impairments in neurological patients.

Methods: Two literature searches from 2009 to 2020 were conducted using PubMed, Embase, Cinahl and Scopus. The studies meeting the criteria for eligibility constituted 224 of the 6257 identified studies.

Results: The first literature search resulted in the identification of 53 different neurological impairments. The following impairments were selected as the most general: six motor (walking/gait abnormality, paralysis/paresis, hypertonia, dystonia, tremor and ataxia), three cognitive (memory, attention/concentration and executive dysfunction), two sensory (visual and hearing impairments) and three uncategorized impairments (communication impairments, sleep abnormalities and seizures/epilepsies). The second literature search resulted in the identification of 22 biomedical technologies able to compensate or rehabilitate the neurological impairments.

Conclusions: This review identified some of the common neurological impairments across diseases and showed that technology can be beneficial for neurological patients by helping them with everyday living. The review also found that different aspects such as personal aspects of the intended users and physical and environmental context of the task play an essential role in the usefulness of the technology. Implications for rehabilitation Neurological diseases are globally the leading cause of disability, whereby there is a great need for rehabilitation of neurological impairments. Assistive
technology can compensate for permanent impairments or be used in rehabilitation as an alternative to usual therapy or an adjunct to increase overall therapy time. This study provides an overview of existing assistive technology and how patients with neurological impairments can benefit from technology.

**Cramer et al (2019) Efficacy of Home-Based Telerehabilitation vs In-Clinic Therapy for Adults After Stroke: A Randomized Clinical Trial**

Many patients receive suboptimal rehabilitation therapy doses after stroke owing to limited access to therapists and difficulty with transportation, and their knowledge about stroke is often limited. Telehealth can potentially address these issues.

Objectives: To determine whether treatment targeting arm movement delivered via a home-based telerehabilitation (TR) system has comparable efficacy with dose-matched, intensity-matched therapy delivered in a traditional in-clinic (IC) setting, and to examine whether this system has comparable efficacy for providing stroke education.

Design, Setting, and Participants: In this randomized, assessor-blinded, noninferiority trial across 11 US sites, 124 patients who had experienced stroke 4 to 36 weeks prior and had arm motor deficits (Fugl-Meyer [FM] score, 22-56 of 66) were enrolled between September 18, 2015, and December 28, 2017, to receive telerehabilitation therapy in the home (TR group) or therapy at an outpatient rehabilitation therapy clinic (IC group).

Primary efficacy analysis used the intent-to-treat population.

Interventions: Participants received 36 sessions (70 minutes each) of arm motor therapy plus stroke education, with therapy intensity, duration, and frequency matched across groups.

Main Outcomes and Measures: Change in FM score from baseline to 4 weeks after end of therapy and change in stroke knowledge from baseline to end of therapy.

Results: A total of 124 participants (34 women and 90 men) had a mean (SD) age of 61 (14) years, a mean (SD) baseline FM score of 43 (8) points, and were enrolled a mean (SD) of 18.7 (8.9) weeks after experiencing a stroke. Among those treated, patients in the IC group were adherent to 33.6 of the 36 therapy sessions (93.3%) and patients in the TR group were adherent to 35.4 of the 36 assigned therapy sessions (98.3%). Patients in the IC group had a mean (SD) FM score change of 8.36 (7.04) points from baseline to 30 days after therapy (P < .001), while those in the TR group had a mean (SD) change
of 7.86 (6.68) points (P < .001). The covariate-adjusted mean FM score change was 0.06 (95% CI, -2.14 to 2.26) points higher in the TR group (P = .96). The noninferiority margin was 2.47 and fell outside the 95% CI, indicating that TR is not inferior to IC therapy. Motor gains remained significant when patients enrolled early (<90 days) or late (≥90 days) after stroke were examined separately.

Conclusions and Relevance: Activity-based training produced substantial gains in arm motor function regardless of whether it was provided via home-based telerehabilitation or traditional in-clinic rehabilitation. The findings of this study suggest that telerehabilitation has the potential to substantially increase access to rehabilitation therapy on a large scale.

