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Fall detection devices for seniors are falling short

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The high-tech aids seniors rely on to summon help if they fall might not be as effective as they'd like to believe.

A new review co-written by University of Alberta researchers concludes that fall detection technologies—monitors like wearable wristbands and pendants or at-home sensors—need to be more extensively explored and tested outside lab settings for how people actually use them.

"There seems to be a knowledge gap between fall detection technology and the use of it," said study co-author Lili Liu, a professor in the Faculty of Rehabilitation Medicine.

Even though the market is already filled with such products, their readiness for use by the general public is questionable, she added.

"It's disturbing to think that these technologies aren't properly tested for the real world, to be used by people who very much depend on them."

In Canada, falls are responsible for 85 per cent of hospitalizations for seniors. After a serious fall, 20 per cent of older adults will die within a year.

Liu, PhD student Noelannah Neubauer and researchers from the Université de Montréal and Universidad del Rosario sifted through 118 peer-reviewed studies, published worldwide in three languages, that focused on development and evaluation of fall detection devices. Ten

types of monitoring technology were identified, including wearable devices and in-home sensors. Though the quality of the research was strong overall, it only went so far, Liu said.

"Most of the studies didn't describe whether the technologies were ready for use in the real world," she added.

Most were tested only in lab settings using available students, said Neubauer. Some studies even used mannequins to simulate falls. None tested the technology with seniors or in real-life environments.

The review also revealed gaps in feedback from real users. Only three studies explored user acceptance, and none focused on their preferences, leaving fall detection tech research out of step with the World Health Organization's recommendation to address what older adults want.

"Most of the technology being researched was either wearable or situated in the home, but most people want a combination of both," Neubauer said.

"None of the studies addressed the fact that just because you have a piece of technology that works, doesn't mean it works for the older adult," Liu noted.

One of the studies showed that 80 per cent of older adults were reluctant to push the button on their devices after a fall, either because they had difficulty activating it or because they didn't want to disturb a caregiver.

"Not everyone who falls wants an immediate emergency dispatch. They might want to contact a neighbour instead or get up themselves. We need to have their input into what happens when they fall, and the technology doesn't capture that," said Liu.

One of the main reasons for developing fall detection devices is to offer an option for people who want to remain independent, yet not one of the studies measured that as an outcome, she added.

In addition, 90 per cent of the reviewed studies didn't include any input from professional or family caregivers, but it's vital to designing technology that they're willing to use, said Neubauer.

"There are too many devices available in the market that are sitting on shelves collecting dust because they did not address the varying wants and needs of the consumer, and caregivers are often the ones who purchase these technologies to assist in their duties."

The cost of the technology was another area that was barely explored: 80 per cent of the studies didn't address the question at all, while 15 per cent mentioned it without specifying a cost, only recommending that systems be low-priced.

More medical research needed

Scientific research into fall detection technology is often limited by grant funding, noted Liu, a member of AGE-WELL, a Canadian technology and aging research network.

"Logistical issues around privacy and ethical considerations come into play when involving members of the public in research projects, and that's a lengthy process that takes time and can often extend beyond grant timelines," Liu said.

There's a need for researchers and networks like AGE-WELL to work more closely with industry to extend the research beyond a lab setting and have that work reflected in the products people are using, she believes.

"It's not an unreasonable ask for industry to validate their products," she said.

Many fall detection products on the market stem from the development of information technology, not necessarily from medical knowledge, she noted.

"These are consumer products versus medical products, so we don't really know how reliable they are."

And while that's "discouraging in one way, it's also encouraging to know that there's so much more than can be done in this field," Liu added.

More information: N. Lapierre et al. The state of knowledge on technologies and their use for fall detection: A scoping review, *International Journal of Medical Informatics* (2017). DOI: 10.1016/j.ijmedinf.2017.12.015

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