Web Versus App –
Compliance of Patients in a Telehealth Diabetes Management Programme Using Two Different Technologies

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Content

- Background & Methods
  - The Problem - Diabetes
  - NFC based mHealth
  - The „Health Dialogue“ project

- Results
  - Patient demographics
  - Usage of App and Web
  - Comparison of compliance
    - App versus Web

- Summary and Conclusion

Telehealth in Australia’s „Red Center“

Diabetes

- shows a dramatic increase in prevalence*
- is a complex chronic disease associated with devastating late complications
- is an expensive disease
- late complications could be prevented or reduced
- Health care systems fail to provide adequate care for citizens with diabetes
- Disease management including Information management is urgently needed.

What can be done?

- Effectiveness of various actions on Glycated Hemoglobin (HbA1c)

<table>
<thead>
<tr>
<th>Action</th>
<th>No. of Tests</th>
<th>% Improvement in HbA1c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet Change</td>
<td>36</td>
<td>5%</td>
</tr>
<tr>
<td>Goal Management</td>
<td>36</td>
<td>4%</td>
</tr>
<tr>
<td>Patient Education</td>
<td>14</td>
<td>3%</td>
</tr>
<tr>
<td>Nutrition Education</td>
<td>16</td>
<td>2%</td>
</tr>
<tr>
<td>Electronic Patient Registry</td>
<td>6</td>
<td>1%</td>
</tr>
<tr>
<td>Blood Glucose</td>
<td>30</td>
<td>0%</td>
</tr>
<tr>
<td>Baseline Blood Glucose</td>
<td>35</td>
<td>-1%</td>
</tr>
<tr>
<td>Self Management</td>
<td>20</td>
<td>-3%</td>
</tr>
<tr>
<td>Baseline Blood Glucose</td>
<td>30</td>
<td>-5%</td>
</tr>
<tr>
<td>All actions</td>
<td>60</td>
<td>-7%</td>
</tr>
</tbody>
</table>

- > ICT (Information and Communication Technology based Therapy) is key!

Solution – better data analysis and presentation

High HbA1c values in the morning

Solution – Closed Loop Healthcare

Patient

Physician

Health Data Center

Anywhere

Anytime

Interaction with the real world ...

by touching things

with NFC

Interaction with the real world ...

by touching things

with NFC
mHealth based on Near Field Communication (NFC)

- Short range (5 cm), low-power, wireless communication technology
- By 2015, 50% of the smartphones shipped will support NFC*
- “Bring-in-Touch” – paradigm
  - Touch contactless smartcard to
    - start software application automatically
    - read data for identification and authentication
  - exchange data with NFC enabled devices
  - read out static data from RFID tag
- without prior pairing

*Source: Gartner Research. Publication Date: 22 March 2011. ID Number: G00211393

Intuitive data acquisition for patients based on NFC

- Touch ID card
  - To launch application
  - For patient identification and authentication
- Touch device to read out recently measured val...S
  - Blood pressure
  - Blood glucose
- ...
- Touch tag board/book with icons
  - Touch smileys to indicate wellbeing
  - ...

NFC based mHealth system „DiabMemory”

- How the telemonitoring system is being used in the „Health Dialogue”
- (starting 03:54)
The “Health Dialogue”

- Large scale pilot on telehealth in diabetes patients
- driven by a health care funding organisation
- “mHealth prescribed”
- Based on the AIT DiabMemory system

Proof of Concept:
- is mHealth for diabetes ready for day2day use?
- Acceptance by patients and doctors?
- Health outcomes?
- Health economics?

DiabMemory – patient interface choices

- App – NFC enabled mobile phone + dedicated application based
- Web – any connected device + browser based

Results – patient group

- Cut-off date for analysis
  - 21.06.2012
  - A total of 403 patients were included in the analysis
  - all patients enrolled to the telehealth program were included → intention to treat
- Drop outs
  - Patients who did not submit any values within the 20 days prior to the cut-off date

Results – Percentage of data submitted via App

<table>
<thead>
<tr>
<th>Percentage of data transmitted via the App</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>95</td>
</tr>
<tr>
<td>&gt;0 and &lt;10</td>
<td>4</td>
</tr>
<tr>
<td>≥10 and &lt;20</td>
<td>6</td>
</tr>
<tr>
<td>≥20 and &lt;30</td>
<td>4</td>
</tr>
<tr>
<td>≥30 and &lt;40</td>
<td>2</td>
</tr>
<tr>
<td>≥40 and &lt;50</td>
<td>1</td>
</tr>
<tr>
<td>≥50 and &lt;60</td>
<td>5</td>
</tr>
<tr>
<td>≥60 and &lt;70</td>
<td>4</td>
</tr>
<tr>
<td>≥70 and &lt;80</td>
<td>6</td>
</tr>
<tr>
<td>≥80 and &lt;90</td>
<td>8</td>
</tr>
<tr>
<td>≥90 and &lt;100</td>
<td>102</td>
</tr>
<tr>
<td>≥100</td>
<td>167</td>
</tr>
</tbody>
</table>
Results - Demographic data for the two groups

<table>
<thead>
<tr>
<th></th>
<th>App group</th>
<th>Web group</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients (females)</td>
<td>291 (59)</td>
<td>112 (3)</td>
<td>-</td>
</tr>
<tr>
<td>Females, %</td>
<td>20.3</td>
<td>2.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mean age (SD), years</td>
<td>57 (10)</td>
<td>56 (11)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Type of diabetes (1 / 2 / unknown)</td>
<td>17 / 257 / 23</td>
<td>9 / 99 / 4</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

n.s. = not significant

Results – Compliance, App versus Web

Results – Compliance, Males versus Females

Summary & Conclusions

- > 400 diabetes patients have been enrolled into a large proof of concept telehealth pilot in Austria. They had the choice between different ways to collect disease related data.
- Statistical analysis revealed a significantly higher compliance rate for patients using a mobile phone and NFC-based application (App) user interface to acquire and transmit their health data than for patients predominantly submitting data via web-browser (Web).
- Different types of data acquisition technologies may have an important effect on patients’ willingness to participate in telehealth programmes in the long-term.
- Further research is needed to gain more insight into critical factors with respect to long-term compliance of patients in telehealth programs.
Conclusions - Telemedicine was digital at first!

- Alice Springs Telegraph Station (opened in 1872)
  
  Duties of the station master ...

From Australia back to Austria ...

- [www.eHealth2013.at](http://www.eHealth2013.at)
- May 23-24, 2013
- Schloss Schönbrunn Conference Center, Vienna, Austria
- Deadline for submission of Papers: January 19th, 2013