

Review

Pre-hospital management, injuries and disposition of ambulance attended adults who fall: A scoping review protocol

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Abstract

Introduction

Falls are a globally prevalent health issue, with 37.3 million falls severe enough to require medical attention each year. Falls can result in major trauma and are the second leading cause of unintentional injury deaths worldwide. The role of emergency medical services (EMS) in the pre-hospital emergency treatment of falls is critical, however the sources describing this phase of care has not previously been synthesised. The aim of this scoping review is to identify and map the published literature on the characteristics and injuries of adults who fall, are attended by EMS, EMS interventions and patient disposition.

Methods

The methods for scoping reviews outlined by the JBI Manual for Evidence Synthesis will be used. Databases including Medline, Scopus, CINAHL Plus, Cochrane, EMBASE and ProQuest will be searched from inception. Reference lists of included sources will also be searched. Two reviewers will independently complete title, abstract and full text screening. Included sources will be summarised using narrative synthesis and conceptual categories including patient characteristics, injuries, EMS intervention and patient disposition will be mapped.

Discussion

This protocol describes the framework to identify the scope, comprehensiveness and concepts surrounding pre-hospital falls to identify gaps in knowledge regarding the role of EMS in attending patients who sustain a fall.

Keywords:

emergency medical services; emergency medical technicians; Joanna Briggs Institute; patient; transportation; accidental falls

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Introduction

Falls are the second leading cause of unintentional injury globally, after road traffic collisions, accounting for 646,000 fatalities annually (1). Risk of a fall increases with age, immobility and fragility, and is associated with high morbidity and mortality (1-3). Adults aged 65 years and more account for the greatest number of fatal falls globally (1), and emergency medical services (EMS) are responding to an increasing number of older adults who sustain a fall, at least in part due to the ageing population (4-7).

Fall related injuries can vary, from none to life threatening, and can include lacerations, fractures and pain; with injuries tending to increase in severity with age (1,4,7-9). In New South Wales (Australia), adults 25 to 34 years of age have the lowest rates of EMS call outs for falls of all age groups, with a crude rate of 239 per 100,000 EMS-attended falls (9). These rates increase significantly for older adults across Australia: from 585 per 100,000 in those 50 years of age to 11,551 per 100,000 in those 85 years of age in New South Wales (9); and from 6000 to 10,000 per 100,000 in adults 65 years of age and more in Victoria (7). A 2019 government report shows the prevalence of fall-related injuries increases with age in Australian older adults: from 3754 to 17,200 per 100,000 in women 65+ to 95+ years of age respectively; and from 2629 to 15,000 in men 65+ to 95+ years of age respectively.(4)

EMS-attended falls review

Emergency medical services are often the first point of medical attention for individuals who sustain a fall. EMS staffing structures differ worldwide, and can include extended care paramedics (ECP), emergency medical technicians (EMT), paramedics and ambulance officers (5,10). On responding to an individual who has fallen, the objective of EMS is to provide interventions to alleviate symptoms and prevent further deterioration, and to provide appropriate treatment based on clinical practice guidelines (CPGs) or protocols. Patient management is based on the underlying cause of the fall (eg. syncope), or injuries sustained from the fall. Falls can result in major injury, so it is crucial that EMS ascertain when it is appropriate to urgently transport the patient to hospital (11). In the absence of injury, patients may not require transport to an emergency department (ED) (6), or they may refuse transport. Depending on the health services available, there may be other options that EMS can employ for patients who sustain a fall, other than transport to hospital (12), such as lift assistance. Lift assistance is provided when a person falls, is unable to move and requires physical help to return to a preferred position (13), such as rise from the floor to stand or sit. Alternatively, the patient may be referred to their general practitioner or an allied health service such as a falls clinic (7,11).

Decision-making and CPGs

Decisions regarding the management of patients who sustain a fall depend on EMS decision-making and CPGs. In the United

Kingdom, CPGs determine that a patient can be left at home and referred to a fall service, transported to ED on request, or sign a 'refuse to travel' document and be left at home without a referral (14). CPGs differ across Australia (15): in Victoria, CPGs for 'elderly/frail non-injury fall' determine that low risk patients who fall should be referred to their general practitioner for a falls assessment. High risk (risk of subsequent fall) patients should be transported to hospital via non-emergency ambulance or, if they refuse transport, follow guidelines for low risk fallers (16). In Western Australia, patients who sustain a fall are treated based on the underlying cause of the fall (eg. syncope) and resultant injuries (eg. fractures).