Hobson et al (2019) Using telehealth in motor neuron disease to increase access to specialist multidisciplinary care: a UK-based pilot and feasibility study

Objectives: Care of patients with motor neuron disease (MND) in a specialist, multidisciplinary clinic is associated with improved survival, but access is not universal. We wanted to pilot and establish the feasibility of a definitive trial of a novel telehealth system (Telehealth in Motor neuron disease, TiM) in patients with MND.


Intervention: TiM telehealth plus usual care versus usual care.

Setting: A specialist MND care centre in the UK.

Participants: Patients with MND and their primary informal carers.

Primary and Secondary Outcome Measures: Recruitment, retention and data collection rates, clinical outcomes including participant quality of life and anxiety and depression.

Results: Recruitment achieved the target of 40 patients and 37 carers. Participant characteristics reflected those attending the specialist clinic and included those with severe disability and those with limited experience of technology. Retention and data collection was good. Eighty per cent of patients and 82% of carer participants reported outcome measures were completed at 6 months. Using a longitudinal analysis with repeated measures of quality of life (QoL), a sample size of 131 per arm is recommended in a definitive trial. The methods and intervention were acceptable to participants who were highly motivated to participate to research. The low burden of participation and accessibility of the intervention meant barriers to participation were minimal. However, the
study highlighted difficulties assessing the associated costs of the intervention, the challenge of recruitment in such a rare disease and the difficulties of producing rigorous evidence of impact in such a complex intervention.

Conclusion: A definitive trial of TiM is feasible but challenging. The complexity of the intervention and heterogeneity of the patient population means that a randomised controlled trial may not be the best way to evaluate the further development and implementation of the TiM.


Purpose: To explore the views of people with motor neurone disease (MND) on the barriers, facilitators and potential benefits of using home-based e-Health service delivery (telehealth) to access MND multidisciplinary clinic care.

Methods: Twelve patients from three MND multidisciplinary clinics and an MND support association group completed a survey of information technology (IT) use and participated in interviews, to gather participants' experiences and perceptions of home-based telehealth for MND clinic care. Survey data were analyzed descriptively, with interview data analyzed using a stepwise inductive approach. Results: Surveys revealed that participants used IT to communicate with family and friends, but were less likely to use the phone, email or videoconferencing with health professionals. Two themes of participants' use of IT in MND care reflected their experiences of MND care; and personal preferences for modes of healthcare delivery. Participants were willing to use telehealth for MND care, with family members acting as patients' main support for telehealth participation. Nevertheless, participants preferred face-to-face contact with the MND clinic team in the initial and early stages of the disease.

Conclusions: People living with MND may wish to participate in individual care planning to facilitate their access to a variety of e-Health service modalities. Additionally, individual care planning may allow healthcare professionals to deliver e-Health-based care, such as telehealth, to increase the scope of care provided. Research to ascertain the views of health professionals and family members as co-participants in service delivery via telehealth is needed to fully assess the potential contribution of e-Health.

Implications for Rehabilitation People living with MND face a range of barriers to attending specialized multidisciplinary care, including fatigue, caregiver availability and logistical challenges to travel. Patients have
indicated willingness to use e-Health applications to improve their access to care. Use of telehealth could expand service delivery to people with MND living long distances from multidisciplinary clinics, and increase the patient-centred focus of care by tailoring care planning. By offering telehealth services routinely, MND multidisciplinary clinics could also improve the quality and timelines of services offered.

**Kurland et al (2019) Effects of a Tablet-Based Home Practice Program With Telepractice on Treatment Outcomes in Chronic Aphasia**

**Purpose:** The aim of this study was to determine if a tablet-based home practice program with weekly telepractice support could enable long-term maintenance of recent treatment gains and foster new language gains in poststroke aphasia.

**Method:** In a pre-post group study of home practice outcomes, 21 individuals with chronic aphasia were examined before and after a 6-month home practice phase and again at follow-up 4 months later. The main outcome measure studied was change in naming previously treated or untreated, practiced or unpracticed pictures of objects and actions. Individualized home practice programs were created in iBooks Author with semantic, phonemic, and orthographic cueing in pictures, words, and videos in order to facilitate naming of previously treated or untreated pictures.

**Results:** Home practice was effective for all participants with severity moderating treatment effects, such that individuals with the most severe aphasia made and maintained fewer gains. There was a negative relationship between the amount of training required for iPad proficiency and improvements on practiced and unpracticed pictures and a positive relationship between practice compliance and same improvements.

