

ALTERNATIVE CARE PATHWAYS IN THE MANAGEMENT OF FALLS IN THE PRE-  
HOSPITAL SETTING – SCOPING REVIEW



## Abstract

Pre-hospital fall is a major public health problem in different health sectors, including the UK. The primary aim of this review was to explore the effectiveness of alternative care pathways in managing falls in the prehospital setting. Therefore, a scoping literature review methodology was adopted to address this research aim. Precisely, the literature search process was conducted on three databases, MEDLINE, AMED, and CINAHL, with high reputations in hosting top-quality evidence on paramedics and nursing literature. Even though the initial literature search process led to the identification of 79 studies, only 6 met all the inclusion criteria and were selected for the review. Thematic analysis of evidence reported in these studies led to the identification of three key themes describing effectiveness of different alternative fall prevention strategies in the pre-hospital setting. The reported themes include; multidisciplinary fall prevention programmes, falls-related educational programs, and fall prevention interventional technologies. Results from the conducted review showed that different alternative approaches for fall prevention have varying levels of effectiveness and this is generally influenced by the overall perceptions and acceptance of the programme by the targeted populations. Among the three-fall prevention and management strategies, multidisciplinary fall prevention programmes were reported to be highly effective in the management of falls as it ensured inclusion of different care stakeholders such as the paramedics, nurses, and individuals who are at risk of falls. Therefore, this review suggested the need to adopt the multidisciplinary fall prevention programmes in the prevention of pre-hospital falls.

## Table of Contents

Abstract.....	1
Introduction.....	4
Background.....	4
Methodology.....	7
Research Aim.....	7
Research Objectives.....	7
Research Question.....	7
Literature Search Strategy.....	8
Eligibility Criteria.....	9
Inclusion Criteria.....	9
Exclusion Criteria.....	10
Data Charting and Data Analysis/Synthesis.....	11
Literature Search Results.....	11
Data Extraction Process.....	12
Literature Quality Assessment.....	16
Study Characteristics.....	16
Method of Data Synthesis.....	18
Reported Themes From Thematic Analysis.....	19
Theme 1: Multidisciplinary Fall Prevention Programmes.....	19
Theme 2: Falls-Related Educational Programs.....	20
Theme 3: Fall Prevention Interventional Technologies.....	22
Interpretation.....	25
Conclusion and Recommendations.....	28
Conclusion.....	28
Limitations.....	29
Implication for Practice.....	29
References.....	31

## Introduction

### *Background*

Prehospital falls have been a significant problem for older adults in the UK. Oladi et al. (2022) define a fall as an occasion that accidentally causes an individual to land on lower heights without the incidence of a main essential occasion, such as a stroke. According to the Office for National Statistics (2023), an average of a third of the total population of England is aged over 65 years, and half of those aged 80 years were reported to have fallen once a year. Based on the current results, the future expectation is that around 20 million persons will be 60 years of age by 2031, which is related to approximately 15.3 million reported in 2018. Reports by Bonner et al. (2021) indicated that 10-25% emergencies which required ambulance responses were related to falls involving people aged 65 years and above. Therefore, there was a high demand for ambulance services. The study by Appeadu and Bordoni (2023) indicated that falling influenced the quality of life of older adults, therefore leading to the reduction of confidence later, resulting in isolation and depression.

Highly risk individuals are the ones aged 65 and above, people with health problems such as diabetes or arthritis, and visionary issues such as poor eyesight (Office for National Statistics, 2023). According to Appeadu and Bordoni (2023), the risks for falls and general fear of falls have led to reduced quality of life among the elderly populations. Appeadu and Bordoni (2023) further reported that the work of medical personnel in society has highly influenced them in identifying individuals in risky situations. This directs them to roles that target lowering falls, such as a link to a community-based falls facility when the affected individual patient is hurt after the fall.

The ambulance services' implementation of an alternative approach across the UK has been influenced. An example is a vehicle managed by paramedics; the professional therapist works only in response to falls (Appeadu and Bordoni, 2023). Due to this, there is a quick response and fast assessment of patients, accompanied by an immediate evaluation of the environment by the therapist occupying the place if a rapid emergency response is not appropriate (Flaubert et al., 2021). This target speeds up the implementation of measures that enable many patients to remain safely in their homes, hence reducing vulnerability of the elderly to falls and related health problems (Oladi et al., 2022). The role aims to improve the quality of medical care to the customer's satisfaction.

There has been an exploration of the efficiency of fall administration involving paramedics. An example by Ortíz-Barrios and Alfaro-Saíz (2020) is the financial inferences of installing a new pathway related to the cost of the traditional route concerning the conveyance of all affected patients to the emergency departments, which have been well-researched to recognise the long-lasting stability of the option. Satchell et al. (2023) emphasised on the need for conducting extensive research on the fall prevention mechanisms in order to generate new knowledge that can be used by the paramedics to care for fall victims and reduce their vulnerability to future falls. A comparative assessment of evidence reported in this context, including the previous studies by Flaubert et al. (2021) and Appeadu and Bordoni (2023), shows that there is still gap in knowledge regarding the most appropriate type of falls management strategies that can be used in the pre-hospital setting. Alternative care pathways for preventing falls in the pre-hospital setting which the present scoping review based its analysis on include comprehensive risk assessments, fall prevention education programs, medication reviews, implementing exercise programs focusing on balance and strength, promoting personal

emergency response systems, and fostering collaboration among healthcare providers and community resources for a coordinated approach.



## Methodology

### *Research Aim*

To explore the effectiveness of alternative care pathways in managing falls in the UK prehospital setting.

### *Research Objectives*

- To evaluate alternative care pathways currently available in the prehospital setting.
- To identify if the available alternative care pathways in the prehospital setting are being utilised and implemented successfully by clinicians.
- To identify potential further education needs to provide clinicians with more awareness of alternative care pathways, ensuring preventable hospital conveyances are avoided.

### *Research Question*

The PICO framework was used in developing research question for this review because it helped in ensured that all key elements (Population, Intervention, Comparison, and Outcome) are clearly defined, facilitating focused and relevant research. Compared to other frameworks, PICO offers a systematic way to formulate precise and answerable questions, enabling efficient literature searches and enhancing the quality and applicability of research findings.

The research question was developed using the PICO framework, as shown in Table 1 below:

Table 1: PICO Framework

PICO Framework	Research Question Variables
Population (P)	People who had experienced falls in the prehospital setting
Intervention (I)	Alternative care management pathways such as comprehensive risk assessments, fall prevention education programs, medication reviews.

