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Towards a common definition of hospital-acquired deconditioning in adults: a scoping review

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ABSTRACT

Background Hospital-acquired deconditioning is a term used in clinical practice, describing a loss of physical and/or cognitive function associated with hospitalisation. Previous reviews have addressed interventions, its prevalence in older adults and potential assessment tools. However, each review has reported a core limitation, the need for an agreed-upon definition and diagnostic criteria for hospital-acquired deconditioning.

Objective We aimed to identify key components used to define hospital-acquired deconditioning in adults. We sought to do this by identifying diagnostic criteria, describing how authors operationalised Hospital- Acquired Deconditioning (HAD), and describing differences between HAD and other immobility-linked syndromes. This article focuses on how hospital-acquired deconditioning is understood and operationalised.

Design A scoping review using the Joanna Briggs Institute methodology for evidence synthesis.

Eligibility criteria Published in English after 1 January 1990, investigating adults over 18, set in inpatient rehabilitation or acute care settings, and including either a definition or description of hospital-acquired deconditioning or an outline of strategies to assess, prevent or manage hospital-acquired deconditioning.

Sources of evidence Published and grey literature, no restriction was placed on study design.

Charting methods Relevant data, where available, was extracted from each source using a proprietary data extraction template.

Results One hundred and three articles were included from 2403 retrieved results. Thirty-three were from rehabilitation or post-acute care settings, 53 from acute care, 15 from intensive care and two from other settings. The literature was diverse in methodology and research question addressed. Hospital-acquired deconditioning was poorly defined, no consistent patterns were identified in aetiology and sequelae; diagnostic criteria were not fully agreed on.

Conclusions The literature on hospital-acquired deconditioning is large, diverse and incomplete. Further work is required to develop a shared definition of hospital-acquired deconditioning, enabling researchers to coalesce for better understanding of the phenomenon, and clinicians, in turn, to better treat and mitigate against it.

Review registration OSF: https://osf.io/b5sgw/

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This review used a standard, recognised methodology for evidence synthesis and followed a prepublished protocol.
⇒ A diverse range of study designs were scoped, resulting in a broad conceptual overview.
⇒ This enabled the variation and lack of agreement across the literature to described in a way that a narrower review could not have achieved.
⇒ Due to the breadth of this review, some depth has been sacrificed and an element of subjectivity has been introduced in interpreting the results.
⇒ In line with Joanna Briggs Institute guidance, no clinical decisions should be made based on this scoping review due to a lack of critical appraisal of the included sources.

INTRODUCTION AND RATIONALE FOR REVIEW

Hospital-acquired deconditioning is portrayed in the media as describing a loss of physiological and cognitive capacity, manifesting as diminished function in activities of daily living (ADLs), associated with a stay in hospital.[1] It is thought to result from periods of immobility, inactivity or reduced activity.[2–4] Around 30% of older adults experience deconditioning during or following a hospital stay;[5] however, the incidence in adults has not been reported.

Previously conducted systematic reviews of interventions for hospital-acquired deconditioning found limited effectiveness of interventions.[6 7] One reason given for this is that hospital-acquired deconditioning is poorly conceptualised, rendering interventions challenging to design and effectiveness difficult to measure.[5 7 8] Reviews refer to and conceptualise deconditioning occurring during hospitalisation in different ways and using different terminologies.[8]

Several other syndromes have been described that overlap with hospital-acquired deconditioning in that they describe either physiological phenomena or clinical syndromes which commonly occur in

hospitals during periods of immobility and which are associated with deteriorating performance in ADLs. These include intensive care acquired weakness (ICU-AW),[9 10] sarcopenia, hospital-associated disability[5 5] and post-hospital syndrome[9 10] —each of which comes with specific, discrete, but overlapping diagnostic criteria.

Against this background and in preparation for empirical research into hospital-acquired deconditioning, we conducted a scoping review to describe and make sense of this diverse literature. We aimed to identify key components used to define hospital-acquired deconditioning in adults. The objectives of this review were to describe diagnostic criteria used for hospital-acquired deconditioning, describe how hospital-acquired deconditioning is understood and operationalised within and between studies and ascertain how other syndromes relate to hospital-acquired deconditioning.