**Conclusion:** Unsupervised home practice with weekly video teleconferencing support is effective. This study demonstrates that even individuals with chronic severe aphasia, including those with no prior smart device or even computer experience, can attain independent proficiency to continue practicing and improving their language skills beyond therapy discharge. This could represent a low-cost therapy option for individuals without insurance coverage and/or those for whom mobility is an obstacle to obtaining traditional aphasia therapy.

Introduction: Preliminary evidences showed that telemedicine may allow a reduction of costs and an enhancement of patients' satisfaction and quality of life (QoL), with the same effectiveness of conventional methods of healthcare delivery. Literature is quite absent in relation to the use of telemedicine for patients with disorders of consciousness (DoC) whose management is delegated almost entirely to the family. In order to promote an alternative setting to manage persons affected by DoC, also supporting their families, a pilot project was designed to test the feasibility of home-care assistance based on a system of telemonitoring.

Methods: In total, 11 patients were supported by a telemonitoring system via a workstation installed at the patients' homes. All patients underwent a clinical and functional evaluation at enrolment, after two months, after six months and at the end of the project, after 12 months by means of clinical scales (Glasgow Coma Scale, Rancho Los Amigos Levels of Cognitive Functioning Scale, Glasgow Outcome Scale, Disability Rating Scale), while the World Health Organization (WHO) QoL, the Hamilton Depression Rating Scale, the Hamilton Anxiety Rating Scale and a satisfaction score were completed by caregivers. Results Patients' scores at the clinical scales did not show statistically significant differences from T0 to T3. A trend toward the improvement of caregivers' QoL, anxiety and depression, as well as a high degree of satisfaction with regard to the intervention, were reported. The economic evaluation showed an average cost/day for a patient of about €70.

Discussion: Preliminary data suggest that the use of telemonitoring services in the management of persons affected by DoC is feasible and well accepted by caregivers, with a potential positive effect on their mood and QoL. Therefore, telemonitoring should be considered in the management of DoC patients to favour discharge from acute care and to support families in home care.

Kizony et al (2017) Tele-rehabilitation service delivery journey from prototype to robust in-home use

Purpose: The purpose of this study is to present a retrospective study on clients with Acquired Brain Injury (ABI) enrolled in a tele-motion-rehabilitation service program for two or more months.
Methods: Data from 82 clients (46 males; 74 with ABI), aged 22-85 years, are reported. The Kinect-based CogniMotion System (ReAbility Online, Gertner Institute, Tel Hashomer, Israel) provided services that included 30-min biweekly sessions. Participants were evaluated prior to and 2 months following the commencement of service with clinical assessments that measured movements and function of the weaker upper extremity and cognitive abilities.

Results: Clients enrolled in the service had intact or mild cognitive impairment, mild-moderate motor impairment but little use of their weak upper extremity for daily activities. They were satisfied with the service and reported high levels of system usability. Post-intervention clinical assessments were performed on about half of the participants after 2 months; significant improvements in active movements of the weak upper extremity, shoulder flexion range of motion and in the Trail Making Test were found ($p < 0.05$).

Conclusions: The service appears to be feasible for people with ABI and effective in important clinical outcomes related to improvements in upper extremity function. Implications for Rehabilitation Tele-rehabilitation provided with Microsoft Kinect 3D sensor virtual reality tracking system is feasible for people with Acquired Brain Injury. People with Acquired Brain Injury in the chronic stage were satisfied with the tele-rehabilitation service and perceived it as beneficial to improve their motor and cognitive abilities. The CogniMotion System service appears to be effective in important clinical outcomes related to improvements in upper extremity function.

Other references

MOBILITY AND SPINAL INJURY


Background: Osteoarthritis (OA) is not curable, but the symptoms can be managed through self-management programs (SMPs). Owing to the growing burden of OA on the health system and the need to ensure high-quality integrated services, delivering SMPs through digital technologies could be an economic and effective community-based approach.

Objective: This study aims to analyze the effectiveness of digital-based structured SMPs on patient outcomes in people with OA.

