Development of a mobile phone application for stimulation of personal mobility for COPD patients

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the recordings. **Results & Discussion** Peak sound levels are mostly caused by the slamming of doors (e.g. closets) and activities of residents and professional caregivers. Averaged over the five sleeping rooms the results show in the night period a mean A-weighted background noise level of 32.1 dB. The maximum A-weighted peak levels go up to 97.8 dB. During the day in the common rooms a mean A-weighted background noise level of 55.3 dB was measured with a maximum A-weighted peak levels up to 115.0 dB.

**References**


**Keywords:** housing & daily activities, health, sound levels, sound sources, older adults

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**Table 1. Measurement results of five common rooms and five sleeping rooms; Aeq=A-weighted background noise level; Peak,max=Maximum peak sound level; Peak, 5min= 5min Mean sound level**

<table>
<thead>
<tr>
<th>Common rooms</th>
<th>Sleeping rooms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter (dB)</td>
<td>Parameter (dB)</td>
</tr>
<tr>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>L_Aeq</td>
<td>55.3</td>
</tr>
<tr>
<td>L_Aeq</td>
<td>32.2</td>
</tr>
<tr>
<td>L_A,peak,max,day</td>
<td>108.6</td>
</tr>
<tr>
<td>L_A,peak,max,night</td>
<td>92.1</td>
</tr>
<tr>
<td>L_A,peak,5min,&gt;80,avg,day</td>
<td>90.0</td>
</tr>
<tr>
<td>L_A,peak,5min,&gt;80,avg,night</td>
<td>86.1</td>
</tr>
</tbody>
</table>

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**Figure 1:** Three versions of the app, adjusted from left to right; the newest version is on the right.
Purpose In order to maintain DPA in COPD patients after rehabilitation, we developed a mobile phone application. It measures DPA as steps per day, measured by the accelerometer of the smartphone, and shows the information to the patient via the display of the mobile phone. A physiotherapist can monitor the patient via a secure website, on which DPA measurements are visible for all patients. Here DPA goals can be adjusted and text messages sent. This presentation focuses on the development of the mobile phone application (app).

Method A list of requirements for the app was created by the research group, keeping the main research purpose in mind. An algorithm was written that measures steps by looking at sinus movements. Preliminary testing was performed by carrying the smartphone with the app for 3 days in combination with a validated accelerometer. Subsequently adjustments were made and testing was repeated. Results have been discussed in an interactive workshop. Development of the app was iterative (SCRUM methodology). Subsequently, three pilot studies were performed to test the mobile phone application for usability, user friendliness, and reliability, and were assessed with questionnaires. The application was tested with students and COPD patients, who wore the phone in their pocket. Pilot studies 1, 2, and 3 lasted for a week (n=10 students), 3 days (n=3), and 3 weeks (n=7), respectively. Feedback was collected in an interactive workshop. Subjects also wore a validated accelerometer (Sensewear) during the period of the study in order to compare these data with the DPA measurements of the mobile phone application. Mix methods have been employed for quantitative and qualitative data analysis in SPSS.

Results & Discussion The findings from the interactive workshop indicated that the design for description of the data needed to be explored. It also provided insight in the feedback to be given in text to persuade users to be physically active and which type of widgets motivate users to increase their physical activity. The application was found to be useful and easy to learn.

References

Keywords: housing & daily activities, health and self-esteem, COPD, physical activity

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