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**Optimal care for the management of older people with frailty non-weight bearing after lower limb fracture: a scoping review protocol**

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East Midlands Research into Ageing Network (EMRAN) is a research collaboration across the East Midlands to facilitate collaborative applied clinical research into ageing and the care of older people. EMRAN was set up with support from NIHR CLAHRC East Midlands.

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## ABSTRACT

### Introduction

There is lack of clarity about what constitutes optimal care for older people with frailty who are immobilised due to being non-weight-bearing after a lower limb fracture. No clinical guidelines for their care exist – yet this is vital if outcomes are to be assured and if research to improve them is to be conducted. To address this problem, we propose to conduct a scoping review to explore what evidence is available for the care and management of this patient group.

### Method

For electronic published literature, four related databases will be searched. Grey literature will be searched using online sources designed specifically for non-research literature. Broad selection criteria will apply for papers concerning the clinical care of non-weight bearing older people with lower limb fractures. Data will be extracted related to the “who, what, and where” of clinical care. Data will be analysed by tabulating findings by professional group, problem and setting, subject to an appraisal of the quality of the evidence, and then summarised in a narrative form. Reporting will follow the modified PRISMA-ScR checklist.

### Discussion

The strengths of this scoping review method are that it is systematic, and an appropriate choice of methods for the research question. We anticipate a challenge in distinguishing between findings that are specific to our population group of interest, and those that are applicable to older surgical patients in general. We also anticipate that the literature on this group may be scant. For this reason we intend subsequently to conduct an expert consensus exercise and to use its findings, together with those of this scoping review and generic guidance for older surgical patients, to design a clinical guideline tailored to older people with frailty who are non-weight-bearing after a lower limb fracture.

## INTRODUCTION

Lower limb fractures rise in incidence with age. In a UK-based epidemiological study the annual incidence of lower limb fractures across all ages was 2.9/1000 for men and 3.4/1000 for women; rising to 3.2/1000, 11.9/1000 and 22/1000 in those the aged 70-79, 80-89 and above 90 respectively [1]. Lower limb fractures that cannot be fixed surgically are advised not to bear weight on the affected limb while it heals, typically for 6-12 weeks [2]. Similar advice is given to those with some acetabular fractures. Fitter patients can remain mobile while non-weight-bearing, albeit with limitations, using crutches - but many people with frailty or prior mobility disorders are rendered immobile. Immobility leads to bone loss [3], muscle loss (acute sarcopenia) [4], muscle function, and muscle strength loss [5]. These consequences of immobility can lead to further disability and loss of functional capacity [6]. Experimental approaches to minimise the consequences of immobility are being developed targeting the biological processes that control synthesis, repair and function.

Before research to evaluate these experimental approaches can and should be done in patients, it is necessary to ensure that the usual clinical care of these patients is optimised. Research conducted on patients where this is not so would be unethical, ineffective and unconvincing. To date there is no clear consensus agreement of what constitutes optimal care for older people with frailty who are immobilised due to being non-weight-bearing after a lower limb fracture.

We propose to address this deficiency by conducting a scoping literature review and following this with a consensus exercise and a synthesis to produce a guideline, standardised operating protocol and other quality improvement materials for the optimal care of this patient group. In this document, we describe the protocol for the scoping literature review.

## METHOD

The Joanna Briggs Institute guidelines on conducting systematic scoping reviews [7] will be followed. Scoping review methodology was selected because the research question about the literature on non-weight-bearing after lower limb fractures is broad and this literature has not yet been reviewed.

### Research question

What evidence is available for the optimal care and management of older people who are non-weight-bearing after lower limb fracture?

### Eligibility criteria

#### Inclusion criteria

*Types of participants:* Studies of patients with an average age of >65 years with lower limb fractures who are non-weight-bearing. The age cut off will be used to avoid inclusion of studies that deal with non-frail people such as athletes or those with road traffic accidents. We will not require studies to explicitly define participants as frail because we anticipate that this relatively new concept may be poorly keyworded and defined within the literature, and that most studies meeting our inclusion criteria will include patients who have frailty.

*Interventions and outcomes:* All interventions and types of clinical outcome are of interest, as we aim to scope the evidence base for overall best practice in the care of these patients.

*Context:* Studies conducted in hospital, primary health care and community will be included, covering the entire clinical journey from injury through recovery to long-term outcomes.

*Types of studies:* All studies, published literature (randomised controlled studies, cross sectional studies, case control studies, case-series studies, cohort studies; and qualitative study designs, systematic and other reviews, meta-analyses) and grey literature (government reports, NGOs reports, policy statements and issues papers, conference proceedings, pre-prints and post-prints of articles, theses and dissertations, research reports, fact sheet) will be included. Study quality will not be used as an inclusion or exclusion criterion but will be used in the analysis stage.