Comparison (C)	Standard care management pathways such as coordinated interdisciplinary care, and exercise programmes
Outcome (O)	Reduced rates of fall-related hospital admissions.

Therefore, the research question for this scoping review was:

Does implementing alternative care management pathways compared to standard care management pathways reduce fall-related vulnerabilities and hospital admissions among people who have experienced falls in the prehospital setting?

#### *Literature Search Strategy*

The research was systematically identified using the specified research question on 3 March 2024 and 10 March 2024, and the study applied both qualitative and quantitative literature review. The reason for combining qualitative and quantitative research was to develop a more reliable conclusion for the study. With reference to the explanation by Paré and Kitsiou (2017), including both qualitative and quantitative studies in a scoping review provides a comprehensive understanding of the topic, capturing diverse perspectives, experiences, and empirical evidence, enabling a holistic synthesis and identification of research gaps. Three databases were used in the literature search process: MEDLINE, AMED, and CINAHL. The collection and implication of these databases were promoted by their standings in hosting the best quality and recent evidence stated in different peer-reviewed lessons concerning social work practice, among other disciplines. Afroz et al. (2020) recorded that these Boolean operators used terms such as "AND", "OR," and "NOT" to combine different search terms and keywords inputted into the search boxes as a tactic for confining the search process to enhance effective identification and selection of the literature which only contained specific terms and keywords. Thus, the inclusion of

Boolean operators into the literature search strategy helps to highlight the equality of evidence identified for new knowledge synthesis.

The applied keywords were; "paramedics" OR "nurses" OR "pre-hospital clinicians" OR "technicians" AND "elderly" or " old adults" AND "United Kingdom" OR "UK" OR "England" OR "Great Britain" AND "alternative care pathways" OR "telemedicine consultation" OR "community paramedicine programs" OR "mobile integrated healthcare (MIH) teams" AND "standard care management pathways" OR "emergency medical response" OR "transportation to hospital" OR "triangle and assessment" OR "acute care management" OR "referral to rehabilitation services".

### *Eligibility Criteria*

#### *Inclusion Criteria*

Inclusion criteria are those standards that every literature must achieve for them to be selected for knowledge synthesis, and they are always focused on different literature characteristics, such as the methodology, purpose for the research results of interest, and the population involved (Paré and Kitsiou, 2017). In this scoping review, both primary qualitative and quantitative studies were selected for the review. This approach is consistent with the explanations by Afroz et al. (2020) which emphasised on the importance of collecting data from primary studies for reviews in order to generate high-quality evidence from the synthesis process. In the review, only those studies published in 2014-2023 was appropriate for this study as they contained up-to-date information about fall prevention strategies in the pre-hospital setting. According to Patino and Ferreira (2018), including only up-to-date literature in a scoping review ensures capturing the most recent findings, trends, and advancements, providing a current state of knowledge on the topic. Precisely, this inclusion criteria facilitated the selection of only older

adults aged 60 years and above who had experienced falls in prehospital settings. Inclusion of only studies with this research population was key in enhancing homogeneity of reported findings from the evidence synthesis process (Afroz et al., 2020). Furthermore, only studies published in the English language were selected for review as a strategy for addressing possible translation and publication bias associated with the language translation process.

#### *Exclusion Criteria*

All the secondary studies such as systematic literature reviews, meta-analyses and scoping reviews were eliminated during the literature selection process. As explained by Afroz et al. (2020), the exclusion criteria are crucial in scoping reviews to maintain focus, ensure relevance, enhance rigor, manage scope, and enable meaningful synthesis. This approach was key in ensuring selection of only studies with primary evidence about the alternative pathways for reducing vulnerability of at-risk populations to pre-hospital falls. To enhance the overall quality of a paper, studies that fail to meet any inclusion criteria should be eliminated during the literature search process (Patino and Ferreira, 2018). Specific to the literature review presented, all studies that focus on falls in the hospital should be eliminated since they are not relevant to the topic of study. Furthermore, studies focusing on falls in people below 65 years were also eliminated from the review. Studies published before 2014 were further eliminated, and studies outside the UK were also eliminated.

## Data Charting and Data Analysis/Synthesis

### *Literature Search Results*

The initial exploration of the three databases resulted in a total of 79 records. The credibility of these records received an equally thorough eligibility assessment to reject irrelevant ones and obtain those that were systematic literature review focused. In phase of duplicates removal, 17 records were deleted, leaving 62 records for inspection further. This was followed by an elaborate evaluation on the basis of the characteristics of the publications, especially the language of the publication and the age of the publication. This led to the exclusion of further 36 records. The 13 records excluded at this stage were published in other languages apart from English; and 23 had been published prior to the year of cut-off, 2014-2024, which coincided with the review focus on recent results. With a total of 14 papers removed from a total of 26 sources, the remaining 12 papers underwent additional screening. The next stage of the process was to discard five articles that were inaccessible without the provided full text and nine secondary research-based papers, in order to ensure the participation of primary research studies. As a result, only 12 original papers which passed the manual evaluation of quality were further analysed, out of which 6 publications were discarded due the clear predefined quality benchmarks. Lastly, when checking against the standards, there were no more than five studies that met all the requirements and were thus chosen to advance to the systematic review process. The systematic approach involves carefully-selected studies that are up-to-date, relevant, and of good quality, thereby contributing to the reliability and credibility of the review's findings and conclusion.

