Well-being through work
Environmental satisfaction among the personnel in Tampere University Hospital – acoustic perspectives

Maija Suokas
Research scientist
Maija.suokas@ttl.fi
Full objectives of AKUSAI project

1. How the hospital staff perceive the physical work environment of their unit, especially acoustic environment and speech privacy?
   • Subjective ratings
   • FINISHED

2. Do the subjective ratings depend on the objective ratings of the unit?
   • Objective vs. subjective ratings
   • UNFINISHED

Units differ w.r.t.
• Age of construction – 1962-2010
• Type of unit
• Ventilation system
• Room acoustics
• Views outside
• Spatial density
• Etc.
METHODS – Implementation of survey

• Ethic board
• Creating the contact to the staff via email
• Preliminary info 30.1.2015
• Link to survey via email and intra
• Survey started 10.2.2015
• Survey closed 26.3.2015
METHODS – Staff and sample

• Personnel in the campus area: 73 work units
• Number of staff receiving the survey 1797 or more
• **Number of respondents 885** – Response rate at most 51%
Age

Gender

<table>
<thead>
<tr>
<th>Mean</th>
<th>Sd</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
<td>11</td>
<td>870</td>
</tr>
</tbody>
</table>
### Education

- **Maintenance**: 10
- **Administrative**: 59
- **Nurses**: 695
- **Special staff**: 57
- **Physician**: 64

### Work Shift

- **Day shift**: 383
- **Day or evening shifts**: 125
- **Three shifts**: 357
- **Mainly night shift**: 23

N=885, N=888
9. How satisfied are you with your work as a whole?

10. How satisfied are you with the work environment of your unit as a whole?

21. How satisfied are you with the acoustic environment of your unit as a whole?
Disturbance of environmental factors during nursing work

11. How much the following factors have disturbed you recently while doing direct nursing work?

- Ventilation sounds
- Sounds of apparatus
- Phone and alarm sounds
- Sounds of patients
- Speech sounds, conversations
- Sounds of walking
- Lack of space
- Unfunctional spaces
- Lack of visual obstructions
- Disorder
- Lack of lighting adjustments
- Unpleasant smells
- Dust or dirt
- Stuffy air
- Hot
- Cold
- Draught
- Not at all
- Only slightly
- To some extent
- To a great extent
- To a very great extent
Disturbance of environmental factors during paperwork

11. How much the following factors have disturbed you recently while doing paperwork or indirect nursing work?

- Ventilation sounds
- Sounds of apparatus
- Phone and alarm sounds
- Sounds of patients
- Speech sounds, conversations
- Sounds of walking
- Lack of space
- Unfunctional spaces
- Lack of visual obstructions
- Disorder
- Lack of lighting adjustments
- Unpleasant smells
- Dust or dirt
- Stuffy air
- Hot
- Cold
- Draught
- Not at all
- Only slightly
- To some extent
- To a great extent
- To a very great extent

0 %  20 %  40 %  60 %  80 %  100 %
Prevalence of strong disturbance

- Lack of space
- Speech sounds, conversations
- Unfunctional spaces
- Phone and alarm sounds
- Stuffy air
- Sounds of walking
- Disorder
- Hot
- Lack of lighting adjustments
- Draught
- Cold
- Lack of visual obscurcitions
- Sounds of apparatus
- Dust or dirt
- Unpleasant smells
- Sounds of patients
- Ventilation sounds

Share of respondents rating great or very great disturbance [%]

- Indirect nursing work, paper work
- Nursing work
12. How many hours of your work shift requires peace of work (other than direct nursing work)?

- < 1 h: 109
- 1-2 h: 260
- 2-3 h: 233
- 3-4 h: 113
- > 4 h: 168

13. Is there a peaceful space available for those work tasks?

- Never: 156
- Only seldom: 334
- From time to time: 195
- Often: 122
- Very often: 80
17. Can you conversate with patients, relatives and other staff so that confidential matters remain private?

18. Do you have a code of conduct in your ward to achieve sufficient speech privacy?
Psycho-physiological symptoms

Effects of acoustic environment has recently ...

- caused symptoms, such as headache: 11%
- disturbed restoration during breaks: 21%
- disturbed concentration: 34%
- annoying: 28%
- distressing: 16%
- been tiring: 26%

% rating great or very great extent

- Not at all
- Only slightly
- To some extent
- To a great extent
- To a very great extent
How is your unit compared to other units of this hospital campus?

Our social climate is ...

Our work environment as a whole is ...

Our acoustic environment is ...