## Exclusion criteria

Studies of participants who are athletes, or suffering from high velocity or poly-trauma (e.g. road traffic accidents or secondary to a fall from standing point) and text not published in the English language will be excluded.

## Information sources

For electronic published literature search, we will use MEDLINE (PubMed) CINAHL, EMBASE and the Cochrane database. For grey literature sources, we will use websites such as Health Management Information Consortium (HMIC) and System for Information on Grey Literature in Europe (SIGLE) [9-11].

## Search strategy

The following search terms will be used: geriatric , elderly, older person, older people, aged , optimal care, best care, care pathway, trauma, NWB and lower limb fractures (distal femur fracture, patella, tibia, fibula, ankle and phalanges), leg fractures, sarcopenia, loss of muscle mass, lower limb fractures, assessment, outcome, results, rehabilitation, immobilisation, physical activity, electrical stimulation, pharmacology, hospital care, home care, community based care, orthopaedic surgery, geriatric medicine, nursing & care staff, physiotherapy, occupational therapy, dietetics, patients, family / social network, team work. Each of the search terms will be combined with this keywords: "non-weight bearing" and "lower limb fracture" and with each of the following three keywords: optimal care, management best care, intervention. The reference list of identified reports and articles will be searched for additional studies. We will apply the same keyword strategy to the grey literature information sources.

Searches will be limited to English language studies from January 2000 to ensure literature is of contemporary relevance and not historical.

## Study selection

Up to seven reviewers (SO, VB, DG, MK, AC, KR, ALG) will be involved in the study selection. Initially, one reviewer (SO) will independently screen the titles and abstracts of citations according to the defined inclusion criteria and then the selection will be distributed

among the rest of the reviewers to screen texts according to the defined criteria, refine and confirm the selection, and resolve any disagreements by discussion.

### **Data extraction**

Year of publication, country, design, participants (including any evidence of frailty or markers thereof), sample size, setting(s), intervention(s) of interest, outcome(s) of interest will be extracted by reviewers using a standardised data extraction table.

The relevant critical appraisal tool for each study design will be used to review the quality of the evidence. Each study will then be given a quality rating of low quality, acceptable quality or good quality that will be based on the hierarchy of evidence as below:

- Good quality: Well conducted randomised controlled trials, well-adjusted cohort studies and systematic reviews
- Acceptable quality: Randomised controlled trials with high risk of bias,
- Low quality: Uncontrolled studies and case report and other grey literature.

### **Data analysis and synthesis**

The nature of the research evidence will be summarised in terms of the content, nature, extent, and quality of the selected articles. A post-hoc, data-driven, iteratively generated classification of the participants, interventions and outcomes studied will be performed, taking relevance to patients with frailty into account. A draft-charting table employed in previous scoping review studies will be used to organise data [7]. Emerging conclusions will take into account of the extent, consistency and quality of the evidence. As the ultimate aim is to provide guidance for the care of this patient group, we will also aim to identify gaps in the evidence.

### **Reporting**

Reporting will follow the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) extension for scoping reviews (PRISMA-ScR) checklist approach [8]. The modified PRISMA flow diagram for the scoping review decision process will be used.

## DISCUSSION

The strengths of this scoping review methodology are that it is systematic, and an appropriate choice of methods for the research question. Involvement of lay personnel and a broad range of clinical professionals will help the clinical appropriateness of our outputs.

Potential limitations relate to drawbacks associated with scoping review methodology in general. There is a risk that important literature will not be identified because it is not adequately key-worded. We aim to reduce this risk by searching reference lists of selected articles not only to identify missed papers and to refine the search strategy if required. Another risk is that vital papers may not be in English. If we identify citations in other languages that appear to be important or numerous, we will revise this exclusion criterion. More important is the matter of the grey literature. Any search in this domain has to be a balance between being unfeasibly exhaustive, yielding findings of diminishing value, and being unnecessarily restrictive. We will use resources already designed to collate such material, and take an iterative approach to our search which may require us to modify the grey literature search strategy, for example if we identify important citations in reference lists that were not found by our primary searches.

We acknowledge at outset that the published and grey literature may not address all aspects of the care of older people with frailty who are non-weight bearing following a lower limb fracture. Many aspects of care will be generic to all older people, all people with frailty, all people who are non-weight bearing and so on. We will take this into account in the later stage of our research process when we undertake a consensus exercise, and as we prepare a clinical guideline for the optimal management for these patients.

### Data management

Data management plan will be in line with the Nottingham University research data management policy (<https://uniofnottm.sharepoint.com/sites/DMPCollection>).

### Ethical Approval:

Not required.

## DECLARATIONS

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This research was funded by the NIHR Nottingham Biomedical Research Centre. The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health and Social Care.

### Competing interests

None

### Authors' contributions

SA drafted the article. All authors read, amended and approved the final manuscript

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**Appendix I.** Modified Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram for the scoping review selection process.