Methods: A total of 7 web-based and 3 grey literature databases were searched for randomized controlled trials assessing digital-based structured
SMPs on self-reported outcomes including pain, physical function, disability, and health-related quality of life (QoL) in people with OA. Two reviewers independently screened the search results and reference lists of the identified papers and related reviews. Data on the intervention components and delivery and behavioural change techniques used were extracted. A meta-analysis, risk of bias sensitivity analysis, and subgroup analysis were performed where appropriate. The Grading of Recommendations, Assessment, Development, and Evaluations (GRADE) approach was used to assess the quality of evidence.

Results: A total of 8 studies were included in this review involving 2687 patients with knee (n=2); knee, hip, or both (n=5); and unspecified joint (n=1) OA. SMPs were delivered via telephone plus audio and video, internet, or mobile apps. Studies reported that digital-based structured SMPs compared with the treatment as usual control group (n=7) resulted in a significant, homogeneous, medium reduction in pain and improvement in physical function (standardized mean difference [SMD] -0.28, 95% CI -0.38 to -0.18 and SMD -0.26, 95% CI -0.35 to -0.16, respectively) at post treatment. The digital-based structured SMP effect on pain and function reduced slightly at the 12-month follow-up but remained to be medium and significant. The post treatment effect of digital-based structured SMPs was small and significant for disability, but non significant for QoL (SMD -0.10, 95% CI -0.17 to 0.03 and SMD -0.17, 95% CI -0.47 to 0.14, respectively; each reported in 1 study only). The 12-month follow-up effect of the intervention was very small for disability and QoL. The quality of evidence was rated as moderate for pain and physical function and low and very low for disability and QoL, respectively, using the GRADE approach.

Conclusions: Digital-based structured SMPs may result in improvement in pain and physical function that is largely sustained at the 12-month follow-up in people with knee and hip OA. The effects on disability and QoL are smaller and less clear. The quality of evidence is moderate to low, and further research is required to confirm the findings of the review and assess the effects of digital-based structured SMPs on other health-related outcomes.
Shirai et al (2020). The use of a mobile educational tool on pressure injury education for individuals living with spinal cord injury/disease: a qualitative research study.31

Background: As many as 30–60% of individuals living with spinal cord injury/disease (SCI/D) experience at least one pressure injury (PI) in their lifetime. Best practice guidelines in SCI/D rehabilitation emphasize the importance of providing education regarding PI prevention and management for individuals living with SCI/D. Mobile educational applications can be used for PI education however there is limited research on the user-experiences of mobile educational applications about PIs for individuals living with SCI/D.

Objectives: The purpose of this study was to explore the experiences of individuals living with SCI/D on the use of Pressure Ulcer Target (PUT), a mobile educational app for PI prevention and management.

Methods/Overview: Nine participants living with SCI/D used PUT over two weeks. Individual semi-structured interviews were conducted to explore the participants’ perceptions regarding the utility, aesthetics and ease of use of PUT and suggested modifications. A conventional content analysis was used to identify themes and categories from the data.

Results: User-experiences with PUT fell into four themes: (1) Strengths and weakness; (2) Target population; (3) Key concepts and messages; and (4) Recommendations for improvement.

Conclusions: PUT serves as a review of previously acquired PI knowledge and should be introduced early in rehabilitation to motivate users to prevent PIs. Future studies exploring healthcare professionals’ perspectives of PUT are warranted.

Implications for Rehabilitation: PUT aids individuals living with SCI/D in the community to review PI prevention and management strategies that they learned as inpatients. The use of pictures to deliver patient education regarding PI prevention and management through a mHealth app is recommended. PUT should be introduced early in rehabilitation to motivate users to prevent PIs.


Background: Leisure-time physical activity (LTPA) is a critical component of a healthy lifestyle for individuals with spinal cord injury (SCI). However, most individuals are not sufficiently active to accrue health benefits. The Active Living Lifestyles program for individuals with SCI who use manual
wheelchairs (ALLWheel) targets important psychological factors that are associated with LTPA uptake and adherence while overcoming some barriers associated with participation restrictions. 

Objective: The goal of the paper is to describe the protocol for the development and evaluation of the ALLWheel program for individuals with SCI who use manual wheelchairs.

Methods: The first three stages of the Medical Research Council framework for developing and evaluating complex interventions (ie, preclinical, modeling, exploratory) are described. The preclinical phase will consist of scoping and systematic reviews and review of theory. The intervention will be modeled by expert opinions and consensus through focus groups and Delphi surveys with individuals with SCI, clinicians, and community partners. Finally, the feasibility and potential influence of the ALLWheel program on LTPA and psychological outcomes will be evaluated.

