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Implementation strategies supporting fall prevention interventions in a long-term care facility for older persons: a systematic review protocol

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ABSTRACT

Introduction Falls are common among older people in long-term care facilities (LCFs). Falls lead to significant morbidity, mortality and reduced quality of life among residents. Fall prevention interventions have been shown to reduce falls in LCFs. However, this may not always translate to effectiveness in real-world situations. We will conduct a systematic review (SR) to identify the implementation strategies used in fall prevention interventions in LCF, describing the effectiveness of strategies in terms of key implementation outcomes and fall reduction.

Methods and analysis The search will include scientific papers in electronic databases, including PubMed, CINAHL, Embase, PsycINFO, Scopus and Web of Science, and published theses. The SR will consider all original research that empirically evaluated or tested implementation strategies to support fall prevention interventions in LCF, published in English or Arabic between 1 January 2001 and 31 December 2021, where data are presented on the implementation strategy (eg, audit and feedback, champions) and/or implementation outcome (eg, fidelity). Clinical trials, quasi-experimental studies and quality improvement studies will be eligible for inclusion. Two researchers will complete abstract screening, data abstraction and quality assessments independently. The screening process will be presented using a Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram. Data will be extracted into a standardised table, including the country, year, authors, type of study, primary clinical outcome (falls rate and/or risk reduction as available), implementation strategy and implementation outcomes. Implementation strategies will be defined and categorised using the Expert Recommendation for Implementing Change Taxonomy. Implementation outcomes will be defined and categorised using the Implementation Outcomes Taxonomy, and clinical outcomes of the intervention effectiveness for falls preventions will be reported as formulated in each study, with a final narrative synthesis of data.

Ethics and dissemination Ethical approval is not required for this study, and the results will be disseminated via peer-reviewed journals and presented at international conferences.

PROSPERO registration number CRD42021239604.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This planned review of effective implementation strategies and processes used in fall interventions in long-term care facilities (LCFs) will help to bridge the evidence–practice gap and to facilitate successful implementation of these interventions in the real-world clinical practice.

⇒ This planned review will Identify the range of implementation strategies used in fall prevention interventions in LCF and the process of implementing the intervention.

⇒ Data concerning implementation strategies and outcomes will be categorised and defined using the Expert Recommendation for Implementing Change Taxonomy and the implementation outcomes taxonomy frameworks, which are considered seminal in the field of implementation science.

⇒ The planned review will include all the clinical trial types, and it is not applicable to be conducted as a meta-analysis.

⇒ The results of this planned review will be summarised to provide a descriptive review.

BACKGROUND AND RATIONALE

Falls are considered a serious health issue, with the WHO reporting that more than 30% of people aged 65 or older experience at least one fall yearly, while 50% of these experience recurrent falls.[1] A fall is defined as 'an event which results in a person coming to rest inadvertently on the ground or floor or other lower level'.[2] Falls can lead to decreased physical activity and loss of independence, increased fear of falling and depression, and reduced confidence and life quality among older people.[3 4] The incidence rate of falls in long-term care facilities (LCFs) is reported to be 1.7 falls per year per resident, more than three times that of community dwellers.[5] Half of all LCF residents experience falls each year, while 25%–30% suffer physical injuries after falling.[6 7] Hip fracture due to falls is estimated

to occur in 3%–5% of residents annually in LCF.[8] Fall-related injuries substantially increase morbidity, mortality and hospitalisation rates among residents in LCF.[7 9] Indeed, 40% of mortality in residential care is caused by fall injuries.[10]

Preventing falls among LCF residents is considered a challenge, and many fall prevention interventions have been described, whether single, multicomponent (standardised) or multifactorial (tailored) interventions.[11 12] These latter fall prevention interventions typically include exercise, environmental assessment, staff education and training, medication review, vitamin D supplementation, etc.[3] Several systematic reviews (SRs) and meta-analyses (MAs) have evaluated the effects and efficacy of fall prevention interventions in LCF.[3 4 12–14] An SR and MA of 14 studies conducted up to 2013 reported that the rate of recurrent falls decreased by 21% due to fall prevention interventions, although there was no reduction in the overall number of falls.[3] It also reported that multifactorial interventions significantly reduced the number of falls and recurrent falls, while single and multicomponent interventions did not. This same SR reported that staff education and training as a single intervention had a possibly harmful effect by increasing the fall rate in the intervention groups compared with the control groups.[3] A later SR of 36 studies conducted up to 2019 reported that fall prevention interventions have a beneficial effect in reducing falls, the number of residents with one fall during the intervention and follow-up, and the number of recurrent fallers by 27%, 20% and 30%, respectively, in LCF residents.[12] It also reported that all multifactorial interventions effectively reduced the number of fallers, while single interventions substantially decreased the number of recurrent fallers. As a single component, exercise is effective, reducing by 36% the number of fallers and by 41% the number of recurrent fallers. Some single interventions involving staff education and training demonstrated benefits in terms of reducing falls and recurrent falls, whereas others were not effective.[12]