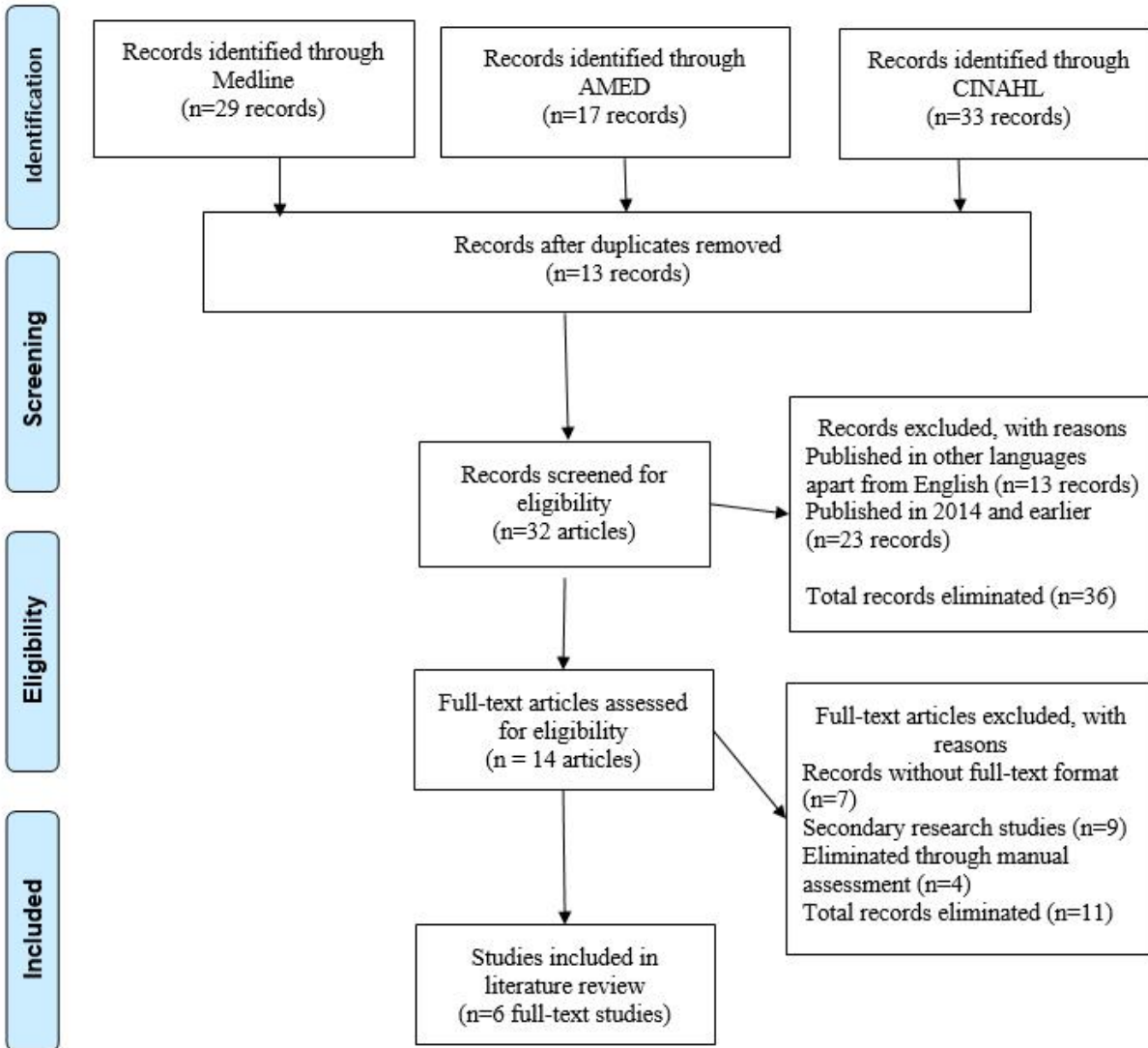


Figure 1: PRISMA Diagram Describing the Literature Selection Process

### *Data Extraction Process*

The data extraction process employed the literature matrix table. According to Haddaway et al. (2020) this approach simplifies data extraction from selected articles allowing for part versus whole analysis of the evidence guiding and sustaining the scope of the research. In the case of this study which positions alternative care and early intervention in falls related cases in the pre-hospital setting in the UK, the literature matrix table proved to be a critical tool in establishing the similarities and differences across selected studies.

The literature matrix table employed in data extraction comprised distinct columns: details of citation (the author(s) and year of publication), research method (including those of study participants and location), outcome of the analysis, and study meaningfulness, which are related to the systematic literature review made. The carefully positioned critical headings of the literature matrix table became the base of deep perspective into the research environment, from which vast information could be extracted and then organised to obtain the most visualised and simplified knowledge. Conversely, possibility with the opportunity to create a literature matrix table, provided a structure for the review process, where extract data from various studies, compare, and synthesise it into a form of a solid analysis of care pathways among UK communities for the fall management. A complete literature matrix is presented in the Table below.



Literature Search Matrix

Authors and publication year	Title	Methodology	Key findings
Charlton, Stagg, and Burrow (2023)	The clinical effectiveness of a fall's rapid response service, and sex differences of patients using the service: a cross-sectional study in an English ambulance trust.	A quantitative research A cross-sectional study (December 2018 and September 2020). Participants aged $\geq 60$ years The 1091 patients attended by the FRRS 4269 by standard ambulance crews.	FRRS consistently conveyed fewer patients versus standard ambulance crews (467/1091 (42.8%) v. 3294/4269 (77.1%), $p = < 0.01$ ). Women were more likely to reside alone than men (181/259 (69.8%) v. 86/167 (51.4%), $p = < 0.01$ ) The participants less likely to fall (16.2% v. 26.3%, $p = 0.01$ ) More likely to report a fear 0 (35.3% v. 22.7%, $p = < 0.01$ ).
Gale, Cooper and Aihie (2016)	Prevalence and risk factors for falls in older men and women: The English Longitudinal Study of Ageing. <i>Age and ageing</i>	Qualitative research Participants were 4,301 men and women aged 60 and over. Survey method was used. -Interviews were used	Sex-specific risk factors were incontinence (odds ratio (OR), 1.48; 95% CI, 1.19, 1.85) Frailty (OR 1.69, 95% CI 1.06, 2.69) in women, -Older age (OR 1.02, 95% CI 1.04, 1.07), high levels of depressive symptoms (OR 1.33, 95% CI 1.05, 1.68). Unable to perform a standing balance test (OR 3.32, 95% CI 2.09, 5.29) in men.
Gazibara, Pekmezovic, Tepavcevic, Tomic, Stankovic, Kostic, and Svetel (2014)	Circumstances of falls and fall-related injuries among patients with Parkinson's disease in an outpatient setting	Quantitative research participants: persons with PD presenting at the outpatient Department of Movement disorders 300 participants involved	180 (60%) reported occurrence Exactly 103 falls (57.2%) took place outdoors Indoor fallers were, on average higher degree of non-motor impairment
Glogowska, Cramer, Pendlebury, Purdy and Lasserson (2019)	Experiences of ambulatory care for frail, older people and their carers during acute	Quantitative research. Participants Age range was 68 - 91 years. Informal interviews with recruited patients/carers	17 of the patients were 80+ 11 lived alone, 11 with spouse/family and one in a care home. Heart Failure or Chronic Obstructive

