Home Monitoring of Chronic Disease for Aged Care - Preliminary results of selected patient reported outcomes

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HIC August 2015

HEALTH AND BIOSECURITY
www.csiro.au

Initiative Funded by the Australian Government
The Spectrum of Care

Less Complex Case → More Complex Cases

100% % Self Care 0%

0% % Professional Care 100%

Self Care

Professional Care

most care is shared care

HOME COMMUNITY HOSPITAL

HIC 2015
Telehealth

• Empowering the patient
• Improved Outcomes
• Reduced Costs
CSIRO NBN Telehealth Trial

• CSIRO is lead organisation
• Total project size $5.4m ($3.02m Telehealth Pilots Program)
• Six trial sites in five states (revised 5 Trial Sites in 5 States)
• Focus on chronic disease management in the community
• Four different models of care represented
• Trial duration 20 months – monitoring ended in Dec 2014
Aims of the Trial

• To demonstrate how Telehealth services can be successfully deployed Nationally by piloting services in different settings across five states

• To gather evidence on how Telehealth services can be scaled up to provide an alternative cost effective health service for the management of chronic disease in the community

• Development and deployment of an Automated Risk Stratification System for triaging patients according to their health status
Key Objectives of the trial

• Identify and model the impact of introducing telehealth services into existing care models for the management of chronic disease in the community.

  - Service utilisation
  - Socio economic outcomes
  - **Impact on patients**, carers and clinicians
  - **Acceptability and usability (patients)** of telehealth services
  - Effect of workplace culture and capacity for organizational change management

• Develop robust statistical models to automatically risk stratify patients using questionnaires and vital signs data
Trial Sites and Design

**Trial Design**

- Case Matched controls

- Before-After-Control-Impact (BACI)
Telehealth Services Provided

• Vital Signs (provided as appropriate to patient’s clinical condition)
  - Blood Pressure
  - Pulse Oximetry
  - Single lead ECG
  - Blood Glucometer
  - Spirometry (FEV$_1$, VC, PEF)
  - Body Temperature
  - Body Weight

• Communications
  • Messaging
  • Video Conferencing

• Questionnaires
  • Large range of Clinical and Wellness questionnaires
Diagnostic for subject selection

At least two unplanned admissions to hospital in the preceding year for one or more of the following chronic conditions;

- Chronic Obstructive Pulmonary Disease
- Cardiovascular Disease
- Hypertensive Diseases
- Congestive Heart Failure
- Diabetes
- Asthma
The participants in this trial
(At each test site)

- 25 Test patients supplied with home monitoring telehealth services
- 50 Control patients (case matched to Trial subjects)
- The Test patients’ usual care community nurse/carer
- Clinical Care Coordinator(s)
- Project Officer assisting with all non-clinical duties for trial
- Clinical Trial Coordinator (CSIRO Liaison Officer with Trial sites)
- CSIRO Research Teams
Challenges we had to manage...

- The tests and controls were not recruited simultaneously
- Too few potential controls in all areas besides TAS and VIC
- Compliance with the study
- Change in design (to BACI)
- Not all monitored for 12 months...

“Don’t worry, the expectations are the same as ever...only completely different”
At End February 2015

Total enrolled
N=287

<table>
<thead>
<tr>
<th></th>
<th>ACT</th>
<th>NSW</th>
<th>QLD</th>
<th>TAS</th>
<th>VIC</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test</td>
<td>16</td>
<td>16</td>
<td>26</td>
<td>29</td>
<td>26</td>
<td>113</td>
</tr>
<tr>
<td>Control</td>
<td>23</td>
<td>13</td>
<td>29</td>
<td>60</td>
<td>49</td>
<td>174</td>
</tr>
</tbody>
</table>

Demographics

<table>
<thead>
<tr>
<th></th>
<th>TEST</th>
<th>CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean ± SD)</td>
<td>71 ±9.2</td>
<td>72±9.5</td>
</tr>
<tr>
<td>% Male</td>
<td>64.6</td>
<td>56</td>
</tr>
<tr>
<td>BMI (mean± SD)</td>
<td>30.6±8</td>
<td>28.0±7</td>
</tr>
</tbody>
</table>
Psychological and QoL outcomes

• Improvements in Psychological and QoL outcomes expected
• Some studies have shown no improvements*
• Recent systematic reviews show inconclusive results**


Data Collection

• Impact on patients

  Kessler 10: Anxiety and Depression
  - Entry - PO face to face
  - Monthly – telemonitoring device entry

  EuroQol-5D: Quality of Life
  - Entry - PO face to face
  - Weekly – telemonitoring device entry

• Acceptability and usability (patients)

  User Satisfaction Questionnaire
  - End of Participation
Results – K10

<table>
<thead>
<tr>
<th></th>
<th>Entry</th>
<th>3 months</th>
<th>6 months</th>
<th>9 months</th>
<th>12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>107</td>
<td>60</td>
<td>61</td>
<td>45</td>
<td>30</td>
</tr>
<tr>
<td>Median</td>
<td>20</td>
<td>15</td>
<td>16</td>
<td>15.5</td>
<td>14</td>
</tr>
<tr>
<td>SD</td>
<td>8.09</td>
<td>9.10</td>
<td>9.25</td>
<td>8.56</td>
<td>10.37</td>
</tr>
</tbody>
</table>