Existing evidence indicates to a degree how multifactorial interventions effectively prevent falls in LCF.[15 16] A multidimensional or multicomponent intervention simultaneously targets several dimensions such as environmental modification, medication review, staff education and physical therapy. The specific term 'multifactorial intervention' is used when the intervention is tailored to the recipient's needs rather than applied in a standardised way to all participants.[9] Implementing these interventions and other kinds of fall prevention interventions in a 'real-world' clinical situation may be complex and challenging because they contain many components and require change at multiple levels. Real-world clinical practice is different from a clinical trial setting. In the latter, there are strict participant inclusion and exclusion criteria, sometimes dedicated support to implement the intervention, which is usually of a limited duration, and other interventions are not usually occurring simultaneously. In everyday (or real-world) clinical practice, the receiving system/staff usually has not volunteered for the intervention, may have multiple competing priorities and demands, including other interventions being implemented simultaneously, and there may be more heterogeneity in staff, patients and systems. In an SR of mixed-method studies which aimed to identify factors that limited fall programme success in LCF, there were 27 barriers, most commonly, staff feeling overwhelmed and helpless, staffing issues, limited knowledge and skills, frustration and concern about the ability to control fall management.[15] The SR authors recommended staff training to improve communication, knowledge and skill, which are modifiable factors when developing a fall prevention programme,[15] and that multifactorial intervention should be addressed barriers to implementation.

The intervention's effectiveness might be influenced by the implementation strategy used, defined as 'the methods and techniques used to enhance the adoption, implementation, and sustainability of a clinical programme or practice',[17] and how well the intervention is implemented. The broader implementation science literature highlights the effectiveness of some implementation strategies (eg, audit and feedback, educational outreach, practice facilitation, local opinion leaders, etc).[18] The implementation outcomes are considered precursors to service and health outcomes and defined as 'the effects of deliberate and purposive actions to implement new treatments, practices, and services',[19] as they give a good indication of the extent and quality of implementation of the intervention. However, all previous SRs[3 4 12–14] reported only sparsely on the implementation strategies or outcomes of the fall prevention interventions. Therefore, determining the process and success of falls prevention intervention implementation is a key issue to be addressed.

Implementation strategies can be described in different ways in different studies, which makes comparison or synthesis of evidence challenging. The Expert Recommendation for Implementing Change Taxonomy (ERIC) is a comprehensive collection of 73 discrete implementation strategies, with agreed labels and definitions for each of these, organised into nine groups.[20 21] The ERIC compilation is based on consensus among experts from clinical practice and implementation science, refining Powell *et al*'s original list of implementation strategies from health and mental health literature.[20] The ERIC compilation was chosen for this review to facilitate the systematic description and reporting of implementation strategies, regardless of differences in terminology between studies.

We aimed to address the current evidence–practice gap by identifying the range of implementation strategies used in fall prevention interventions for older people in LCF and their success as measured by implementation outcomes and fall reduction.

Research question

► What implementation strategies have been used in single-component or multicomponent/multifactorial fall prevention interventions in LCF to date?

Table 1 Inclusion and exclusion criteria according to the PICO framework

PICO framework	Inclusion criteria	Exclusion criteria
Population	▶ All staff members in LCFs working with older people (aged 65 and above). ▶ Older LCF populations or mixed LCF populations where the older population is separately studied. ▶ Mixed settings can be included only if LCF-related data are separately reported.	▶ Intervention is not directed at the staff of the LCF. ▶ Studies included only individuals aged under 65 or where data are not separately reported for the older people within a mixed-age population. ▶ Studies based outside of an LCF. ▶ Studies relating only to specific populations in LCF, for example, long-stay mental health residents, people with cognitive issues, intellectual disability, etc. ▶ Non-English, non-Arabic language. ▶ Published before 2001.
Intervention	Fall prevention interventions, whether single component or multifactorial/multicomponent, where there is an implementation strategy or implementation process described	Studies where the implementation strategy or process is not described
Comparaison	Usual care or other interventions	There will be no restriction on the comparator used in eligible studies.
Outcome	▶ Implementation outcomes (eg, adoption, fidelity, etc). ▶ Patient-related outcomes (ie, fall risk and/or rate)	Studies must include implementation outcomes and/or falls outcomes to be included.

LCF, long-term care facility; PICO, population, intervention, comparison and outcome.

▶ What implementation strategies are most successful in terms of implementation outcomes and fall prevention?