- better than in other units.
- more or less the same as in other units.
- worse than in other units.
Effects of noise on conversation

Has the acoustic environment of your unit hampered discussion in ...
Preliminary associations between subjective measures (bivariate correlation analyses)

• Job-, Environmental- and Acoustic satisfaction are associated with each other
• Environmental satisfaction is most strongly associated with
  • Lack of space, unfunctional spaces, and disorder (r>0.45...0.55)
  • Noise was not so important (r=0.16...0.36)
• Noise sensitivity was associated with Acoustic satisfaction (r=0.30)
• Stress was associated with Job satisfaction (r=0.34)
  • Ac-S (0.27), Env-S (0.24)
• Stress was weakly associated with individual environmental factors: Lack of space (r=0.23) and phones sounds (r=0.23) had the largest associations
• Multi-variate regression models hopefully emerge later

DETAIL: Age had no association with Job-, Environmental- and Acoustic satisfaction.
• 5 units have been measured using 24 hour logging time

• Levels are not high and largest levels occur in coffee rooms and offices

• Mean values are close to 55 dB

• Speech is the main sound source
  • Speech is both useful and necessary sound but it can be noise for those who are not involved with the conversation

<table>
<thead>
<tr>
<th>Unit</th>
<th>LAeq,8h [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Evening</td>
</tr>
<tr>
<td><strong>Intensive care unit</strong></td>
<td></td>
</tr>
<tr>
<td>2-person patient room (critical care)</td>
<td>51</td>
</tr>
<tr>
<td>Corridor</td>
<td>55</td>
</tr>
<tr>
<td>4 person patient room (critical care)</td>
<td>52</td>
</tr>
<tr>
<td>Office room, aisle</td>
<td>50</td>
</tr>
<tr>
<td>Coffee room</td>
<td>60</td>
</tr>
<tr>
<td>3-person patient room</td>
<td>55</td>
</tr>
<tr>
<td><strong>Gastroenterology 1/Surgeon 2</strong></td>
<td></td>
</tr>
<tr>
<td>Office room</td>
<td>56</td>
</tr>
<tr>
<td>Corridor</td>
<td>59</td>
</tr>
<tr>
<td>4 person patient room (critical care)</td>
<td>58</td>
</tr>
<tr>
<td>Monitoring room</td>
<td>57</td>
</tr>
<tr>
<td>Break room</td>
<td>58</td>
</tr>
<tr>
<td>Office room</td>
<td>49</td>
</tr>
<tr>
<td>Office</td>
<td>54</td>
</tr>
<tr>
<td>3-person patient room</td>
<td>45</td>
</tr>
<tr>
<td><strong>Orthopedics and traumatology, ward</strong></td>
<td></td>
</tr>
<tr>
<td>6-person patient room</td>
<td>46</td>
</tr>
<tr>
<td>Office</td>
<td>56</td>
</tr>
<tr>
<td>Break room</td>
<td>57</td>
</tr>
<tr>
<td><strong>Cancer ward (RS2)</strong></td>
<td></td>
</tr>
<tr>
<td>Reception/office</td>
<td>54</td>
</tr>
<tr>
<td>Office</td>
<td>53</td>
</tr>
<tr>
<td>Office (closed)</td>
<td>54</td>
</tr>
<tr>
<td>Reception/office</td>
<td>56</td>
</tr>
<tr>
<td>Patient citchen</td>
<td>47</td>
</tr>
<tr>
<td>Break room</td>
<td>52</td>
</tr>
<tr>
<td><strong>MEAN OF ALL DATA</strong></td>
<td>54</td>
</tr>
</tbody>
</table>
Objective evaluation of the units

Visual assessment by two researchers (ONGOING PART OF PROJECT)

- **Type of unit** (Normal ward, Intensive care, Polyclinics, Surgery, First aid, Maternity, Etc.)
- **Number of patients/staff**
- **Age of unit** Year of construction/renovation
- **Windows/view/natural light** (No, limited sight, sight to nature)
- **Ventilation system** (Gravity-based outlet, mechanical outlet/inlet)
- **Cooling system** (No, active convectors, active chilling beams)
- **Operation**: 8/5, 14/7, 24/7
- **Spatial density** (three classes)
- **Activity/hastiness** (High, moderate, peaceful)
- **Masking sounds** (Low/High)
- **Room absorption** (Five classes)

**Noise level measurements**
- 24 hour noise logging in ten wards

Evaluation in 30 out of 73 units where >10 respondents
Conclusions

• Final conclusions of AKUSAI wait for the objective data of the units

• The results concern Tampere University Hospital in 2015.

• However, building styles from 6 decades are involved as well as all kinds of medical units so that the results may have some general interest.

• Based on survey, some preliminary conclusions are...
Conclusions

• 885 respondents from 73 units

• Lack of space & unfunctionality of spaces were the main disturbants during nursing - noise disturbance was not so serious

• Noise levels were not high: 35 and 62 dB. Noise problems seem to deal with disturbance rather than noise levels.

• Speech and conversations were among main disturbants both during paperwork and indirect nursing
  • Variation between units was large
  • Differences between both activity and acoustic quality may explain the differences between the units

• Speech privacy was not well supported by spaces

• Acoustic environment caused strong psycho-physiological symptoms among 10 to 35 % of respondents
Thank you!