The impact of autonomous smart homes on the independence of people with dementia

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Autonomous smart homes

Communication network

Sensors

Support devices

Care staff or outside help
Emulating carer actions

- **Carer detects problem**
  - Carer prompts user to act
  - If no response, carer intervenes
  - Carer reassures user

- **Sensors detect problem**
  - Home prompts user to act
  - If no response, home intervenes
  - Home reassures user
Bed occupancy sensor

Lighting control

Restless at night

Movement sensing

Door wander monitor

Gone outside

Tap usage monitor

Call for assistance

Had to turn off

Cooker monitor
Evaluation procedures

- **Assessment**
  - Assessment of support needed

- **Monitoring**
  - Provides baseline for evaluation

- **Technology turned on**
  - Evaluation using interviews, questionnaires, and sensor data

- **Move in**

**Technology assistance**
OT assessment

- Problem with continence
- Night-time wandering
Before turn on

Days

Hours sleep
User behaviour

- Get out of bed at night
  - Wander for a while
    - Wander for >10 minutes
      - Get back into bed
        - Still wandering after 15 mins

House reaction

- Light fade on
  - “I’ve turned the toilet light on for you dad”
- No action
- “You should go back to bed now dad”
- Light fades off after 3 mins
- Care staff alerted
After turn on

Hours sleep

Days
Main impact on behaviour

- Improved average sleeping from around 3 to 6 hours per night
- Much reduced wandering out at night
- Much improved urinary continence
Quantitative outcome measure: meeting goals

Goals set

- Usage of taps
- Usage of cooker
- Finding toilet
- Wandering

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<th>Family</th>
<th>Staff</th>
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<tbody>
<tr>
<td>Usage of taps</td>
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Qualitative outcome measures

**Client**
- Reported that he wasn’t aware of the technology – but he could recall the messages almost verbatim!
- Knew the messages were his daughter’s voice, and that he should do what she was recommending.
- Recalled the automatic lighting, and found it helpful.

**Daughter**
- Felt the technology was a real safeguard, and improved his independence.

**Staff**
- Had concern at the start, but became very confident about it.
- Hadn’t increased their workload.
- Tennant had become calmer and more settled.
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