METHODS

We chose the Joanna Briggs Institute (JBI) scoping review methodology because this is useful for concept clarification when there is variability or uncertainty in the literature.[11] It allows for multiple systematic reviews that may have focused on different or overlapping populations and for reviews and original empirical research to be considered in parallel.[12] A preliminary search of MEDLINE, the Cochrane Database of Systematic Reviews, PROSPERO, Epistemonikos and JBI Evidence Synthesis found no current or underway systematic or scoping reviews on the topic. The protocol was registered on the Open Science Framework in January 2022 and is available online and in the supplementary material.[13]

Search terms

Seven electronic databases—AMED, CINAHL, Cochrane Library, EMBASE, PEDro and PsychInfo were searched from inception to February 2022 and updated in July 2023 and September 2024. No limits were applied at the database search stage on date, language, subject or source type. Three registers—ProQuest thesis and dissertations, GreyNet and GreyLit (grey literature databases) were used to find publications outside the peer-reviewed literature, that might include a working definition of hospital-acquired deconditioning.

The initial search string was developed using MEDLINE with support from the University of Nottingham Library Service and the syntax was adapted for use in other databases. The MEDLINE search string is provided as online supplemental Appendix A in supplementary file “Appendices and Supplementary Files” for “Towards a common definition of hospital-acquired deconditioning in adults: a scoping review.”

Citation searching was undertaken to find further articles that met eligibility criteria.

Eligibility criteria

Articles were eligible for inclusion if published in English, after 1 January 1990, focused on adults over 18, set in inpatient rehabilitation or acute care settings and including either: a definition or description of hospital-acquired deconditioning, or an outline of strategies to assess, prevent or manage hospital-acquired deconditioning. Sources were excluded if published before 1990, including paediatric, animal or space flight population, or if hospital-acquired deconditioning was discussed in relation to specific health conditions rather than as a generic phenomenon. These criteria were implemented based on the acknowledgement that physiological decline, often cited as contributing to negative hospital outcomes, begins in the third decade.[14]. In addition, this scoping review placed no geographical limitations to account for the wide variation in the descriptor used for residential clinical facilities where patients may be affected by hospital-acquired deconditioning.[15] Specific health conditions were excluded as it was anticipated that these conditions result in limitations as part of their presentation. Therefore, it would be unclear what symptoms and signs were reported due to the underlying condition and which were due to systematic processes resulting in hospital-acquired deconditioning.

Citations were organised and shared between reviewers using Rayyan.[16] Duplicates were removed manually by the lead author (MW). Two independent reviewers (MW with KR or LH or AC) conducted the title and abstract screening. Two independent reviewers (MW and KR or AC orALG) conducted full text screening. Where full texts of included citations were unavailable, authors were approached once if contact details were publicly available. Where full texts were unavailable, data were extracted from abstracts. Including data from abstracts is compatible with the JBI methodology[17 18] and reflects a commitment to the breadth of the review. This acknowledges that research on hospital-acquired deconditioning often takes the form of quality improvement projects published as conference posters that communicate important records of what hospital-acquired deconditioning is being understood as in clinical practice-based research. Sources identified through citation searching were independently screened for inclusion by MW and KR at the title, abstract and full-text levels on Rayyan. Conflicts during screening were resolved through discussion between independent reviewers, with a third reviewer used to break ties where conflict could not be resolved.

After title and abstract screening, the authorship team deviated from the published protocol by refining the inclusion and exclusion criteria (the final criteria are discussed above).[13] The refined criteria are available to view in online supplemental Appendix B. This was due to an unmanageable number of potential full texts to review, given the available resources.

Data charting process

Included sources were entered into a data extraction tool, appendix C, which was piloted using five studies of varying types to ensure fitness for purpose. Data extraction was

completed in full by MW and checked by ALG. KR and AC each checked a third of the data set for accuracy.

Data items

Items extracted from each source, where available, included article characteristics (eg, publication type, country of origin, authorship membership), characteristics and definitions of hospital-acquired deconditioning (eg, diagnostic criteria for hospital-acquired deconditioning, signs and symptoms reported, definitions or descriptions given for hospital-acquired deconditioning), physiological changes (body system changes), sequalae of hospital-acquired deconditioning (complications or consequences arising from hospital-acquired deconditioning), primary causes and contributors to hospital-acquired deconditioning (reported causes and factors associated with hospital-acquired deconditioning) and risk factors for hospital-acquired deconditioning (individual and contextual factors associated with the development of hospital-acquired deconditioning).