Results: This project is funded by the Craig H Neilsen Foundation, the Fonds de Recherche du Québec-Santé, and the Canadian Disability Participation Project and is currently underway.

Conclusions: Using peer trainers and mobile phone technology may help to cultivate autonomy-supportive environments that also enhance self-efficacy. Following a framework for developing and evaluating a novel intervention that includes input from stakeholders at all stages will ensure the final product (ie, a replicable intervention) is desirable to knowledge users and ready for evaluation in a randomized controlled trial. If effective, the ALLWheel program has the potential to reach a large number of individuals with SCI to promote LTPA uptake and adherence.


Objectives: Novel and theory-based interventions promoting leisure time physical activity (LTPA) are needed for adults with spinal cord injury (SCI). The purpose of this study was to pilot test a tele-health intervention, grounded in self-determination theory, to enhance need satisfaction, motivation, physical activity, and quality of life among adults with SCI.

Design: Pilot randomized controlled trial.

Methods: Participants (N = 24) were randomized to either a control or intervention group (N = 22 completed the study). The intervention group received one, 1-h counselling session per week, for eight weeks and the sessions were delivered via an online video-chat platform. The counselling
sessions focused on fostering the basic psychological needs and autonomous motivation, teaching behaviour change techniques, and self-regulatory strategies. The control group was asked to continue with their regular routine. Participants responded to a questionnaire at baseline, mid-, and post-intervention. Hedge’s $g$ effect sizes were used to examine group differences and reliable change indexes to verify individual changes.

Results: Compared to the control group, the intervention group reported greater autonomous motivation (Hedge’s $g = 0.91$) and LTPA (Hedge’s $g = 0.85$) post-intervention. Large to moderate effects supporting the intervention group were found for health participation at six weeks (Hedge’s $g = 0.97$), and meaningful life experiences (Hedge’s $g = 0.72$) and social cognitive predictors of LTPA (Hedge’s $g > 0.76$) post-intervention.

Conclusion: This study demonstrated the preliminary effectiveness of a self-determination theory and tele-health LTPA counselling intervention for adults with SCI, which may help inform larger interventions aimed at promoting LTPA among this population.

Münch et al. (2019) MOBIllity assessment with modern TECHnology in older patients’ real-life by the General Practitioner: the MOBITEC-GP study protocol

Background: Mobility limitations in older adults are associated with poor clinical outcomes including higher mortality and disability rates. A decline in mobility (including physical function and life-space) is detectable and should be discovered as early as possible, as it can still be stabilized or even reversed in early stages by targeted interventions. General practitioners (GPs) would be in the ideal position to monitor the mobility of their older patients. However, easy-to-use and valid instruments for GPs to conduct mobility assessment in the real-life practice setting are missing. Modern technologies such as the global positioning system (GPS) and inertial measurement units (IMUs) - nowadays embedded in every smartphone - could facilitate monitoring of different aspects of mobility in the GP’s practice.

Methods: This project’s aim is to provide GPs with a novel smartphone application that allows them to quantify their older patients’ mobility. The project consists of three parts: development of the GPS- and IMU-based application, evaluation of its validity and reliability (Study 1), and evaluation of its applicability and acceptance (Study 2). In Study 1, participants (target N = 72, aged 65+, ≥2 chronic diseases) will perform a battery of walking tests (varying distances; varying levels of standardization). Besides videotaping
and timing (gold standard), a high-end GPS device, a medium-accuracy GPS/IMU logger and three different smartphone models will be used to determine mobility parameters such as gait speed. Furthermore, participants will wear the medium-accuracy GPS/IMU logger and a smartphone for a week to determine their life-space mobility. Participants will be re-assessed after 1 week. In Study 2, participants (target N = 60, aged 65+, ≥2 chronic diseases) will be instructed on how to use the application by themselves. Participants will perform mobility assessments independently at their own homes. Aggregated test results will also be presented to GPs. Acceptance of the application will be assessed among patients and GPs. The application will then be finalized and publicly released.