Patient disposition

As new care pathways emerge as alternatives to default transport to an ED, a challenge for EMS is to ascertain if it is both safe and appropriate to not transport patients who sustain a fall, and which alternative pathway to choose (12,17). The disposition of patients who sustain a fall varies depending on age, comorbidities, mechanism of injury and availability of health services (17). Non-transport rates of patients who have sustained a fall vary from 11% to 56% between the United Kingdom, United States and Australia for adults more than 60 years of age (17). Potential risks associated with non-transport include a subsequent increase in unplanned healthcare use such as EMS re-attendance, self-presentation to an ED and hospitalisations (17-19). A meta-analysis of 13 studies reviewing how ECP influence transport to the ED found a reduced likelihood of patient transportation compared with conventional EMS (10). Patients were more likely to be discharged at the scene when treated by an ECP, however two studies found an increase in subsequent ED attendances of 26% (20), and 41% (21) after being seen by an ECP compared with conventional EMS (10). The disposition of patients who sustain a fall varies greatly, though data on non-transported patients is equivocal (10,11,17). There is strong evidence regarding the incidence, prevention and consequences of falls (22,23). However, there is limited evidence regarding pre-hospital interventions delivered by EMS for patients who sustain a fall, and evidence describing their management is scarce.

Causes of falls and EMS care

Falls can be caused by intrinsic factors (ie. muscle weakness, poor balance, impaired sensory function) or by extrinsic factors (ie. environment) which can influence how a patient who sustains a fall is managed (24,25). A systematic review of EMS-attended adults aged 65 years and more who experienced a fall highlighted there is sparse evidence about the use of alternative interventions to safely manage older people who fall and do not require conveyance to hospital (24). Rates of conveyance via EMS have been found to vary among patients who fall (17). Referral to primary care or falls prevention services and alternative models of EMS response have been trialled and are shown to vary (17,18,24).

This scoping review aims to systematically map the range,

comprehensiveness and key concepts in the published literature to identify knowledge gaps in EMS management of adult patients who fall, including patient characteristics and injuries, and EMS interventions and disposition. The review questions are: i) Which adults attended by EMS sustain what injuries after falling? ii) How do EMS manage the care (ie. interventions) of adults who have fallen? iii) What pathways (ie. disposition) are used by EMS when attending adults who have fallen?

Methods

This scoping review will 'map' the topic of EMS-attended falls to compose an overview and identify the extent of the current literature describing research conducted on the pre-hospital management of patients who sustained a fall. A scoping review is an appropriate methodological choice to explore the breadth of the literature, map and summarise the available evidence and to inform future research (26) by comprehensively reviewing the previously unreviewed topic of EMS management of adults who sustained a fall.

The review will follow the JBI methodological guidelines for scoping reviews and will be reported according to PRISMA-ScR reporting guidelines (26-28). A preliminary search of Medline, Scopus, CINAHL Plus, Cochrane, EMBASE, ProQuest and PROSPERO was conducted to ensure no similar scoping reviews are underway or address this review's objective, before designing this scoping review protocol.

Inclusion criteria

Population

This scoping review will collate peer-reviewed sources focussing on the management of adults who sustained a fall and were subsequently attended to by EMS, and will not be limited by ethnicity, location, gender or comorbidities. The review will include sources that report any population of adult patients who had fallen, as defined by each individual study, to explore all aspects of EMS management of falls.

Concept

Sources of evidence that report on patient characteristics, patient injuries, EMS interventions and/or patient disposition (including transported to ED or otherwise) after a fall will be included in this review. This may be broadly described as patient management and may include: patient assessment, referral to alternative health services and/or disposition decisions. Sources will need to include patient characteristics (eg. age, gender), details of injury, interventions (eg. lift assistance) or disposition (eg. transported, referred or treated at scene).

