Enabling Aging in Place with Personal and Environmental Emergency Response Systems: The HOME-Tech Study

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Introduction

- The demand to age in place is occurring in the context of burgeoning healthcare budgets, a shrinking work force to provide in-home care, and increased demands on family caregivers.[1,2]
- New technology, including personal and environmental sensors and alarms has the potential to help maintain older adults at home.[3]
- First-generation sensors and alarms require user activation.[4] Second- and third-generation devices are automatically activated through changes in the environment or the user's behaviour.[4]
- Few studies have evaluated how these new technologies are experienced by users and their caregivers.

Objectives

- To explore the impact of personal and environmental sensors and alarms on health outcomes and service delivery in community-dwelling older adults.

- Research questions:

1. What is the effect of providing first-, second-, and third-generation alarm and sensor devices to community-dwelling older adults in terms of outcomes such as independence, safety, health outcomes, quality of life and well-being of individuals?

2. What are the perceptions and lived experiences of older adults with the use of the first-, second-, and third-generation alarm and sensor devices in terms of satisfaction, acceptability, value, and usability?

Methods and Analysis

- Participants were community-dwelling individuals 60 years of age and older, at risk for being unable to remain in their own homes.
- Participants were provided with up to 3 sensors and/or alarms by Northwood Intouch, a local provider, based on their needs.
- A mixed-methods approach using both quantitative surveys and semi-structured qualitative interviews was employed. Participants were interviewed in their own homes before the installation of the devices, and approximately 3 and 6 months later.
- A total of 36 older adults were recruited at the onset, and 20 remained at the end of the study.
- The analysis identified 7 main themes. Highlights from two themes: (1) personal and contextual influences on experiences with devices and; (2) participant outcomes are included here.
- Pseudonyms are used.

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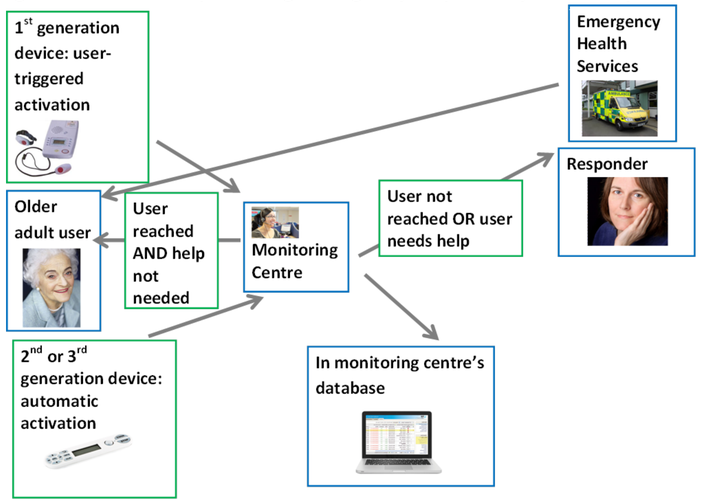
Figure 1: Relationships among emergency response system components



Results

PERSONAL AND CONTEXTUAL INFLUENCES ON EXPERIENCES WITH DEVICES

Person-device fit. The fit between a particular device and the user varied based on the user's perception of how well the device met his or her needs. Participants varied in the extent to which they perceived a need for a particular device, which affected how they used the devices. For example, Leona, who was in her late-eighties and experienced frequent falls, explained how the personal pendant fit in with her needs:

6 months:

> "I think [the pendant] is what I need to be here. As long as I'm here why, yeah I'd like to know I can get help."

In contrast, Christine, who was in her mid-sixties and had recently undergone knee surgery, explained how she felt she no longer needed the pendant:

3 months:

> "I think the device is better for a person who is more disabled or has more health issues than what I had. Because after 3 weeks I was able to do things for myself. I let the girls go that were here and everything 'cause by that time I was able to get my own meals, get in and out of the shower by myself and do my own laundry and all that sort of thing so."

A few participants who had the medication dispenser or the stovetop sensor expressed that they did not find this device fit within their perceived needs, as Carol explained:

> "It was just inconvenient. You know if I put a roast in the oven or something then I kind of knew within my mind when it would be ready because I go a lot by smell and then that thing would go off because I completely forgot I had to run in. You know I'm too busy getting ready for company or something…"

Results Cont'd

Prohibitive cost. A few participants indicated that they wouldn't keep the device past the study period because of the cost. For example, Patricia explained:

6 months:

> "I would really love to have it but I don't have the money to afford it. That's what I said to the girl when she called."

PARTICIPANT OUTCOMES

Increased sense of safety. Of the participants who completed the study, the majority indicated feeling safer as time went on because of the personal pendant. Leona expressed how the personal pendant increased her sense of security, and this was maintained over time:

3 months:

> "I always had a fear and I always think when I walk, what if I fall […] in the house we had a lady […] she went to the fridge for something and she went down, she fell, she got lodged in there and she couldn't get herself moved. She dislocated her shoulder and she couldn't […] get anybody to come and it took her several hours to get herself hitched in enough and then she had no medical things on her or anything […]
>
> So I feel no matter where I am and at night time I take [the pendant] off but I lay it right on my stand by my bed and my phone and numbers there and lights that go on and things there, and it's right there beside me."

6 months:

> "Oh I like the pendant. It makes me feel secure. I feel more secure and I know [my daughter] does too. I have it and I wear it. It's nice to know and I take it in off at night and I put it beside my bed on my stand so I know if I'm in distress or anything, I need help, I can get it."

Conclusions

- The majority of participants reported feeling safer having the personal pendant.
- Some of the second- and third-generation devices did not seem to align with participants' expectations, highlighting the importance of customizing devices so that they fit with older adults' needs.
- These results reflect the wide range of factors influencing the acceptance and adoption of technology[5] and suggest that newer generations of technology may be perceived as a threat to independence for some people.[6]
- More research is needed on how such devices can be used to support the varying needs of older adults.
- More research is needed on the cost-effectiveness of increasing financial accessibility to the devices to support aging in place.

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