Discussion: If successful, the MOBITEC-GP application will offer health care providers the opportunity to follow their patients’ mobility over time and to recognize impending needs (e.g. for targeted exercise) within pre-clinical stages of decline.


Background: Osteoarthritis and spinal pain are common and burdensome conditions; however, the majority of patients with these conditions do not receive care that is consistent with clinical practice guidelines. Telehealth models of care have the potential to improve care for osteoarthritis and spinal pain patients. The aim of this review was to assess the effectiveness of verbal real-time telehealth interventions, including telephone-based and videoconferencing interventions to reduce pain intensity and disability in patients with osteoarthritis of the knee or hip and spinal pain (back or neck pain).

Methods: We searched seven electronic databases from inception to May 2018. Randomised controlled trials (RCTs), cluster-RCTs, and non-randomised controlled trials were included. Two review authors independently extracted data for each included study. Primary outcomes were pain intensity and disability. We conducted primary meta-analyses combining all conditions with similar interventions and comparators. Standardised mean difference (SMD) and 95% confidence intervals (CIs) were calculated using random effects models. We used the Cochrane Risk of Bias tool to assess risk of bias, and GRADE to evaluate the quality of evidence.
Results: We included 23 studies with 56 trial arms and 4,994 participants. All studies utilised telephone-based interventions. Only two studies used a telephone only approach and the remainder included educational materials and/or face-to-face components. We found no studies utilising videoconferencing. Meta-analysis showed telephone-based interventions (with educational materials) for osteoarthritis and spinal pain improved pain intensity ($n = 5$ trials, $n = 1,357$ participants, SMD -0.27, 95% CI [-0.53, -0.01], $\tau^2 = 0.06$, $I^2 = 74\%$; moderate-quality evidence) and disability ($n = 7$ trials, $n = 1,537$ participants, SMD -0.21, 95% CI [-0.40, -0.02], $\tau^2 = 0.03$, $I^2 = 56\%$; moderate-quality evidence) compared to usual care. Meta-analyses found telephone with face-to-face interventions does not improve pain and disability compared to usual care or face-to-face care alone.

Discussion: We are moderately confident that telephone-based interventions reduce pain intensity and disability in patients with osteoarthritis and spinal pain compared to usual care, but telephone plus face-to-face interventions are no more effective than usual care or face-to-face interventions alone.

VISUAL AND HEARING IMPAIRMENT

Daczewitz et al (2020) PiCs: Telepractice coaching for a parent of a child who is hard-of-hearing

Services for families of young children with low-incidence disabilities (e.g. deaf/hard-of-hearing, DHH) are expensive to deliver and may not be available in all geographic regions. Parents of children who are DHH may be taught and coached to implement strategies to encourage communication. The purpose of this single-case multiple-baseline design study was to implement and assess telepractice teaching and coaching of a parent whose child is hard-of-hearing. The parent was taught to implement naturalistic teaching strategies for communication using the Parent-implemented Communication Strategies (PiCS) protocols. Results varied across strategies, and the parent expressed satisfaction with the goals, procedures, and outcomes of the intervention. Implications include recommendations for practitioners and researchers.

Senjam et al (2020) Assistive technology for students with visual disability in schools for the blind in Delhi

Background: To understand the awareness and utilization of assistive technology in students at schools for the blind in Delhi.
Methods: A cross-sectional study was conducted among 250 students selected randomly from 10 blind schools in Delhi. Binocular distance presenting and pinhole vision acuity were assessed using Snellen "E" chart and a multiple pinhole occluder. Students were also interviewed using a questionnaire about 42 assistive devices to understand their awareness and use.

Results: Male participants were 72.8%. Of the total, 27.6% students had best corrected visual acuity <6/18 to 1/60, and the rest had <1/60 vision. The awareness about tactile and sound-based technology was good among students: Braille books (98%), Braille slate and stylus (99.2%), handheld audio recorders (77.6%) and screen readers (77.2%). Good awareness was reported for abacus (88.8%), walking long canes (94.4%) and smart cane (89.6%), audible balls (96%), Braille chess (82.8%) and talking watch (98%). Among the students with <6/18 to 1/60 vision, the awareness of visual based technology ranged from 0.8% (typoscope) to 43.6% (video magnifiers). Braille technology was used for reading by 96.4% (books) and for writing by 96.8% (Braille slate and stylus) irrespective of visual status. Other devices were poorly used ranging from nil (typoscope) to 55% (screen readers). The use of math and science learning devices was poor (<20%). Walking canes were used by 59% of students whereas 87.2% students used audible ball for games.