0-15 have 1/4 population risk of anxiety or depressive disorder

16-30: 3x population

30-50: 10x population
## Results – K10

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Entry - Median (SD)</th>
<th>Follow up - Median (SD)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry vs. 3 months</td>
<td>55</td>
<td>17 (8.66)</td>
<td>15 (8.96)</td>
<td>P=.001</td>
</tr>
<tr>
<td>Entry vs. 6 months</td>
<td>58</td>
<td>18 (8.99)</td>
<td>16 (9.39)</td>
<td>P=.002</td>
</tr>
<tr>
<td>Entry vs. 9 months</td>
<td>44</td>
<td>18.50 (7.66)</td>
<td>15.50 (8.56)</td>
<td>P=.072</td>
</tr>
<tr>
<td>Entry vs. 12 months</td>
<td>29</td>
<td>17 (9.03)</td>
<td>14 (10.37)</td>
<td>P=.075</td>
</tr>
</tbody>
</table>
Results – EQ-5D

Quality of Life

Average score

Entry: 110
Month 1: 38
Month 2: 43
Month 3: 49
Month 4: 57
Month 5: 61
Month 6: 59
Month 7: 49
Month 8: 47
Month 9: 43
Month 10: 39
Month 11: 40
Month 12: 29
Month 13: 22
Month 14: 16
Month 15: 12
Month 16: 9
Month 17: 5
Month 18: 5
## Results – EQ-5D

<table>
<thead>
<tr>
<th>Anxiety/Depression</th>
<th>B</th>
<th>3M</th>
<th>B</th>
<th>6M</th>
<th>B</th>
<th>9M</th>
<th>B</th>
<th>12M</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=65</td>
<td>N=59</td>
<td>N=47</td>
<td></td>
<td>N=32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am not anxious or depressed</td>
<td>55.4</td>
<td>56.9</td>
<td>52.5</td>
<td>59.3</td>
<td>61.7</td>
<td>63.8</td>
<td>65.6</td>
<td>68.7</td>
</tr>
<tr>
<td>I am moderately anxious or depressed</td>
<td>43.1</td>
<td>36.9</td>
<td>42.4</td>
<td>33.9</td>
<td>38.3</td>
<td>29.8</td>
<td>31.3</td>
<td>21.9</td>
</tr>
<tr>
<td>I am extremely anxious or depressed</td>
<td>1.5</td>
<td>6.2</td>
<td>5.1</td>
<td>6.8</td>
<td>0</td>
<td>6.4</td>
<td>3.1</td>
<td>9.4</td>
</tr>
</tbody>
</table>
# User perceptions - patients

<table>
<thead>
<tr>
<th>Complexity</th>
<th>N=40</th>
<th>% Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall, I find the TMD <strong>easy to use</strong></td>
<td></td>
<td>93</td>
</tr>
<tr>
<td>I sometimes find the TMD system frustrating to use</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>Instructions on the TMD are easy to understand and follow</td>
<td></td>
<td>88</td>
</tr>
<tr>
<td>Using the TMD system is cumbersome</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>I needed to learn a lot of things before I could get going with the TMD</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>I found the TMD unnecessarily complex</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>I think that I would need the support of a technical person to be able to use the TMD</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>I feel very <strong>confident</strong> using the TMD</td>
<td></td>
<td>90</td>
</tr>
<tr>
<td>I find the various functions in the TMD are well integrated</td>
<td></td>
<td>85</td>
</tr>
</tbody>
</table>

# Compatibility

<table>
<thead>
<tr>
<th>Compatibility</th>
<th>N=40</th>
<th>% Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMD is a tool that would be easy to incorporate into my daily routine</td>
<td></td>
<td>85</td>
</tr>
<tr>
<td>The TMD fits right into the way I like to manage my health</td>
<td></td>
<td>83</td>
</tr>
<tr>
<td>Using the TMD fits well with my lifestyle</td>
<td></td>
<td>75</td>
</tr>
</tbody>
</table>
## User perceptions - patients

<table>
<thead>
<tr>
<th></th>
<th>% Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Observability</strong></td>
<td></td>
</tr>
<tr>
<td>The effects of the telemonitoring service on my chronic condition are apparent to others</td>
<td>38</td>
</tr>
<tr>
<td>I would recommend using the telemonitoring service to other people</td>
<td>90</td>
</tr>
<tr>
<td><strong>Satisfaction</strong></td>
<td></td>
</tr>
<tr>
<td>Overall how satisfied are you with the telemonitoring service</td>
<td>90</td>
</tr>
<tr>
<td>Would you like to continue using the telemonitoring service after the trial?</td>
<td>60</td>
</tr>
</tbody>
</table>
Patient comments...

“I have a lot of faith in it and I show it to my mates, it is like having a doctor at home.

“This gives me a great piece of mind. I am getting to know the variations, and when I have a bad reading I take it easy. Without this thing I would just go about like normal and get myself in trouble.”

“I know the ladies behind are seeing my data and will call me if need be, it is like seeing my GP.”
Discussion

• Strengths of study
  – readily incorporating K10 and EQ-5D questionnaires to be scheduled through TMC and through longitudinal capturing of questionnaire responses
  – trial was based in multiple states and in different healthcare settings.

• Improvement in anxiety and depression as measured by K10

• Overall QoL not improved
  – WSD found that Telehealth did not improve QoL or psychological outcomes for patients with COPD, diabetes, or HF over 12 months
  – Telehealth could reduce health related QoL owing to the increased burden

• However, Anxiety and Depression improved as measured by EQ-5D

• High user acceptance and satisfaction by patients

• More research required to understand potential benefits and harm
Thank you

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Our Partners

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