Data analysis

Data were analysed by publication rate by year, country of publication, study type, participant type and study settings. Results were analysed using a narrative approach and in descriptive tables.

Data quality

In line with the JBI scoping review methodology, critical appraisal of sources was not undertaken and the risk of bias was not formally assessed. The results of this scoping review have drawn from a broad range of study designs and quality. Critical readers may wish to view a repository copy of this manuscript where the in-text citations have been annotated to denote whether they are informed by primary or systematic review articles, quality improvement, or non-systematic literature sources (available at: https://nottingham-repository.worktribe.com/output/41922635)

Patient and public involvement

Specific patient and public involvement (PPI) was not sought for this scoping review. However, MW's PhD thesis, of which this forms a part, has benefitted from consultation with several PPI groups throughout its design and execution to ensure the outcomes remain relevant.

RESULTS

A total of 2403 articles were identified, of which 750 were excluded through deduplication. A further 1347 and 123 were excluded at the title and abstract, and full-text screening stages, respectively, leaving 103 for inclusion in the full review. A Preferred Reporting Items for Systematic

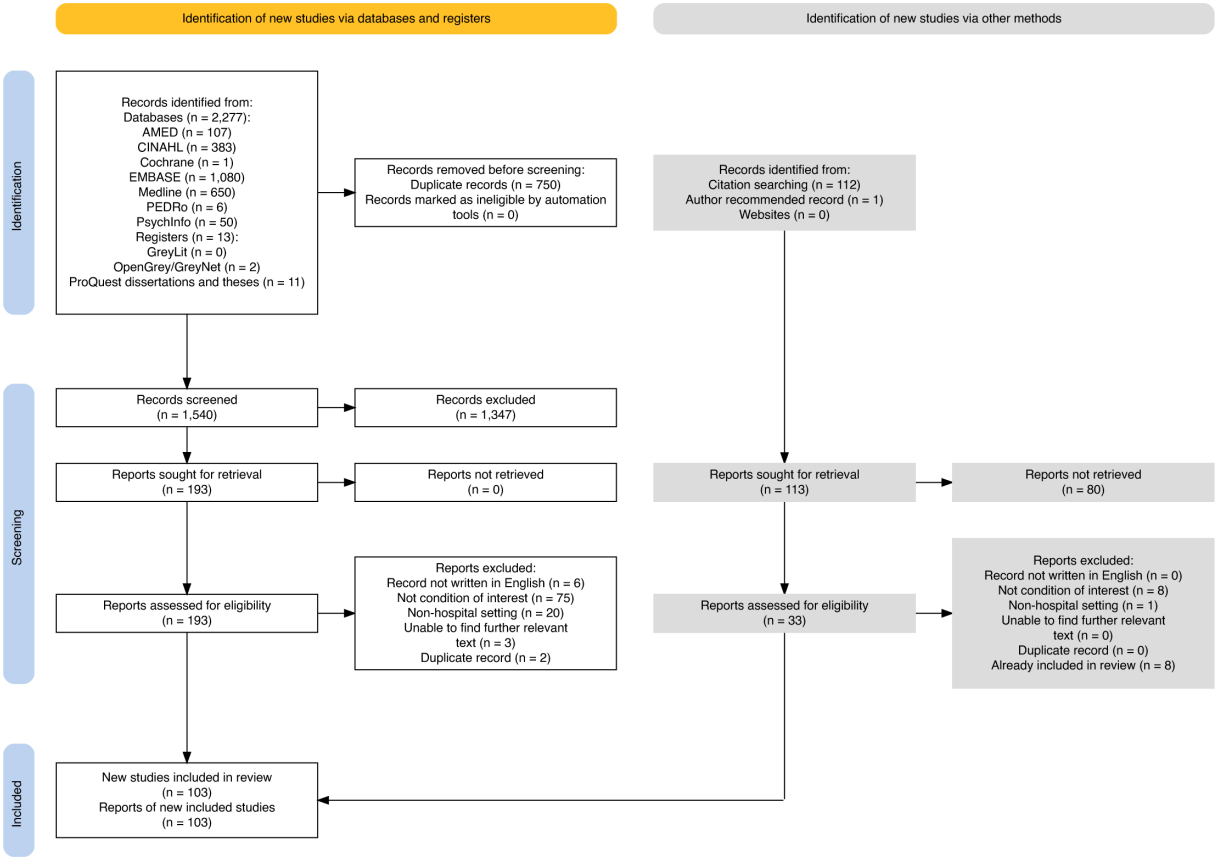

Figure 1 PRISMA flow chart demonstrating the article selection process.

