Establishing a Rural Telehealth Service for Treatment of Voice Disorders in Parkinson’s Disease

Natasha Moller
Speech Pathologist, West Moreton Hospital and Health Service
12-13 November 2015

Outline
• Background
  • Parkinson’s Disease
  • Telehealth
  • West Moreton Hospital and Health Service
  • Problem
• Aim
• Method
• Results
• Barriers and facilitators
• Conclusion and future directions

Background: Parkinson’s Disease
• Progressive neurological disease
• Affects approximately 80,000 Australians (17,000 Queenslanders)
• Mean age of diagnosis = 65 years old
• 50-90% present with motor speech impairments known as hypokinetic dysarthria
  ➢ Reduced loudness and stress
  ➢ Monotone pitch and loudness
  ➢ Imprecise articulation
  ➢ Harsh and breathy vocal quality
  ➢ Variable rate and short rushes of speech

Background: Telehealth
• 69% of the Australian population live in major cities, with the remaining 31% living in rural and remote areas
• Geographic location = barrier for patients to speech pathology services
• Benefits:
  ✓ Access to increased services
  ✓ Increases timing, intensity, frequency of therapy
  ✓ Reduces travel time and distance

Background: West Moreton Hospital and Health Service (WMHHS)
• Ipswich Hospital
• Rural Health Services
  – Boonah
  – Esk
  – Gatton
  – Laidley
• Community Health
  – Community Based Rehabilitation Team (CBRT)

Background: Problem
• Limited Speech Pathology service provision to rural health facilities requiring our service (once per week)
  – Reduced frequency and intensity of therapy
  – Patients experienced difficulties with transport and large distance to travel if required to come to Ipswich
Aim

1. To increase frequency and intensity of service access for patients with Parkinson Disease in rural hospitals using Telehealth
2. To improve patients' vocal quality, volume, and speech intelligibility
3. Evaluate patient satisfaction using Telehealth to facilitate intensive therapy
4. Reduce patient travel time

Participants

- 6 with Parkinson Disease (3 male, 3 female) aged between 64 and 80 years
- Due to illness, mobility, and transport, final sample size = 3
- Time post PD diagnosis ranged from 7 to 12 years
- Hypokinetic dysarthria (various severities)
- Lived in rural towns and were accessing rural health services
- Referred to Community Based Rehabilitation Team from varying internal and external sources

Assessment

Assessment Environment:
- Face-to-face (F2F) assessment
- Pre and post therapy block

Assessment Battery:
- Oromotor examination – Movement of jaw, brows, lips, cheeks, tongue, palate, vocal folds
- Speech intelligibility at single word and sentence level - Assessment of Speech Intelligibility of Dysarthric Speech (ASSIDS) (Yorkston and Beukelman, 1981)
- Instrumental assessment of duration (seconds) and volume (dB) of vowel prolongation and reading 10x functional phrases
- Questionnaire to evaluate patient satisfaction using telehealth

Treatment

- 6 week therapy block - 18 sessions
- 2 x Telehealth and 1 x face-to-face sessions per week
- All sessions conducted at our rural facilities
- Therapy:
  - Diaphragmatic Breathing
  - Sustained phonation – volume (dB) and duration (seconds)
  - Functional phrases – volume (dB)

Equipment

<table>
<thead>
<tr>
<th>Device</th>
<th>Provider</th>
<th>Receiver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop computer</td>
<td>MOVI</td>
<td>MOVI</td>
</tr>
<tr>
<td>Adjustable web camera</td>
<td>(1920 x 1080 resolution)</td>
<td>(1920 x 1080 resolution)</td>
</tr>
<tr>
<td>Microphone</td>
<td>Cardioid condenser microphone</td>
<td>Cardioid condenser microphone</td>
</tr>
</tbody>
</table>
Outcome measures

<table>
<thead>
<tr>
<th>Outcome Measures</th>
<th>Pre therapy block</th>
<th>Post therapy block</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oromotor assessment</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Formal speech assessment (ASSIDS)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Assessment phonation time (dB)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Volume (sec)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telehealth Satisfaction Questionnaire</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Results: Impairment based

- Sustained phonation:
  - Timing: Mean increase of 5.56 seconds
  - Volume: Mean increased of 2.02 dB
- Speech Intelligibility: 100% intelligible speech achieved on ASSIDS at word and sentence level

Results: Questionnaire

- The results revealed that all participants and clinicians had an increased satisfaction and confidence with telehealth and identified that the service met their health care needs.

Results: Service intensity

Facilitators

- Support of Statewide Telehealth team, West Moreton Hospital and Health Service Telehealth team, CBRT and Speech Pathology department
- Receptiveness of rural sites
- Willingness of patients and clinical staff to try new technology

*“There should be more telehealth sessions, particularly in country areas where there are limited services and transport.”*
### Barriers

- Patient attendance
- Inter-rater reliability of assessments
- Measuring vocal volume via Telehealth
- Establishing a new delivery of service within current clinical demands (no additional funding)
- Availability of video conference units (provider and receiver)

### Barriers: Technological Drawbacks

<table>
<thead>
<tr>
<th>Problem</th>
<th>Laptop</th>
<th>Portable VC device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual quality</td>
<td>Reduced pixilation</td>
<td>Nil pixilation problems</td>
</tr>
<tr>
<td></td>
<td>Cameras doesn’t adjust to lighting</td>
<td>Camera automatically adjusts to lighting</td>
</tr>
<tr>
<td>Audio quality</td>
<td>Reduced volume</td>
<td>Adequate volume due to attached microphone</td>
</tr>
<tr>
<td>Connection</td>
<td>Lag time (visual and audio)</td>
<td>No lag time</td>
</tr>
<tr>
<td>Camera</td>
<td>Unable to remotely control camera</td>
<td>Able to remotely control camera</td>
</tr>
</tbody>
</table>

### Future directions

- Continuation of the service
- Expanding the service to deliver to other patient populations
- Ongoing evaluation of the service
- Measure rural onsite satisfaction with the service and the associated impact (nursing and administration time, demand for service, availability of the equipment)

### Conclusion

- Telehealth offered an intensive, feasible and efficient service for rurally located patients with Parkinson Disease accessing voice therapy within West Moreton Hospital and Health Service

### Questions?

**Natasha Moller**  
Speech Pathologist  
West Moreton Hospital and Health Service  
Email: natasha.moller@health.qld.gov.au

### References