Conclusion: The results showed that majority of students used tactile based technology irrespective of visual status.

Implications for Rehabilitation: Students with visual disability need assistive technology for a wide range of activities including academic learning. Students in schools for the blind who have binocular best corrected vision acuity of 1/60 or better should be encouraged to use visual based assistive technology instead of tactile based. Students with binocular best corrected vision acuity less than 1/60 should be encouraged to use other available tactile and sound-based assistive technologies as well as Braille books and Braille slate and stylus for their academic activities including maths and sciences. Teachers should be trained in the use of various assistive technologies for reading, writing, maths, sciences, sports, mobility and activities of daily living.

Völter et al (2020) Therapist-Guided Telerehabilitation for Adult Cochlear Implant Users: Developmental and Feasibility Study. Background: Cochlear implants can provide auditory perception to many people with hearing impairment who derive insufficient benefits from
hearing aid use. For optimal speech perception with a cochlear implant, postoperative auditory training is necessary to adapt the brain to the new sound transmitted by the implant. Currently, this training is usually conducted via face-to-face sessions in rehabilitation centers. With the aging of society, the prevalence of age-related hearing loss and the number of adults with cochlear implants are expected to increase. Therefore, augmenting face-to-face rehabilitation with alternative forms of auditory training may be highly valuable.

Objective: The purpose of this multidisciplinary study was to evaluate the newly developed internet-based teletherapeutic multimodal system Train2hear, which enables adult cochlear implant users to perform well-structured and therapist-guided hearing rehabilitation sessions on their own.

Methods: The study was conducted in 3 phases: (1) we searched databases from January 2005 to October 2018 for auditory training programs suitable for adult cochlear implant users; (2) we developed a prototype of Train2hear based on speech and language development theories; (3) 18 cochlear implant users (mean age 61, SD 15.4 years) and 10 speech and language therapists (mean age 34, SD 10.9 years) assessed the usability and the feasibility of the prototype. This was achieved via questionnaires, including the System Usability Scale (SUS) and a short version of the intrinsic motivation inventory (KIM) questionnaires.

Results: The key components of the Train2hear training program are an initial analysis according to the International Classification of Functioning, Disability and Health; a range of different hierarchically based exercises; and an automatic and dynamic adaptation of the different tasks according to the cochlear implant user’s progress. In addition to motivational mechanisms (such as supportive feedback), the cochlear implant user and therapist receive feedback in the form of comprehensive statistical analysis. In general, cochlear implant users enjoyed their training as assessed by KIM scores (mean 19, SD 2.9, maximum 21). In terms of usability (scale 0-100), the majority of users rated the Train2hear program as excellent (mean 88, SD 10.5). Age (P=.007) and sex (P=.01) had a significant impact on the SUS score with regard to usability of the program. The therapists (SUS score mean 93, SD 9.2) provided slightly more positive feedback than the cochlear implant users (mean 85, SD 10.3).

Conclusions: Based on this first evaluation, Train2hear was well accepted by both cochlear implant users and therapists. Computer-based auditory training might be a promising cost-effective option that can provide a highly
personalized rehabilitation program suited to individual cochlear implant user characteristics.


Purpose: To evaluate the feasibility of Hear-Communicate-Remember, a training programme developed for family caregivers of people with dementia and hearing impairment that integrated hearing, communication and memory strategies, which was intended to be delivered via telehealth.

Materials and Methods: Participants included six dyads consisting of adults with dementia and hearing impairment and their family caregivers. Data collection involved a combination of semi-structured interviews, self-report questionnaires and field notes.

Results: Analysis of the qualitative interviews revealed four themes: appropriateness of intervention resources, considerations for the delivery of intervention via telehealth, knowledge and application of intervention strategies, and impact of the intervention on day-to-day life. Results from the satisfaction survey indicated that caregiver participants were mostly satisfied with all aspects of the intervention except the use of some technological components. The field notes described challenges with implementation via telehealth.

Conclusions: Future research involving a cohort comparison study with a larger cohort of dyads is needed to establish treatment efficacy.


