

The development of a garment-integrated artificial intelligence-based sensor system for early detection of stress in persons with impaired cognition

Introduction

Persons with impaired cognition are vulnerable to stress (1). Stress can lead to challenging behavior, which negatively impacts quality of life of persons with impaired cognition and their caregivers (2,3).

Objective: to identify user requirements for a garment-integrated sensor system that enables caregivers to identify early signs of stress in people with impaired cognition.



Methods

- Qualitative design with online focus groups and interviews. Online focus groups were not feasible for people with dementia.
- 43 participants took part in two rounds of focus groups or interviews between February 2022 and May 2022.
- The last round is scheduled to take place in June 2022.
- Thematic analysis using Atlas.ti.

Table 1: Participant characteristics

Number of participants per group	People with intellectual disabilities			People with dementia		
	People with intellectual disabilities (n=7)	Family caregivers (n=6)	Healthcare professionals (n=7)	People with dementia (n=4)	Family caregivers (n=10)	Healthcare professionals (n=9)
Mean age in years [range, SD]	40.7 [25 – 62, SD=15.6]	55.7 [39 – 73, SD=12.2]	37.4 [22 – 52, SD=10.4]	66.3 [55-75, SD=9.8]	64.3 [54-72, SD=7.1]	49.0 [27-65, SD=13.4]
Female (%)	2 (28.6%)	4 (66.6%)	7 (100%)	2 (50%)	7 (70%)	9 (100%)

Results

Data collection is still ongoing. Preliminary results are divided into three main themes.



Safety

Sensor system must not contain loose parts to prevent choking hazards. To maintain privacy and ensure data security, accessibility to data should be limited.



Knowledge

Training regarding the use of the sensor system should be provided to staff, family caregivers, and (in some cases) the care recipient.



User acceptance

To increase acceptability, the sensor system should be customizable and should not 'stand out' to minimize stigma. The sensor system should be user friendly to increase acceptability among healthcare professionals.

Preferred designs for the sensor system are a wristband or shirt.



Conclusions

User friendliness and customizability to the needs and preferences of the person with impaired cognition are important user requirements for the sensor system.

Training in the use of the system should not be limited to healthcare professionals.

Third round of focus groups will identify factors deemed essential for implementation of the sensor system in long-term care.



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