Objectives

This SR aims to synthesise the evidence on implementation strategies used to support falls prevention interventions (including RCTs of all types, quality improvement projects and quasi-experimental studies) as follows:

▶ Identify the range of implementation strategies used in fall prevention interventions in LCF and the process of implementing the intervention.

▶ Synthesise the effectiveness of the strategies used to implement fall prevention interventions in LCF.

METHODS

This review was registered on the International Prospective Register of Systematic Reviews database (registration number CRD42021239604). The reporting of the review follows the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocol. The population, intervention, comparison and outcome framework was used for framing and reporting the inclusion and exclusion criteria for this protocol (Table 1).

Types of participants/population

This review will consider all the studies that had an intervention directed to all staff members who worked at LCF for older people aged 65 years and older and reside in LCF. LCFs are defined as 'residential facilities that provide 24-hour-a-day surveillance, personal care, and limited clinical care for persons who are typically elderly and infirm'.[12] This includes nursing homes and care homes. We will exclude studies reporting on specific populations in LCF, for example, those residing in long-stay mental health facilities, and studies involving only people with cognitive issues, intellectual disability, etc. We will include studies aimed at mixed populations in LCF, where the data related to older people can be separated.

Types of interventions

This review will consider all studies aimed at preventing falls, whether designed as single, multicomponent or multifactorial interventions, and whether delivered by multidisciplinary teams or by a single discipline. We will include studies that describe the use of any implementation strategy, such as champions/local leaders, audit/feedback, education materials, workshops, etc. Strategies will be defined using the ERIC.[20 21]

Comparisons

This will include any other interventions or usual care.

Types of outcomes

This review will consider two main outcome types: implementation outcome, which measures the success of the implementation process, and focused patient-related outcomes (ie, fall rate and risk).[19] There will be no restrictions of the studies based on the included outcomes, as long as the implementation strategy is included, but only these two outcome types will be presented. Our primary interest is the implementation outcomes, which include feasibility, fidelity, adoption, appropriateness, implementation cost, sustainability, acceptability and penetration of

the intervention, as per Proctor et al.[19] We are also interested in the effect of the intervention on falls reduction, noting that this is variably reported in intervention studies as fall risk reduction, fall rate reduction, time to first fall, etc. We will not differentiate between injurious and non-injurious falls and will not present data on secondary outcomes such as medication use or mortality rates .

Types of studies

We will consider all intervention studies involving experimental and quasi-experimental designs, including randomised controlled trials (RCTs) (single site, cluster), feasibility studies for RCTs, quality improvement empirical studies, and pretest–post-test empirical designs. Our primary focus is the implementation strategy and process and the success of this in terms of implementation outcomes. Therefore, as well as quantitative studies, we anticipate including some mixed methods and qualitative studies that accompany or arise from RCTs or prestudies–poststudies, where these explain the implementation success or describe the implementation strategy in more detail. All relevant studies published in English or Arabic in the last 20 years (beginning 1 January 2001) will be included, noting that implementation science is a relatively new field so that we expect little data to be available prior to 2000.

Information resource and search strategy

We will conduct searches for all published interventions studies (as specified previously) in electronic databases, including PubMed, CINAHL, Embase, PsycINFO, Scopus and Web of Science, limited to the last 20 years. The search will also include published theses within the last 20 years, identified using the following grey literature databases:

► OPEN GREY (www.opengrey.eu).
► Open Access Theses and Dissertations (www. Oatd. org).
► ProQuest (www. Proquest.com).
► British library EThOS (www.ethos.bl.uk).
► EBSCO Open dissertation (www.ebsco.com).

► RIAN (www.rian.ie).
► LENUS (www. lenushealth.com).
► CORA (www. cora.ucc.ie).

The process of searching will combine free and controlled terms, including text-specific keywords or Medical Subject Headings terms, and it will be integrated with Boolean operators. The search will be filtered to include studies in the English and Arabic languages (spoken by the authors), in an LCF, all intervention study types, and older people aged 65 years and above (table 2). A forward and backward citation search of the included studies will be performed. We will also conduct a manual search, using the names of the authors of intervention studies, seeking any linked feasibility or implementation papers.

Data management and selection process

All retrieved articles will be imported and managed using the evidence synthesis software Covidence (www. covidence.org), with full references included. Duplicate studies will be removed using the application. Two independent reviewers will screen the retrieved studies based on titles and abstracts, discussing any discrepancies and agreeing with a list of potential studies for full screening. The two reviewers will then examine the full text of these articles independently to ensure that they fulfil the inclusion criteria. Disagreement about eligibility at this stage will be resolved through discussion and consultation with an additional reviewer if necessary. The results of the search strategy and selection of studies for inclusion will be reported using a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram.

