A review of the efficacy and effectiveness of using telehealth for paediatric speech and language assessment

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Overview

- Background
- Aim
- Method
- Results
- Gaps
- Conclusion

Background

- What is speech?
  - The way that a person uses their voice and oral muscles to “say” sounds.

Speech Assessment

1. Oromotor assessment
2. Articulation assessment
3. Speech intelligibility rating

What is language?

- Receptive language = understanding language
- Expressive language = using language
**Language Assessment**

**Receptive Language:**
Point to pictures on command, follow instructions, and answer questions about a spoken paragraph.

**Expressive Language:**
Name objects, finish a sentence, repeat a sentence, and describe a picture.

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**Prevalence**

- 6-25% of children have a speech and/or language disorder

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**Impacts**

- Affects ability to communicate effectively at home, in the community, and at childcare or school
  - Communicate needs and wants
  - School readiness and school performance
  - Literacy and numeracy
  - Engage socially with peers
  - Self-esteem
  - Frustration + +

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**Long-term Impacts**

- Reduced quality of life
- Reduced academic performance
- Reduced vocational opportunities
- Chronic behavioural, social, and emotional difficulties

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**Face-to-face Services**

Unfortunately, many families are unable to access face-to-face speech pathology services:

- Distance
- Staff vacancies/shortages at local centres
- Costs associated with travel
- Family work commitments
- Lack of childcare for siblings
- Inadequate public transport
- Waiting lists

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**Telehealth**

- To the home or a local health facility
- Family friendly
- Observe the child in their home environment
- Saves travel time and costs for the family
- Improves access for rural and remote families
- Compared with home visiting: saves time and money for service provider, no risk to the speech pathologist
- Cost depends on the system used – can be cheap or free
Aim

- Previously published literature reviews do not deal specifically with children.
- We aimed to review the literature relating to the efficacy and effectiveness of telehealth for pediatric speech and language assessment.
  - Inform speech pathologists
  - Identify gaps in the evidence to guide future research

Terms

- Efficacy = the extent to which an intervention provides a beneficial result under ideal conditions.
- Effectiveness = a measure of the extent to which an intervention when deployed in the field in routine circumstances, does what it is intended to do in a specific population.

Methods

- Databases: PubMed, CINAHL, PsychINFO, ERIC.
- Reference lists searched to identify relevant papers
- Speech and language assessment via telehealth for children <16 years
- English
- Peer-reviewed journal
- Jan 2004 – Jul 2014

Papers Reviewed


All papers were efficacy studies – there were no effectiveness studies found.
Methods

1. Study design
2. Equipment
3. Validity
4. Reliability
5. Satisfaction

Results

Equipment
• All used real-time videoconferencing (synchronous)
• 3 papers used store-and-forward (asynchronous) for scoring
• The custom-built system was designed for low-speed Internet connections
  – Store-and-forward
  – Speech pathologist can remotely display images on the participant’s computer
  – Pre-recorded test instructions
• 1 paper used Skype on 2 standard computers
• The final paper did not describe equipment

Speech Assessment
• All papers examined telehealth validity for at least one aspect of speech assessment.
  – Oromotor assessment
  – Articulation screening
  – Speech intelligibility rating

Discrepancies
Oromotor assessment = due to ↓ video quality?
• Sequenced movements (e.g. cough and poke out your tongue)
• Tongue protrusion and lateralisation
• Didochokineti tasks (DDK) (how quickly a person can repeat a sound sequence e.g. "pa-ta-ka")

Articulation assessment = due to ↓ audio quality?
• Voicing (whether or not the vocal cords vibrate)
• Sounds without visible articulation
• High frequency sounds
• Consonant clusters (a combination of consonant sounds e.g. /bl/ in blue)
**Language Assessment**

- Screening = 1 paper
- Full assessment = 2 papers
- Screening and full assessment = valid by telehealth
- Discrepancies:
  - Similar sounding words (e.g. cook-book)
  - Plurals (/s/ is a high-frequency sound)
  - Need to repeat test instructions

**Audio and Video Quality**

1. Some individual speech and language tasks were not valid when assessed by telehealth.
2. Repetition requests

- Changes to equipment may improve audio and video quality

**Reliability**

- Three studies examined intra- and inter-rater reliability
- Intra- and inter-rater reliability was good for:
  - Articulation assessment
  - Speech intelligibility rating
  - Language assessment
- Oromotor assessment: variable intra- and inter-rater reliability in both telehealth and face-to-face environments = subjective assessment

**Satisfaction**

- Ciccia et al (2011)
- Examined parent satisfaction with telehealth screening during a paediatrician appointment
- Overall satisfaction was high
- Would prefer to access screening via telehealth during an existing appointment, rather than attending an additional face-to-face appointment

**Gaps**

- Preschool-aged children
  - Importance of early intervention
- Satisfaction
  - Clinician satisfaction and confidence
- Characteristics of paediatric assessment:
  - How to build rapport?
  - How to manage behaviour?
Conclusion

• Some evidence to support validity and reliability of paediatric speech and language by telehealth
• Probably not sufficient to influence clinical practice or policy development
• Further research is required:
  – Improved technology
  – Once efficacy is established, there is a need for large-scale effectiveness studies (ideally RCT)

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