

Artificial Intelligence in Fall Prevention for Older Adults in the UK: A Systematic Review of Effectiveness, Ethics, and Human Factors.

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Research Question:

What is the effectiveness of AI -based interventions for fall prevention in Older Adults in the UK, and how do ethical considerations and human factors influence their design, implementation and use?

Research Aim:

This study will be a systematic review and critical analysis of AI use in older adults in fall prevention in the UK, its effectiveness, ethical considerations, and human factors that affect its use and adoption in healthcare and social care facilities.

Research Objectives:

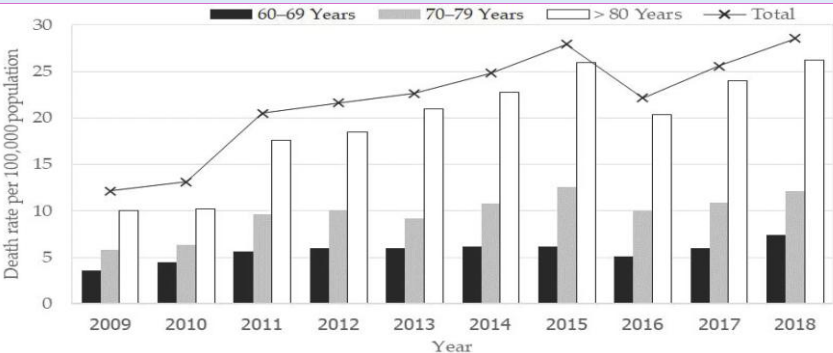
1. To identify and synthesise existing evidence on AI-based interventions used for fall prevention (Palmerini et al., 2017; Yu et al., 2020).
2. To assess the effectiveness of AI technologies in reducing falls, fall-related injuries, and associated health outcomes in this population.
3. To critically examine the ethical issues related to AI in fall prevention, including privacy, consent, data security, autonomy, and potential bias.
4. To explore human factors affecting the implementation and acceptability of AI fall-prevention tools,
5. To develop evidence-based recommendations for the safe, ethical, and person-centred use of AI in fall prevention for older adults in UK health and care settings. The design and deployment of AI technologies.

Rationale of Research

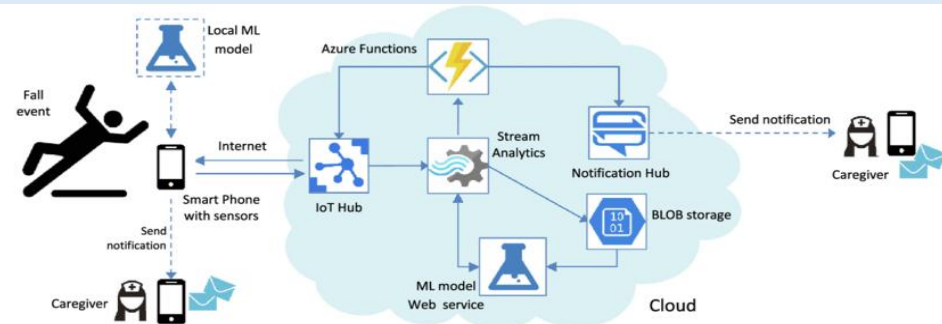
- Elderly falls increase morbidity, death, and medical costs. Falls are a major public health issue for this group.
- Falls as the second biggest cause of accidental injury deaths.(WHO,2023)
- Falls cause the most injury-related hospital admissions for 65-year-olds in the UK (NHS, 2022).
- NHS contributed this data. Fall prevention techniques including physiotherapy, medication reviews, and home hazard improvements may reduce risk but not all fall causes (NICE, 2022).
- Smart home monitoring, wearable sensors, and machine learning algorithms are revolutionising fall detection and prevention (Wong et al., 2023, Igual et al., 2013; Delahoz and Labrador, 2014).
- Each technology has AI-powered fall prevention systems' efficacy, ethics, and human elements are under studied.

Prevalence

- About one in three 65-year-olds in the UK fall each year, according to the NHS.
- Falls cause around 220,000 emergency hospital admissions in England, according to Public Health England (2021).
- People who fall can suffer hip fractures, brain damage, and mobility issues. These injuries can affect a person's independence and quality of life (NICE, 2022; WHO, 2023).
- National Institute for Health and Care Excellence (NICE) estimates that fall-related injuries will cost the NHS £2.3 billion annually.
- The number of persons who fall will rise dramatically over the next several decades due to the ageing population (Office of National Statistics, 2023). A large rise in falls is projected.



Death rates from falls among older adults in the UK by age group (2009–2018) (Office for National Statistics, 2023).



Research Impact

This research is beneficial for several stakeholders:

Older adults

- AI-enhanced fall prevention for early risk detection and monitoring (WHO, 2023).

Improved safety, independence, and quality of life for older adults. Provide medical and social care.

Health and social care services

- There is evidence that fall prevention programmes should integrate AI-based monitoring systems (NICE, 2022).

Hospital admissions and healthcare costs related to falls may decrease.

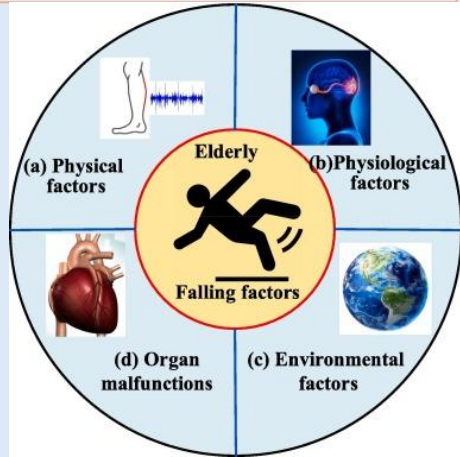
Healthcare professionals

- AI-assisted fall detection and digital health technology expertise improved

- Helping fall prevention programs make evidence-based decisions (Bates et al., 2021).

Policymakers need evidence to impact national standards for secure digital health technology integration into healthcare systems.

Makers of technical equipment (Flor-Unda et al., 2024) discuss the ethics, usefulness, and acceptance of AI systems among elderly people, carers, and healthcare professionals.



Multifactorial risk factors for falls among older adults (WHO, 2023).

Artificial intelligence wearable sensor systems for fall detection and monitoring in older adults (Wong et al., 2023).

References

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