Table 1 Study designs of the included sources

Research type	Number of sources	Relevant citations
Interventional/experimental	8	
Randomised controlled trial (RCT)	3	47 48 79
Pilot/exploratory RCT	3	26 101 110
Feasibility (cohort)	1	30
Evaluation (cohort)	1	31
Quality improvement/service development	22	
Interventional	12	32 49–51 83 94 100 105–108 112
Non-interventional	3	52 53 99
Mixed designs	7	33 34 54 84 95 103 114
Non-interventional studies	38	
Prospective studies	17	19–21 35 36 55–59 80 81 85 86 111 115–117
Retrospective studies	11	22 23 37 38 60 61 87 88 96 97 118 119
Cross-sectional studies	5	39 62 63 77 120
Delphi	1	92
Qualitative	4	24 27 28 78
Literature	33	
Systematic review	7	6–8 64–66 121
Narrative literature review	3	40 46 89
State of the art review	2	90 93
Editorial	17	25 41–44 67–75 91 98 109
Conference materials	1	45
Study protocol	3	29 76 102
Total sources included	103	

Reviews and Meta-Analyses (PRISMA) diagram is shown in figure 1.

The majority of articles (n=75) were published from 2010 onwards. Forty-nine were from the USA and Canada, 14 from the UK and 11 from Australia. Seventeen of the remainder came from Europe, six from Asia and four from the Americas.

Seventy-seven sources were published as journal articles, the remaining twenty-six were abstracts from conference materials. Seventy-seven articles were empirical research studies. First authorship data were available for 67 sources, of which 35 were medical doctors, 12 physiotherapists, 10 nurses and 6 occupational therapists. The remainder were written by a diverse range of disciplines. The authorship team was multidisciplinary for 27 and author disciplines were not identifiable for 36 publications.

A wide range of study designs were used. These are outlined in table 1. Seven sources were secondary analyses of previously collected data sets [19–25] or part of larger research programmes.[26–29]

Study participant and context characteristics

It was not possible to provide a total number of participants to avoid double counting due to the inclusion of systematic reviews, which also draw on the same primary studies as this scoping review. Furthermore, not all included sources reported participant numbers. Descriptive statistics have been provided for interventional, non-interventional and systematic review population characteristics, including the total reported figure of participants, the mean age range (unadjusted) and the gender balance in table 2.

The majority (n=53) of sources, where reported, originated from acute care settings with specialities covering a range of medical and surgical pathways. Rehabilitation or post-acute care was featured in 33 sources, critical care 15, and prehabilitation and research care focuses had one source each. The settings where the included research was conducted are summarised in online supplemental Table 1), available with all supplementary material in the file beginning "Appendices and Supplementary Files."

Some studies were conducted partially or exclusively with staff participants rather than patients, summarised in table 3.

Characteristics and definitions of hospital-acquired deconditioning

There were sixty-three unique descriptions of hospital-acquired deconditioning. Eighteen of these were

Table 2 Population characteristics of the included sources

Study population	Number	Mean age range (years)	Percentage female (range)	Relevant citations
Total interventional study participants	71362	54.45–88	32–75	26 30–34 47–51 54 78 79 83 84 94 95 100 101 103 105–108 110 112 114
Total non-interventional study participants	213877	33.4–84.6	0–77	20–24 35–39 52 53 55–63 77 80 81 85–88 96 97 99 111 115–120
Total systematic review participants	21820 across 68 reviewed original studies	65.95–82.5	39–61	6–8 64–66 121

generated de novo for a given study with no reference to development, consensus or validation work.[25 27 30–45]

Popularly cited works included Hoenig and Rubenstein from 1991,[42] who described hospital-acquired deconditioning as, "In addition to the effects of whatever acute illness brought them to the hospital, older people frequently incur major functional setbacks stemming from in-hospital treatment and immobilisation." ([42] p.220)

In parallel, Siebens et al.in 1990[3] published the following definition: "Deconditioning is probably best defined as the multiple changes in organ system physiology that are induced by inactivity and reversed by activity." ([3] p.177) Researchers using this definition frequently omitted the second half: "The type of changes depend on prior fitness level and the degree of superimposed inactivity." ([3] p.177)

These definitions were superseded mainly after 2009 by that of Kortebein's 2009 paper,[46] who described deconditioning as:

"the cumulative effect of a prolonged or complicated hospitalisation, a patient has experienced a significant functional decline." ([46] p.67).