	illness: a qualitative, ethnographic study.	Semi-structured interviews with patients' post-discharge Thematically analyse	Pulmonary Disease, suspected infections, reduction in mobility, falls and pain
Snooks, Anthony, Chatters, Dale, Fothergill, Gaze, Halter, Humphreys, Koniotou, Logan, and Lyons (2017a)	Support and Assessment for Fall Emergency Referrals (SAFER) 2: a cluster randomised trial and systematic review of clinical effectiveness and cost-effectiveness of new protocols for emergency ambulance paramedics to assess older people following a fall with referral to community-based care when appropriate.	Quantitative methods Cluster randomised controlled trial design. Participants were aged 65 years and over. Three ambulance services in England and Wales in random stations.	3078 patients attended by 105 paramedics from 14 ambulances. 2841 attended by 110 paramedics from 11 stations. For unmatched patients 2391 intervention group and 2264 control group in primary outcomes analyses
Snooks, Anthony, Chatters, Dale, Fothergill, Gaze, Halter, Humphreys, Koniotou, Logan, and Lyons (2017b)	Paramedic assessment of older adults after falls, including community care referral pathway: cluster randomised trial	Quantitative research Used a cluster randomised trial in 3 UK ambulance Participants were patients aged 65 years or older Primary outcome was subsequent	Analysed 2,391 intervention and 2,264 control patients 1/3 died in one month 2/3 in 6 months Lower subsequent 999 call rates within 6 months (0.0125 versus 0.0172; adjusted difference -0.0045; 95% confidence interval -0.0073 to -0.0017). Intervention paramedics referred 8% of patients (204/2,420)

### *Literature Quality Assessment*

The assessment of the quality and the validity of the studies was achieved via the Critical Appraisal Skills Programme (CASP) checklist which is one of the instruments available in the field of systematic reviews (CASP, 2018). A research by Haddaway et al. (2020) reinforces this idea and states this approach prevents any biases and the conclusion is based on good evidence and is reliable. CASP includes six questions for the extraction process and makes special emphasis on the data quality. The initial stage is screening questions (which is, Question 1 and Question 2). Precisely, using the CASP provides a structured, systematic approach to evaluate the quality, validity, and relevance of diverse literature, ensuring robust synthesis and reliable conclusions in a review.

Only the studies that get a 'Yes' answer for both criteria continue to the next (CASP, 2018). The answers to each question are coded as "yes," "no," or "can't tell," with 1 point awarded for a "yes" answer and no points given for any "no" or "can't tell" responses (CASP, 2018). In order to provide only high-level quality studies, studies scoring at least 8 points out of 10 points were included in the review. This stringent reviewing process aligns with well-known systematic review guidelines described in the study by Afroz et al. (2020) and helps the process generating reliable and rigorous synthesised results even more.

### *Study Characteristics*

In the course of the systematic literature search for scoping review on alternative care pathways in the management of falls in pre-hospital settings, 6 relevant studies were found. One of the studies that were part of this research was done by Charlton, Stagg, and Burrow (2023), which studied clinical effectiveness of a fall's rapid response service and also had a gender difference among the patients using that service within an English ambulance trust. This study

provides detailed explanation of the key factors that increase vulnerability of older adults to falls as the most appropriate strategies that can be used to reduce their vulnerabilities. Another notable study by Gale, Cooper, and Sayer (2016) also, addressed the extent and risk factors regarding falls in older men and woman that was published as the Longitudinal Study of England aging (ELSA). A comparative assessment of evidence reported in these studies shows that older adults, specifically those who are 60 years and above are often at higher risk of experiencing falls compared to younger populations.

Gazibara et al. (2014) also explored the background of falls and fall-related injuries in a group of patients with Parkinson's disease in an outpatient setting. This study points to the particular challenges and risk factors of falls among patient groups which are different, consequently influencing the policy towards developing patient-specific interventions. Also, Glogowska et al. (2019) disclosed a qualitative ethnographic study to investigate the experiences of ambulatory care through acute illness episodes of frail elderly individuals and their caregivers. The information presented in these studies places more emphasis on the need to develop adaptable and highly effective alternative care pathways for reducing vulnerability of older adults to falls in the pre-hospital setting.

The two studies Snook et al. (2017a; 2017b) tested new assessment protocols for the emergency paramedics following the pre-hospital falls, especially referral paths to the community-based care whenever appropriate. These trials take the form of cluster-randomised trial which contribute to the evidence on clinical effectiveness and cost-effectiveness of care pathways focusing in pre-hospital setting that manage falls that can inform policy and practice decisions. Overall this systematic search came with a wide variety of studies that mainly focused

on fall management in different contexts of pre-hospital settings supporting the foundation of the scoping review.

### *Method of Data Synthesis*

A thematic analysis method was then used for analysing data collected from the selected studies in order to develop a comprehensive understanding of the scoping review based on alternative care pathways in the management of falls in the pre-hospital settings in the UK (Paré and Kitsiou, 2017). Consistent with the explanations by Peel (2020), thematic analysis is widely used in the analysis of qualitative data because it focuses on the identification, analysis and interpretation of key patterns of meaning or themes about the research problem under investigation. Thematic analysis approach provided the researcher with the opportunity to develop a comprehensive understanding of the major scoping review based on alternative care pathways in the management of falls in the pre-hospital settings in the UK (Paré and Kitsiou, 2017). Precisely, a thematic analysis approach described in the study by Hamel et al. (2021), which involved analysis of the qualitative data collected from the individual studies was adopted in this research. The three stages of thematic data analysis included the free line-by-line coding of the findings of primary studies; the organisation of these 'free codes' into related areas to construct 'descriptive' themes; and the development of 'analytical' themes (Afroz et al., 2020). Generally, themes reported from the thematic analysis processes described the scoping review based on alternative care pathways in the management of falls in the pre-hospital settings in the UK (Afroz et al., 2020).

## *Reported Themes From Thematic Analysis*

### *Theme 1: Multidisciplinary Fall Prevention Programmes*

A good body of evidence and data shows that falls are a prominent concern for inpatient individuals as it is documented that falls occur with a high frequency and severity (Gazibara et al., 2014). Such acts of medical negligence and violence against healthcare workers cannot only be seen as patient safety issues but also as a threat to healthcare expenditure which is the central top priority for hospital quality and safety programs (Snooks et al., 2017a). This review is emphasising the multidisciplinary measures that can be taken to reduce the fall risk in acute care inpatient settings. The evidence reported in these studies demonstrates that vulnerability of older adults to falls in the community setting is significantly increasing hence the need for highly advanced approaches for reducing such risks and increasing their overall quality of life.