Data extraction

Two independent reviewers will extract the data regarding the eligible studies. The data will then be compared, and any disagreement will be solved by discussing until a consensus is reached, with input from a third (senior) researcher if needed.

The data extracted will include the following details:
► First author, publication year and country.

Table 2 Search term strategy used in electronic databases

1. Population and settings.	"long-term care setting*" OR "nursing home*" OR "residential care setting*" OR "Residential facilit*" OR "institution care" OR "nursing care" OR "nursing facilit*" OR "continuous care"
2. Intervention/phenomena of interest.	Faller* OR "accidental fall*" OR falling OR falls OR slip* OR "fall prevention" OR "falls prevention" AND Prevent* OR reduc* OR minimi* OR decreas* OR interven*
3. Outcome	Feasib* OR sustain* OR adopt* OR accept* OR appropriate* OR fidelity OR implement* OR uptake* OR adher* OR facilitat*OR barrier* OR accessib* OR penetrat* OR mechanism* OR mediat* OR driv*
Combination with Boolean operators	1 AND 2 AND 3
Limitation	English and Arabic languages Published since 2001

- ► Study design and study duration (intervention and follow-up periods).
- ► Participant eligibility criteria and sample size (eg, patient criteria and staff criteria) and participant data.
- ► Fall intervention characteristics (eg, type of intervention and usual care or control intervention).
- ► Implementation theory or framework.
- ► Implementation strategy (type, number, target, temporality and dose).
- ► Implementation outcomes (eg, fidelity).
- ► Clinical outcome (ie, direct fall-related outcomes described in the included studies such as fall risk, fall rate, time to first fall, etc).

Data synthesis procedure

Data concerning implementation strategies and outcomes will be categorised and defined using Powell *et al*'s and Proctors *et al*'s frameworks, which are considered seminal in the field of the implementation science.[19 22] Originally, the Powell *et al* framework contained a list of 68 implementation strategies based on a review of healthcare and mental healthcare literature.[22] A group of researchers and expert clinicians developed this work, adding to the compilation and generating expert consensus on a common set of terms and definitions.[20] These implementation strategies were updated, reaching 73 in number, under the title of the ERIC, and these strategies were grouped into nine categories.[20 21] The implementation strategy data for this review will be coded and characterised using the labels and definitions for the 73 distinct strategies and then synthesised under these 9 subheadings.

Proctor *et al* developed an implementation outcome taxonomy that used a narrative review approach, whereby an expert group from the implementation sciences collated the implementation outcome definitions used by investigators, and determined the similarities and differences between them, determining clear concepts for labelling the implementation process.[19] This taxonomy distinguishes implementation outcomes from service or system outcomes (eg, reduced waiting time) and clinical treatment outcomes (eg, mortality). It provides definitions of eight implementation outcomes: feasibility, fidelity, adoption, appropriateness, implementation cost, sustainability, acceptability and penetration; these support the labelling and assessment of the implementation process. The implementation outcome data of this review will be coded and synthesised using the Proctor implementation outcome taxonomy.

Quality appraisal

Two independent reviewers will assess the quality of the studies included. Any disagreement will be discussed and resolved via a third reviewer. We expect that some intervention studies will embed implementation data within the main clinical outcome paper, and others will report this as a separate paper.

All RCTs and quasi-experimental studies will be assessed using the relevant checklists from the Joanna Briggs Institute Critical Appraisal Tool for determining the quality of the studies.[23 24] Each criterion is rated as 'yes' if the criteria are clearly reported, 'no' if not, 'unclear' if there is no information or 'not applicable' if not relevant to the study.[25]

The Mixed Method Appraisal Tool (MMAT) will be used to assess the quality of mixed data.[26] MMAT consists of five categories based on the study designs. It is rated with a yes if the criteria are clearly met, or a no if not; 'can't tell' can be selected if there is unclear information on the reporting relating to the criterion. The authors have suggested calculating an overall score by scoring the presence/absence of each criteria as 1/0 and then dividing the sum of 'presence' responses by the number of 'relevant criteria' and multiplying this by 100.[27]

Patient and public involvement

There has been no direct contribution from patients or the public to the methodological design of this protocol, but the need for this SR was raised by clinicians working in residential care facilities. The preliminary results will be reviewed by a member of the public who works in an LCF and by a member of a national support and advocacy service for older people and healthcare patients who will represent residents and their families. Both of these will review and contextualise the results, supporting the writing of the discussion/conclusion section of the review paper.

Summary of evidence and reporting of the review

The results will be summarised to provide a descriptive review of effective implementation strategies for interventions aimed at preventing falls in LCFs, both in terms of leading to successful clinical outcome and in terms of implementation success. As intervention effectiveness is not the main focus of this review, the effects of the interventions will be presented in table format and summarised narratively.

The reporting of the review will follow PRISMA guidelines.

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