Fifty-four articles reported an alternative name for hospital-acquired deconditioning, resulting in 27 different terms.[6 7 20–22 25 27–29 34 36 37 39–44 46–76] The most common alternative name was "functional decline" or "decline in function" or similar description (n=30). Other descriptors included are listed in online supplemental Table 2.

Clinical presentations of hospital-acquired deconditioning

Information on the clinical presentation (signs and symptoms) of hospital-acquired deconditioning from eight rehabilitation, 18 acute care and four intensive care studies was available. The descriptors and features are summarised in online supplemental figure 1). Diagnostic criteria or thresholds for hospital-acquired deconditioning needed to be clarified in much of the literature.

Hospital-acquired deconditioning was frequently described as being identified at the time patients attempted to return to their usual activities,[66] which often coincided with discharge or the period immediately post discharge, when patients were challenged by a return to their usual activities[8 40 54 71 77 78]

While most sources referred to the impact of or need for action to address hospital-acquired deconditioning, only a few of the included sources discussed the components/features of hospital-acquired deconditioning, which should be considered diagnostic or presented as core assessment areas. online supplemental figure 1 further demonstrates the range of descriptors and variables used across the three clinical populations of acute care, rehabilitation or post-acute and intensive care used to identify suspected cases of hospital-acquired deconditioning.

While also non-diagnostic, Falvey's core cluster of muscular weakness, decreased stamina, diminished appetite, fatigue and decreased ability to perform ADLs, informed by their understanding of older adults'

Table 3 Characteristics of non-patient populations from included sources

Non-patient populations	Sample recruited from	Number of participants	Number of studies	Citations
Registered nurses	Medical and surgical units	27	2	24 62
Nursing associates	Working in geriatric medicine	36	1	95
Occupational therapists	'Experts' (5 years or more experience)	26	1	92
Caregivers	For people with hip fracture or discharge delay	22	1	28
Healthcare providers	Not specified	62	2	28 52
Decision makers	For people with hip fracture or discharge delay	11	1	28

experience after hospitalisation, was often cited. Falvey and other authors described this pattern of symptoms as associated with loss of functional reserve, decreased physical performance and increased risk of further adverse health events.[71]

Six sources provided explicit criteria for diagnosing hospital-acquired deconditioning.[35 57 77 79–81] Of which, only one validated diagnostic framework -the Post-operative Physical Deconditioning Scale (PPDS) provided a framework to judge severity of deconditioning[80 82] This scale categorised hospital acquired deconditioning into three levels of: none, simple and complex, depending on the presence of neurological or orthopaedic co-morbidities and the level of impairment experienced.

The remaining five diagnostic criteria were designed to establish hospital-acquired deconditioning as being present or absent in a binary way. Wakabayashi & Sashika[57] outlined four criteria, all of which were required by the Japanese government for a diagnosis of hospital-acquired deconditioning: (1) a period of inactivity or bed restriction after acute hospitalisation; (2) a new disability to complete one of the basic ADLs needed to live independently without assistance: bathing, dressing, rising from bed or a chair, using the toilet, eating or walking across a room during acute hospitalisation; (3) a new disability is unrelated to a specific neurological or orthopaedic insult or both and (4) Barthel index score is 85 points or under.[57] Raj *et al*[31] meanwhile, based their diagnosis on the basis of one or more social, emotional, cognitive or physical conditions which interfere with quality of life following hospitalisation.[31] Sourdet *et al*, Pavon *et al* and Ortiz-Alonso[77 79 81] each used the Katz ADL scale and set a diagnostic threshold of 0.5 to a one point decline for diagnosis of hospital-acquired deconditioning.