Glogowska et al., (2019) highlights the importance of multidisciplinary falls prevention strategies, with a significant translation to the clinical setting as demonstrated by the remarkably futile odds ratio (OR) of 0.90. Furthermore, this review, which emphasises the benefit of multidisciplinary fall prevention strategies, is highly contextualised because the clinical efficacy of the strategies may be constrained nevertheless. A multidisciplinary approach to prevent falls with the OR of 0.9 in combined interventions can potentially result in 1 to 10 falls avoided per 10,000 patient-days based on the fall rates of 1.7 to 9.5 falls per 1,000 patient days (Snooks et al., 2017b). With provided incidence stats, 8 falls for every 1000 patient days can be considered a fair baseline. Converting this number to patients, the average amount of days to prevent a solitary inpatient fall treatment is 1250 (Glogowska et al., 2019). Also, it is noteworthy that most of the falls do not lead to injuries (only 33%), and among this small number of injuries, a small amount is extremely serious. Such evaluation of conceivable benefit and actual fall incidence

rates leads to a matter of considering the cost-effectiveness of the programs with multiple components due to their heavy personnel and institution expenses. Additionally, it brings out the drawbacks of basing healthcare quality solely on hospital falls with minimal data showing any workable solution to the problem.

Glogowska et al. (2019) reported on ineffective compliance with their interventions. On either intervention floors or control floors, just 36.4% of patients on intervention floors followed the toileting schedule in comparison to just 24.6% on control floors. Likewise, the groups on control floors were more likely to get physical and occupational therapy consults, yet just a small percentage (1.8%) of walking aids were provided on intervention floors highlighting these as nationally promulgated strategies (Gale, Cooper and Aihie 2016). We can also claim that the crucial point following the do-committee audit is the staff adherence. However, one can also support the theory that the initial advantage of interventions decreases with time due to reduction in participation while the policies are maturing (Gazibara et al., 2014). In one another work, Charlton, Stagg, and Burrow (2023) reported quite low compliance (64%) with fall care plan forms and also high miss information (77%) rates on same plans. However, a comprehensive fall-prevention research study, though it did not entirely meet the inclusion criteria, still showed the strong positive effects resulting from cultural transformation of hospital to fall-precaution (Gazibara et al., 2014). Therefore, this illustrates the significance of the intervention's adoptability, to induce approval and, in the long run, the implementation effectiveness.

### *Theme 2: Falls-Related Educational Programs*

Falls-oriented educational programs play a crucial role in overcoming the variety of problems associated with fall risks and fall prevention strategies, at a hospital setting (Gale, Cooper and Aihie 2016). The researchers, Charlton, Stagg, and Burrow have shed light on the

multitude of techniques and the scope of these programs, from hospital-focused to those that can help at home or in different parts of the community (Gale, Cooper, and Aihie Sayer, 2016). These programs have mastery of customising content to personalised risk factors that can be identified through the assessment. In that way, the patient is empowered to practice self-care such as using call bells, waiting for nurses during mobility, putting on a suitable footwear, and using assistive devices for safe walks (Gazibara et al., 2014). Nonetheless, multispectral approaches promise a decrease in the cases of inpatient falls, and their impact may be restricted by compliance issues as well as a shift in medical policies. The elimination of these obstacles will be a major step in establishing an environment where fall prevention is consciously practiced by healthcare workers. This will facilitate the effectiveness and efficiency of fall related education programs.

Additionally, the growing educational programs are now encouraging the goal-setting practices and involving the patients in the identification of their own falls' risks. This way, learning self-responsibility and having a clear goal is being introduced to the people (Glogowska et al., 2019). On the contrary, however, the program content description depth level shows a diversity among the studies, where some fail to specify enough clarity for being replicated, Snooks et al., 2017a). As regards the delivery of these programs, you find an extraordinary variety of approaches ranging from case studies to on-site demonstrations and videos, to electronic modules, and tutorials. Among the different options, which is the face-to-face education infrastructure standing out as the number one choice, with doctors or researchers participating in the direct teaching (Snooks et al., 2017b). Furthermore, videos, handouts, leaflets and posters on fall prevention can be used by all of us either alone or together in order to promote learning and to make us remember better (Charlton, Stagg and Burrows, 2023).

Although there are many articles on these subjects, they lack a deeper understanding of the educational theories or underlying design principles that provide the base for their programs. However, other studies have highlighted specific models such as the Health Belief Model that underscore perceived risks, barriers, benefits and self-efficacy dimensions in influencing an individual's behavioral change (Gale, Cooper and Aihie Sayer, 2016). In addition, the principles of teaching adults or patient engagement have been taken into consideration in the program design that is focused on participation, feedback and low anxiety in order to achieve effective learning (Glogowska et al., 2019). Besides that, people started using the teach-back technique or motivational interviewing approaches as an examination method in order to make sure that comprehension level was high and trigger behaviour change.

Fall-related educational programs are a combination of a wide variety of strategies targeted at educating patients with reduced mobility about the risks of falls and those precautions to acquire (Glogowska et al., 2019). However, the theoretical frameworks these programs build on may not always be evident, but they sometimes utilise models like the Health Belief Model or adult-learning principles. These programs are very important as they are used to enable patients to obtain the relevant knowledge and the skills required to help minimise fall risks and this comes to pass because the ProFaNE guidelines demands this as explained by Gazibara et al., (2014). Through their multiple-approach strategies, such measures try to enable a culture of safety and proactive prevention of falls inside the hospital and outside of it as well.

### *Theme 3: Fall Prevention Interventional Technologies*

The ability of fall prevention intervention systems (FPIs) to decrease the odds of falls among individuals is pivotal, particularly in the event of the admittance to the acute care settings. The main objective of such systems is to combat the geriatric falls that occurs because

of both internal and external risks factors. This consequently decreases the risk of falling. In researching the effectiveness of pre-fall prevention interventions (pre-FPIs), studies have concentrated on the mitigation of identified risk factors proven to lead to falls (Charlton, Stagg and Burrow, 2023).

Similarly, pre-FPIs have focused on intrinsic risk factors, such as functional ability deficits and balance impairments, two of the most common causes of falls in older adults. For example, the team of embedded wearable sensors and sensor networks to monitor the physical activities of patients at high risk of fall due to functional decline in hospital. These technologies can detect early warning signs of susceptibility to falls and recalling interventions will be used to prevent risks (Charlton, Stagg, and Burrow 2023). Apart from that, novel methods using serious games associated with tai chi are presented to foster stability and equilibrium in older people with mobility limitations (Glogowska et al., 2019).. These interactive approaches intend to heal and enhance operational skills.