Context

The context of this scoping review will be EMS attendances, otherwise referred to in Australasia as ambulance or paramedic services. This review will include sources that describe adult patients who have sustained a fall and are then attended by EMS, including paramedics, EMT and various levels of

ambulance officers delivering patient care. Sources that report on hospitalised patients, in-hospital falls, inter-hospital transfer of patients or sources exclusively reporting on residential aged care facilities (RACF) will be excluded from this review.

Types of evidence sources

Sources that are peer-reviewed and written in English are likely to contribute the clinical information required to answer the objectives for this review and are a primary source that will include information on the attendance, treatment or management of patients who have sustained a fall.

Potential grey literature identified in the search strategy will be considered for inclusion if they contribute to the study objectives. Newspaper articles and blogs will not be included in this review. This review will include sources that contain data on both out-of-hospital and RACF attendance by EMS. Sources that have only data on RACF attendances will be excluded as RACF have policies and procedures that influence patient disposition of adults who sustain a fall. Sources containing data on adults and children who sustain a fall and are subsequently attended to by EMS will be included; sources with only children will be excluded.

Search strategy

The search strategy will follow the three steps outlined in the JBI methodological framework (26,27). First, Medline, Scopus, CINAHL Plus (EBSCO), Cochrane, EMBASE and ProQuest databases will be searched for relevant text words and indexing terms, through analysis of titles and abstracts for relevant sources. Second, researchers will complete a full-text search of potentially relevant sources. Third, a snowball search of the reference lists of included sources of evidence will be made for additional potential sources of evidence, and each will be assessed to identify if they also met the inclusion criteria. The search strategy will purposefully be broad to capture as many relevant sources as possible and relevant measures will be taken to account for plurals, suffixes and variations to broaden the search.

Searches will not be restricted by date, although sources over 10 years old are less likely to be relevant than more recent research. A research librarian was consulted for the development of initial search terms and will supervise the searches, as their expertise in systematic searches has been found to increase the sensitivity and specificity of search strategies (27,29). The PRESS Guideline Evidence-Based Checklist was used to check the search strategy and assistance was received from a research librarian (25,29). A draft search strategy using medical sub-headings (MeSH) and indexed keywords and terms is presented in Table 1. Further refinements may occur during the search and these will be listed in the final scoping review.

Source of evidence selection

All identified sources will be searched and screened for

duplicates and two researchers will independently conduct title and abstract examinations according to the inclusion criteria, based on JBI methodology: population, concept, context and source type. Any study recommended to pass the initial filtering of titles and abstracts, by either reviewer, will progress to the next stage. Sources remaining at this stage will have the full text versions obtained and examined for eligibility. Additional records identified through hand searches of relevant journals will also be reviewed. Both researchers will use the PRISMA checklist for scoping reviews as a guide (23), following the inclusion criteria. One reviewer will extract all of the sources and all search results will be reviewed by at least one other reviewer.

Table 1. Search strategy for Medline (Ovid interface) with MeSH headings and search terms

Step	Medline (Ovid) search strategy
1	Exp Ambulances/
2	Exp Air Ambulances/
3	Ambulances.mp.
4	(Ambulance* or EMS or "emergency* medic* service*").mp.
5	Exp Emergency Medical Services/
6	1 or 2 or 3 or 4 or 5
7	Exp Accidental falls/
8	(Fall* or fell*).mp.
9	7 or 8
10	6 and 9
11	Emergency Medical Technicians/
12	("emergency medic* tech*" or EMT or paramedic*).mp.
13	Exp "Transportation of Patients"/
14	11 or 12 or 13
15	10 and 14

Presenting the results

Content analysis will enable the formation of a descriptive summary of data to provide a clear explanation of how the results relate to the review question (26). This will not include a thematic analysis or synthesis as this would be beyond the scope of a scoping review (26). Quality appraisal of included sources will also not be conducted as this does not form part of a scoping review (28,30). Substantial variation is anticipated in the granularity of the data throughout included sources. Sources of evidence and data will be described, with results classified under the following conceptual categories: population, injuries/ observations, interventions, and/or disposition.

Discussion

This scoping review will systematically map sources on the pre-hospital management of EMS-attended adult patients who sustain a fall in the out-of-hospital setting. The final review will

present what is currently known about patients, their injuries and observations, interventions and/or eventual disposition (and overall EMS management). Gaps in the available evidence that require further research will be highlighted by the results.

Competing interests

The authors declare no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

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