Physiological changes in hospital acquired deconditioning

Thirty-two studies reported on physiological changes associated with hospital-acquired deconditioning. Despite numerous papers exploring causal relationships between physiological changes and hospital-acquired deconditioning, a consistent pattern has yet to emerge.[8 19 29 41–44 46 48–50 54 56 58 64 67–73 75 83–91]

Loss of muscle strength and mass was the most frequently described physiological correlate of hospital admission. Still, it was not consistently associated with clinical measures of functional decline.[7 8 43 51 58 75 81 83 86 87 90 92 93]

Sequalae of hospital-acquired deconditioning

The most commonly reported sequel of hospital-acquired deconditioning caused was functional decline.[7 8 21 24 25 27 30 34 36–40 42 43 46 49–51 55 57 58 60 61 66 67 70–73 75 77 79 81 83 86 87 92 94–98]

Functional decline was described by Graf (Graf, p.60)[43] as "*the consequence of those physiologic changes (that result from either ageing or immobility) – the resulting inability to perform activities that ensure a person's independence, such as rising unaided from a chair*". Inouye *et al*[36] defined functional decline as "*a deterioration in self-care skills*" ([36] p.645) or more broadly as "*a decrement in physical and/or cognitive function.*" ([25] p.1967)[110])

Mobility impairment was reported as a specific form of functional decline in seven studies.[8 24 30 34 60 86 87] Mobility impairment was purposefully excluded as a feature of hospital-acquired deconditioning in Brown[21] because of near universal implementation of physician-directed bed rest orders on admission in US care settings at the time of writing.

While functional decline, with or without mobility impairment, was identified as the dominant sequel of hospital-acquired deconditioning. Further reported consequences included increased rates of readmission,[72 85] institutionalisation,[72 77 79 94 97] cognitive function decline,[8 25 31] a requirement for extended rehabilitation,[30 76 99] the generation of additional social costs, extended length of stay[28 100] and pressure injuries.[51 75]

Reversibility was presumed with a return to activity in five studies that cited Sieben's 1990 definition.[3 46 48 67 91 101] Sanchez-Rodriguez *et al*[102] suggest that newly developed functional limitations following acute medical or surgical intervention may prove reversible. Creditor (1993) was the least optimistic, stating that hospitalisation (of older adults) is often the beginning of an irreversible decline in function termed the *cascade to dependency*.[42 73]

Primary causes of hospital-acquired deconditioning and contributing factors

Forty-three studies reported that the adverse changes experienced in functional capacity as part of hospital-acquired deconditioning resulted from acute hospital care or exposure.[6–8 21 22 24 25 27 28 30 31 33 36 37 39 40 42–44 46 48–50 54 55 57 58 61 62 66 70–72 77 85 87 90 94–96 102–104] But just under half (n=16) of these studies made this assertion without reference to underpinning data illustrating a causal association. Nine sources found hospital-acquired deconditioning was unrelated to the admission diagnosis.[40 41 45 46 70 95 97 98 101] Nine studies found that impairment during and after hospitalisation was unrelated to a specific neurological or orthopaedic diagnosis.[39 46 50 57 58 60 70 87 88] online supplemental file 2 further summarises the identified causes and contributors to hospital-acquired deconditioning.

Reduced activity levels (inactivity, bed rest, reduced activity) were reported as an association, correlation or causative factor for hospital-acquired deconditioning in 34 studies. This finding was predominantly reported in empirical studies (n=19). However, many other articles made the same assertion.[7 8 22 24 27 30 32–34 42 43 46 48 49 51 54 60–62 67 69 72 78 85–87 91 93 98 101] Other important phenomena that were associated with the development and subsequent recognition of hospital-acquired deconditioning included medically complex conditions,[59 61] persistently raised C reactive protein[85] and directly disabling pathologies such as stroke or fracture.[55 86] Prolonged hospital stays,[7 46 59 61 90 95 102] impairment despite successful treatment of the cause of admission[6 40 73 102] and generalised risk and stress from acute hospital care[28 71] were also

suggested, although predominantly in from editorials or quality improvement literature.