There are interventions that have been developed that do not only offset functional deficits and balance impairments, but also enable people to perform their daily activities without further harm. Example the work on the use of 3D visualisation technology, gaming and home-based exercises which improved muscle strength and balance (Gazibara et al. 2014). Likewise, exergues have been made for the purpose of helping older adults to exercise and have fun doing activities that mimic situations from evidence-based exercise programs (Snooks et al., 2017a). Besides constitutional factors, pre-FPIs also provide cognitive impairments, including the fact that they have an impact on the ability to function and fall risk (Gale, Cooper, and Aihie, 2016). Interventions that combine mentally-demanding operations incorporate into the virtual environments to evaluate cognitive function and balance problems together.

Fall prevention education programmes aim to raise awareness, provide strategies, and teach techniques to individuals and caregivers for identifying and mitigating fall risks, promoting safety and independence. (Glogowska et al., 2019). Beyond this, smartphone apps have been as well designed to identify hazards and even alert users about risks in the environment hence enabling the fall prevention initiatives (Gazibara et al., 2014). Intervention modes, ever so, interchange with some being administered by practitioners and others by the patients themselves. The provision of physical activities through VR and game technologies are the common approach that mostly allows patients to engage in exercise activities and improve adherence to programs of falls rehabilitation (Snooks et al., 2017b). These technologies create an interactive environment for patients, improving their tendency to comply with an exercise routine.

Furthermore, cognitive training compounded with physical activities which have been slated as one of the strategies for the reduction of fall rates. For instance, a created game balancing training that included Microsoft Kinect and together physical with cognitive task to improve their balance and cognitive abilities concurrently (Snooks et al., 2017b). Moreover, exergames have been a means of promoting balance, reaction time, and attention in older adults through dancing gameplay (Charlton, Stagg, and Burrow, 2023). Education is highly important for fall prevention intervention as certain programs may involve exercise training and, in combination with falls prevention educational sessions. Those sessions emphasise the identification of environmental dangers as well as underscore the implementation of tactics that would help to decrease fall chances in living environments (Gale, Cooper, and Aihie, 2016). Involving and training carers of the older adults in the fall prevention educational programmes would help in reducing their overall vulnerabilities to falls. Therefore, an alternative

care approach in this context would be to include the community members in the fall prevention process rather than depending entirely on the services provided by the health practitioners such as nurses and paramedics.

### *Interpretation*

The emerging notion from this scoping review suggests the fact that patient education is one of the most important factors in falls prevention within hospitals and these interventions are either standalone or part of multicomponent approaches (Charlton, Stagg, and Burrow, 2023). Nevertheless, a number of knowledge inheritances were revealed to be caused by the journey of knowledge creation (Gazibara et al., 2014). Also, most of the studies did not have clear parameters for the exposition of the instructional methods and the quality of the tools to be used. Education has been dominated by a lack of emphasis on evidence-based instruction or learning theories, as very few studies applied the method of participatory learning through which patients can be engaged rather than just passive learners who do not appreciate the knowledge they get.

According to some studies that showed that the quality of the education programme might result in the decrease for falls and fall-related harms yet the overall evidence is still controversial (Gazibara et al., 2014). Of the 79 trials assessing falls-related outcomes, 6 were randomised-controlled trials (RCTs) with moderate quality patient education. There were, among these, some interventions that were effective in producing marked results in falls post-education for instance discovered (Gale et al., 2016). In spite of this, fall numbers mainly belonged to patients that were not educated. The strong programs dedicated specific content and teaching methods consistent with the hospital environment which could be a factor that contributes to safety within wards.

In addition, these studies were also showcasing a good relationship between patient education and decreased hospital falls rates which were observed when interventions scored high on quality metrics (Gale, Cooper and Aihie, 2016). Besides multifactorial interventions that included patient education, there was effectiveness shown on it to have reduced falls (Gazibara et al., 2014). As an example, including "teach-back" tactic as part of multifactorial strategy, and this led to the decrease of hospital falls rates. Consequently, the future interventions are expected to be multifactorial with at least one component addressing the targeted patient education outcomes. At the same time, RCTs and non-RCTs were the sources that provided evidence on these interventions. This trend may demonstrate the multifaceted effectiveness of mixed-level approaches, but the fact that in different studies such environments and modes of education differs sources twisted conclusions (Gazibara et al., 2014). Therefore, the impacts of patient education on the multi-level complex interventions are difficult to isolate and determine.

Interestingly, very few trials wrote theories, principles or frameworks of patient engagement into their programs design of studies (Charlton, Stagg, and Burrow, 2023). However, the studies demonstrate that the creation of such conditions is essential for the best possible results in health education, as demonstrated in case of other chronic diseases. The active learning methods see self-efficacy and knowledge retention increasing, which finally leads to positive health behaviours being promoted (Glogowska et al., 2019). Moreover, including the environment and the uniqueness of the sufferers in crafting successful fall prevention programs is a key factor. Inpatients exposed to anxiety or loss of control may have difficulty with the desired and needed knowledge retention (Snooks et al., 2017b). Moreover, cognitive loss presents different challenges with regards to falls prevention education that compete with unrefined methods including "chunking," repetition and simplification of material.

Nevertheless, the fact that this review offers a number of important insights cannot be denied, and these limitations also have to be considered. The inclusion of only articles in the English language and the narrowing of the primary focus to adult hospital populations may have led to limited or narrowed scope (Snooks et al., 2017b). Also, the study methodologies conditions or falls rate reporting makes result interpretation more difficult. The review calls for the need to conduct further research to address some of these critical strategies on falls prevention and offer more qualitative patient education interventions in hospitals. In this regard, patient education is pivotal to falls' prevention in hospital settings, either as a single intervention or when it is a multifactorial approach as part of the treatment initiatives (Gazibara et al., 2014). Although the existing evidence indicates a favourable link between patient education and the rates of falls, the exhibited need for more rigorous exams that incorporate educational theory and patient involvement models, remains a pressing issue (Snooks et al., 2017b). Ensuring the individualised care addressing the particular problems, especially patients with a cognitive impairment is an important part in developing a successful falls prevention program. Finally, determining appropriate approaches of falls prevention requires an advanced level of understanding of educational principles, patient safety needs. The review has established that more emphasis should be placed on enhancing competency levels of community members and carers of the older adults in order to reduce their vulnerability to falls in the community or pre-hospital settings.

## Conclusion and Recommendations

### *Conclusion*

This scoping review recognised several fall prevention studies for older people that, when elaborated to those that involved assessment by paramedics, displayed exercise variations connected to the administration of this affected role. Eventually, four papers related to the connection between local devoted fall facilities and paramedics were included. Usually, the involvement groups completed fewer falls and successive quick action calls despite the difference needing to be more statistically significant. In connection to the developments in welfare and the actions of day-to-day activities renowned by the studies, the discovery that admission to a fall-specific maintenance set is beneficial to older adults who fall in a backup of their individuality, then stopping needless transportation to hospitals. However, some still have much expectation of benefiting from the research.

