

Author:
Doug Johnson, Occupational Therapist
douglas.johnson@nhs.net



The impact of falls sensors and technology in

falls prevention and detection – a narrative literature review



Introduction and background

Adult Community Services has a high percentage of referrals for those who fall. My aim was to review the literature in relation to the impact of falls sensors and technology in falls prevention and their use in the early identification and notification of falls.

The main objective was to gain an awareness of current fall sensors and technology and the use in falls prevention programmes and to consider the implications of a long lie.

- sensors and technology
- fall prediction or fall notification
- wearable and non-wearable
- compliance
- long lies.

Two other factors were highlighted in the results. Often the falls systems were tested more often on younger people in laboratory situations or by actors in an attempt to gain appropriate quantity of information. All of the studies reviewed had small test groups and there were no large-scale randomised controlled trials.



Population – falls, sensors, technology, falls prevention.

Intervention – sensors, sensor mats, sensor alarms, wearable sensors, assistive technology, home monitoring system, remote monitoring system.

Compare – the different technological interventions available.

Outcome – this is the effect of a long lie and impact of an early response to a fall. These were refined to more general terms to allow for a broader search to be completed.

Analysis and results

A total of 29 studies – 22 articles that met the criteria and seven grey literature sources, as they informed this practice area.

Each study was analysed systematically drawing out key themes from the results and the discussions from each paper. These themes were then reviewed and correlated into categories:

Discussion

The review of the evidence was clear – there are inconsistencies and gaps in the literature in support of the effectiveness of falls sensors and technologies in falls prevention and detection.

There is evidence to support the effectiveness of multi-faceted interventions for falls but there is no evidence to support which facet is having an impact. Compliance was a reoccurring issue highlighted in the literature with many variables that influenced the use of technology and sensors but with no clear solutions to improve this. There was little support in the evidence that fall lies can be reduced if sensors are used effectively and a timely response is provided.

Methodology

The following databases were used to perform searches between January and July 2020: Google Scholar, EBSCO, SCOPUS, CINAHL, PubMed, The British Library and the Cochrane Library.

The following keywords were identified from the research question and population, intervention, comparison, outcome (PICO) was used to help refine the search terms.



Conclusion and recommendations

The evidence reviewed is unclear as to the specific impact that fall sensors and technology has in fall prevention and detection.

Further research is needed to understand the full impact that falls sensors and technology have in falls prediction and detection.

Randomised controlled trials with significant numbers would be beneficial in ascertaining the effectiveness of the above, though there would have to be a robust ethical framework.

Further research is needed into the types of technology and sensors to ascertain the efficacy and cost effectiveness and to develop an operational framework.

This should include expected response times to falls notification.



Key references

- Tinetti, M.E., Liu, W.L. and Claus, E.B. (1993). 'Predictors and prognosis of inability to get up after falls among elderly persons', *Journal of the American Medical Association*, 269 (1), pp. 56-70
- Todd, C. and Skelton, D. (2004) 'What are the main risk factors for falls amongst older people and what are the most effective interventions to prevent these falls?' Copenhagen, WHO Regional Office for Europe (Health Evidence Network Report; <http://www.euro.who.int/document/E82552.pdf>, Accessed: 11 March 2020
- Fleming, J. and Brayne C. (2008) 'Inability to get up after falling, subsequent time on floor, and summoning help: perspective cohort study in people over 90', *BMJ* 2008; 337, a2227 doi:10.1136/bmj.a2227
- Khosravi, P. and Ghapanchi, A. H. (2015) 'Investigating the effectiveness of technologies applied to assist seniors: A systematic literature review' *International Journal of Medical Informatics*, 85 (2016), pp. 17-26