The purpose of this study is to systematically review published evidence regarding the development, use, and effectiveness of assistive devices and technologies that enable internet access for individuals who are deafblind. Eight electronic research databases (CINAHL, Embase, Engineering Village MEDLINE, PsycINFO, PubMed, Cochrane Library, and Web of Science) and three clinical trials registries (ISRCTN Registry, WHO ICTRP, and ClinicalTrials.gov) were searched. Seven articles met the inclusion criteria for this systematic review. The assistive technologies described were in the preliminary stages of development, with only three of the technologies having undergone any testing. The effectiveness of all seven assistive technologies was quantified in this review based on the proposed impacts of
internet access on the domains of the World Health Organization’s International Classification of Functioning, Disability and Health framework. Internet access technologies for individuals with deafblindness are in the early stages of development and are targeted toward specific functions of the internet. It is imperative that future device development and evaluation seek input from persons who are deafblind. There is also a need to address the gap between academic research, which seeks to develop assistive technology to access the internet and the translation into real-world use of this technology.

**CLINICAL TRIALS**

**Interactive Telehealth for Wheelchair Users**  
February 2020 CN-02080365 AU: NCT04266808  
[https://clinicaltrials.gov/show/NCT04266808](https://clinicaltrials.gov/show/NCT04266808)

**Brief Summary:**
During typical daily activity, people with established spinal cord injury perform significantly fewer pressure-relief manoeuvres than the recommended frequency while overestimating their adherence on recall surveys of pressure relief activity. The rate of pressure ulcer recurrence in individuals with a prior ulcer is 44% in those with surgical repair and as high as 75% in those with non-surgical healing indicating that increased attention to pressure relief is critical for these individuals. This study will evaluate the efficacy of a wheelchair sensor and app-based biofeedback for establishing healthy self-management behaviours (pressure relief manoeuvres and daily physical activity). Investigators will enrol 50 participants with paraplegia from spinal cord injury who use a manual wheelchair for mobility and have a history of pressure ulcer that has healed or is six months post-surgical repair. Participants will be randomized into one of two groups: an intervention group that will receive an education intervention and the proposed technology to be used for one year, and a control group that will receive only the education intervention. The primary outcome will be pressure ulcer occurrence over one year. Investigators hypothesize that participants receiving the intervention of biofeedback on their pressure relief activity will have a lower recurrence of pressure ulcer than the education only control group. Secondary outcomes include depressive symptoms, self-efficacy, participation and satisfaction with life. Investigators hypothesize that increasing physical activity will reduce depressive symptoms and improve participation and satisfaction with life.
Produced by the members of the National Health Library and Knowledge Service Evidence Team. Current as at 14 August 2020. This evidence summary collates the best available evidence at the time of writing and does not replace clinical judgement or guidance. Emerging literature or subsequent developments in respect of COVID-19 may require amendment to the information or sources listed in the document. Although all reasonable care has been taken in the compilation of content, the National Health Library and Knowledge Service Evidence Team makes no representations or warranties expressed or implied as to the accuracy or suitability of the information or sources listed in the document. This evidence summary is the property of the National Health Library and Knowledge Service and subsequent re-use or distribution in whole or in part should include acknowledgement of the service.

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The following PICO(T) was used as a basis for the evidence summary:

<table>
<thead>
<tr>
<th>People</th>
<th>Digital and/or assistive technology</th>
<th>Delivery of service</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEOPLE WITH A DISABILITY</td>
<td>DIGITAL AND/OR ASSISTIVE TECHNOLOGY</td>
<td>DELIVERY OF SERVICE</td>
</tr>
</tbody>
</table>

The following search strategy was used:

**PubMed**

- DISABLED (MH)
- (DISABILITY OR DISABLE OR DISABILITES OR DISABLE PERSON)
- TELEHEALTH (MH)
- TELEREHABILITATION (MH)
- (TELEPRACTICE OR TELEHEALTH OR TELEREHABILITATION OR TELEMEDICINE)

1 Margaret Morgan, Librarian, Regional Hospital Mullingar [Author]; Julia Reynolds, Librarian, Mayo University Hospital, Castlebar [Editor]; Brendan Leen, Area Library Manager, HSE South [Editor]