A comprehensive intervention considering several issues can make fall reduction more effective; this will impact high-risk patients more. Interventions that deal with many factors causing falls simultaneously, such as muscle weakness, poor balance, and drug intake, may be more effective than interventions that only deal with one risk factor. Preliminary results show the effectiveness of group therapy for elderly patients who are instructed to increase their physical activities and vitamin D levels, correct their walking style, and change habits, but better support is needed. It is also a critical point that operates the efficiency of any intervention since the people's participation would be crucial to determine the outcome.

### *Limitations*

The entire scoping review was conducted by a single researcher; hence it was prone to researcher bias during literature selection and evidence synthesis. To reduce this danger, an academic administrator should be allocated by the institution and used by the investigator to achieve a dissimilar strategy and information when organising the research plan and analysing the outcomes of studies wherever necessary. Similarly, neither the personal researcher nor the academic administrator needed advanced knowledge of the role of professional counsellors as the leading ones in bringing involvement. Thus, there was authorisation to offer access to professional background resources and knowledge through efforts from local professional therapists.

Another restriction of this review was capital accessibility as a small-scale research scheme. As this was part of academic studies, school access was provided to enhance database explorations, and the theoretical supervisor gave more sustenance to update this assessment based on the university's suggestion. Another restriction of this evaluation was the spotting of combined industrial therapists and ambulances to manage these patients. This initiative is still new, and it is used in a restricted number of areas. Because of this, only two session abstracts were identified, which were later eliminated due to the need for a complete study paper. Thus, this led to a treatment decision that reached the research goal by being entirely excluded.

### *Implication for Practice*

Newly developed knowledge from the present review has significant implications for nursing practice, precisely in the improvement of quality of life among victims of falls and reducing vulnerability of older populations to falls. Outcomes for successive falls and alternative facility usage due to falls ranged; nevertheless, a steady helpful result on affected role comfort

remained identified. It can be measured by reducing falls by enlightening personal confidence and thus initiating activity and treatment. Observance by older individuals of the same involvement may benefit in the future because a reasonable consideration of this may enable adjustments to the conveyance of fall stoppage involvements, inspiring a better devotion and thus much advantage. Reports from this kind of study might also be used to advance corresponding observance features of care. Repeating a study on nurses' acceptance of these upkeep trials may be beneficial. Now, it is further recognised and primarily used to identify any hindrance restricting its use. The study also found that adherence by older adults to the intervention may be one of the challenges; thus, there were recommendations to improve adherence to these interventions. Further studies highlighted that the rate of referrals by the paramedics to the community where fall services were based was weak. Thus, more elaborative research was needed to see how paramedics use these widely used care pathways and thus identify any barriers that limit their use.

BEST DISSERTATION  
WRITERS

## References

- Afroz, Z., Burak Gunay, H. and O'Brien, W., 2020. A review of data collection and analysis requirements for certified green buildings. *Energy and Buildings*, **31**(1), pp.19-26. Doi: 10.1016/j.enbuild.2020.110367
- Appeadu, M. and Bordoni, B., 2023. Falls and fall prevention in older people. *British Paramedic Journal*, **6**(1), pp.46–52. Doi: 10.1017/cbo9780511722233.002
- Barrett, J.W., Williams, J., Skene, S., Griggs, J.E., Bootland, D., Jessica W.T. Leung, Antoine Da Costa, Ballantyne, K.C., Davies, R. and Lyon, R., 2023. Head injury in older adults presenting to the ambulance service: who do we convey to the emergency department, and what clinical variables are associated with an intracranial bleed? A retrospective case–control study. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*, **31**(1), pp.19-26. Doi: 10.1186/s13049-023-01138-1
- Bonner, M., Capsey, M., and Batey, J., 2021. A paramedic's role in reducing number of falls and fall-related emergency service use by over 65s: a systematic review. *British Paramedic Journal*, **6**(1), pp.46–52. Doi: 10.29045/14784726.2021.6.6.1.46
- Bonner, M., Capsey, M., and Batey, J., 2021. A paramedic's role in reducing number of falls and fall-related emergency service use by over 65s: a systematic review. *British Paramedic Journal*, **6**(1), pp.46–52. Doi: 10.29045/14784726.2021.6.6.1.46
- Cameron, I.D., Dyer, S.M., Panagoda, C.E., Murray, G.R., Hill, K.D., Cumming, R.G. and Kerse, N., 2018. Interventions for preventing falls in older people in care facilities and hospitals. *Cochrane Database of Systematic Reviews*, **9**(9), 3-8. Doi: 10.1016/j.enbuild.2020.110367

- CASP., 2018. Critical Appraisal Skills Programme- Qualitative Checklist. [online] Available at: <https://casp-uk.net/checklists/casp-qualitative-studies-checklist-fillable.pdf>. Accessed: 3<sup>rd</sup> March, 2024.
- Charlton, K., Stagg, H. and Burrow, E., 2023. The clinical effectiveness of a fall's rapid response service, and sex differences of patients using the service: a cross-sectional study in an English ambulance trust. *British Paramedic Journal*, **8**(1), pp.28-33. Doi: 10.1017/cbo9780511722233.002
- Choi, N.G., Choi, B.Y., DiNitto, D.M., Marti, C.N. and Kunik, M.E., 2019. Fall-related emergency department visits and hospitalizations among community-dwelling older adults: examination of health problems and injury characteristics. *BMC Geriatrics*, **19**(1), pp.115-119. Doi: 10.1016/j.enbuild.2020.110367
- Flaubert, J.L., Menestrel, S.L., Williams, D.R. and Wakefield, M.K., 2021. Nurses in disaster preparedness and public health emergency response. *Annals of Emergency Medicine*, **70**(4), pp.495-505. Doi: 10.1186/s13049-023-01138-1
- Foo, Y.Z., O'Dea, R.E., Koricheva, J., Nakagawa, S. and Lagisz, M., 2021. A practical guide to question formation, systematic searching, and study screening for literature reviews in ecology and evolution. *Methods in Ecology and Evolution*, **12**(9), pp.1705–1720. Doi: 10.1017/cbo9780511722233.002
- Gale, C.R., Cooper, C. and Aihie Sayer, A., 2016. Prevalence and risk factors for falls in older men and women: *The English Longitudinal Study of Ageing. Age and Ageing*, **45**(6), pp.789-794. Doi: 10.1186/s13049-023-0990-23
- Gazibara, T., Pekmezovic, T., Tepavcevic, D.K., Tomic, A., Stankovic, I., Kostic, V.S. and Svetel, M., 2014. Circumstances of falls and fall-related injuries among patients with Parkinson's

disease in an outpatient setting. *Geriatric Nursing*, **35**(5), pp.364-369. Doi:  
10.1016/j.enbuild.2020.110367

Giovannini, S., Brau, F., Galluzzo, V., Santagada, D.A., Loreti, C., Biscotti, L., Laudisio, A.,  
Zuccalà, G. and Bernabei, R., 2022. Falls among Older Adults: Screening, Identification,  
Rehabilitation, and Management. *Applied Sciences*, **12**(15), pp.118-126. Doi:  
10.1017/cbo9780511722233.002

Glogowska, M., Cramer, H., Pendlebury, S., Purdy, S. and Lasserson, D., 2019. Experiences of  
ambulatory care for frail, older people and their carers during acute illness: a qualitative,  
ethnographic study. *Journal of The American Medical Directors Association*, **20**(10),  
pp.1344-1347. Doi: 10.1016/j.enbuild.2020.110456

Haddaway, N.R., Bethel, A., Dicks, L.V., Koricheva, J., Macura, B., Petrokofsky, G., Pullin, A.S.,  
Savilaakso, S. and Stewart, G.B., 2020. Eight problems with literature reviews and how  
to fix them. *Nature Ecology & Evolution*, **4**(12), pp.1582-1589. Doi:  
10.1017/cbo9780511722233.903

Hopewell, S., Copsey, B., Nicolson, P., Adedire, B., Boniface, G. and Lamb, S., 2019.  
Multifactorial interventions for preventing falls in older people living in the community:  
A systematic review and meta-analysis of 41 trials and almost 20,000 participants. *British  
Journal of Sports Medicine*, **54**(22), pp.118-126. Doi: 10.1017/cbo9780511722233.335

Kieft, R.A., De Brouwer, B.B., Francke, A.L. and Delnoij, D.M., 2019. How nurses and their  
work environment affect patient experiences of the quality of care: A qualitative study.  
*BMC Health Services Research*, **14**(1), pp.114-119. Doi: 10.1016/j.enbuild.2020.110367

Lee, S.H. and Yu, S., 2020. Effectiveness of multifactorial interventions in preventing falls  
among older adults in the community: A systematic review and meta-analysis.

*International Journal of Nursing Studies*, **106**(1), pp.145-149. Doi: 10.1186/s13049-023-01138-1

Mezmir, E.A., 2020. Qualitative data analysis: An overview of data reduction, data display, and interpretation. *Research on Humanities and Social Sciences*, **10**(21), pp.15-27. Doi: 10.1017/cbo9780511722233.002

Ng, C.A.C.M., Fairhall, N., Wallbank, G., Tiedemann, A., Michaleff, Z.A. and Sherrington, C., 2019. Exercise for falls prevention in community-dwelling older adults: trial and participant characteristics, interventions and bias in clinical trials from a systematic review. *BMJ Open Sport & Exercise Medicine*, **54**(22), pp.118-126. Doi: 10.1016/j.enbuild.2020.110367

Office for National Statistics, 2023. *Profile of the older population living in England and Wales in 2021 and changes since 2011 - Office for National Statistics*. [online]

<https://www.ons.gov.uk/> Bonner, M., Capsey, M., and Batey, J., 2021. A paramedic's role in reducing number of falls and fall-related emergency service use by over 65s: a systematic review. *British Paramedic Journal*, **6**(1), pp.46–52. Doi: 10.1186/s13049-023-01149-7

Oladi, S., Uiga, L., Hebert-Losier, K. and Masters, R.S.W., 2022. We are testing the efficacy of a motor analogy designed to promote safe landing by older adults who fall accidentally: a study protocol for a randomized control study. *BMJ Open*, **12**(8), pp.495-505. Doi: 10.1017/cbo9780511722233.002

Ortiz-Barrios, M.A. and Alfaro-Saíz, J.-J., 2020. Methodological Approaches to Support Process Improvement in Emergency Departments: A Systematic Review. *International Journal of*

*Environmental Research and Public Health*, **8**(2), pp.18-23. Doi:  
10.1016/j.enbuild.2020.110367

Paré, G. and Kitsiou, S. (2017). Methods for literature reviews. *Cochrane Database of Systematic Reviews*, **9**(9), 3-8. Doi: 10.1186/s13049-023-01138-1

Patino, C.M. and Ferreira, J.C. 2018. Inclusion and Exclusion Criteria in Research Studies: Definitions and Why They Matter. *Jornal Brasileiro De Pneumologia*, **44**(21), pp.109-114. Doi: 10.1186/s13049-023-335668-9

Peel, K.L., 2020. A beginner's guide to applied educational research using thematic analysis. *Practical Assessment, Research, and Evaluation*, **25**(1), pp.2-7. Doi:  
10.1017/cbo9780511722233.337

Satchell, E., Carey, M., Dicker, B., Drake, H., Gott, M., Moeke-Maxwell, T. and Anderson, N., 2023. Family & bystander experiences of emergency ambulance services care a scoping review. *BMC Emergency Medicine*, **23**(1), pp.17-24. Doi: 10.1016/j.enbuild.2020.110367

Snooks, H., Anthony, R., Chatters, R., Dale, J., Fothergill, R., Gaze, S., Halter, M., Humphreys, I., Koniotou, M., Logan, P. and Lyons, R., 2017a. Support and Assessment for Fall Emergency Referrals (SAFER) 2: a cluster randomised trial and systematic review of clinical effectiveness and cost-effectiveness of new protocols for emergency ambulance paramedics to assess older people following a fall with referral to community-based care when appropriate. *Health Technology Assessment*, **21**(13), pp.1-32. Doi:  
10.1017/cbo9780511722233.002

Snooks, H.A., Anthony, R., Chatters, R., Dale, J., Fothergill, R.T., Gaze, S., Halter, M., Humphreys, I., Koniotou, M., Logan, P. and Lyons, R.A., 2017b. Paramedic assessment of older adults after falls, including community care referral pathway: cluster randomized

trial. *Annals of Emergency Medicine*, **70**(4), pp.495-505. Doi:

10.1017/cbo9780511722233.002

Young, M. and Smith, M.A. (2022). Standards and evaluation of healthcare quality, safety, and

person-centered care, *International Journal of Nursing Studies*, **106**(1), pp.145-149. Doi:

10.1016/j.enbuild.2020.110367





BEST DISSERTATION  
WRITERS