The practices of bed rest and activity restriction were reportedly facilitated through tradition,[33 54 74 89 91 98] a lack of staff resources,[24 25 28 29 40 43 52 54 69 72–75 84 95 100 103 105–108] an unfriendly hospital environment (eg, lack of adaptive equipment, slippery floors)[28 40 41 43 73 78 101] and organisational and professionals risk aversion to adverse events associated with mobility (eg, perceived lack of safety, increased risk of falls).[7 24 28 40 72 74 95 96 100 109]

Risk factors for hospital-acquired deconditioning

Relevant data about risk factors were extracted and available from 33 acute hospital,[8 21 24 25 28 29 36 38 40–43 46 48 49 51 64 67 68 73–75 77 80 83 85 86 91 96 101 105 110 111] 15 from rehabilitation [7 23 31 39 50 57 59 60 63 70 87 88 92 97 112] and seven from intensive care studies.[33 41 43 54 69] These are summarised by potential modifiable, non-modifiable and iatrogenic factors in online supplemental Table 2.

DISCUSSION

The main finding of this scoping review of the peer-reviewed and grey literature on hospital-acquired deconditioning is that the condition is poorly defined, aetiological factors and sequelae are far from clear and the operationalisation of the signs and symptoms of are not fully agreed on. Hospital-acquired deconditioning has been visited as a physiological phenomenon, a clinical syndrome defined by deterioration and a source of avoidable harm. These separate approaches to the phenomenon interdigitate and overlap incompletely in the literature. Through this scoping review, we addressed aim two confidently: understand how hospital-acquired deconditioning is understood and operationalised from a clinically informed perspective. The data available indicates a broad range of clinical presentations and trajectories incorporating physiological changes, sequalae, potential causes and contributors and risk factors. Limited data was available to robustly extract to address aim one diagnostic or identification criteria, which was reflected by the presence of only six sources explicitly reporting diagnostic criteria.[35 57 77 79–81] The remaining studies employed a range of descriptors to qualify a broad range of signs and symptoms. Furthermore, due to the large overlap of descriptors used to describe a loose cluster of clinical presentations and trajectories, few meaningful conclusions could be drawn from the dataset to differentiate between hospital-acquired deconditioning and other immobility-linked syndromes robustly which would have confidently addressed aim three. Of course, ICU-AW remains the exception and has been well conceptualised within the literature, even if variation remains within its diagnostic criteria.

Given the lack of clarity in the published literature, it is tempting to ask whether hospital-acquired deconditioning is a useful descriptor that serves a worthwhile function. If it had utility, would it not be better defined by now? The literature we found was large, but heterogeneous. It was united by a recognition that the correlation between hospitalisation and deterioration in well-being and functional independence that persists beyond hospitalisation is an important one. It is essential because it may be predictable by the presence of risk factors, preventable through attendance to aetiological factors and treatable through appropriate and timely intervention. It is not yet clear the extent to which hospital-acquired deconditioning is a consequence of an acute illness sufficiently severe to mandate hospitalisation or a consequence of the limitations that modern hospitalisation imposes on patients. Most authors suggest it is a combination of both.

This work adds to the existing published reviews, which have largely had a narrow focus on papers around interventions[6 7 64] or the natural history of hospital-acquired deconditioning,[5] by enabling the full breadth of published literature to be considered as one. This serves to highlight key areas of uncertainty around hospital-acquired deconditioning. One crucial issue that only becomes apparent when viewing the literature in a broad sense is the issue of temporality. There is a clear overlap in the criteria used to diagnose hospital-acquired deconditioning by way of functional deterioration and the criteria used to identify new physical disability of a longer-standing nature as a sequel of deconditioning. But it is not clear when such deterioration is sufficiently established to meet the diagnostic criteria for hospital-acquired deconditioning and when it moves from being hospital-acquired deconditioning into longer-standing disability. These concepts play into issues of primary and secondary prevention and reversibility. There is much subjectivity at play here—a parallel with other oft-mentioned but frequently poorly specified concepts such as rehabilitation potential, that are similarly the subject of broad clinical consensus and complex and contradictory underpinning literature.[113]

The strengths of this study lie in the broad search terms, applied systematically, using diverse sources to capture the broadest conceptualisation of hospital-acquired deconditioning. Standardised methodologies were used and a written protocol was published in advance. Limitations relate to the difficulty of accommodating broad variations in study design, aims and objectives within a single narrative framework, which led to some subjectivity of interpretation. The broad overview, which drew in part from abstracts, grey literature and systematic reviews with different search terms, may have sacrificed some depth. Despite the broad search terms, the use of decline and deconditioning as the key terms may have limited the papers retrieved and subsequent conclusions drawn; however, their use reflects current clinical nomenclature. Furthermore, their selection may underpin the

limited findings for physical performance measures. However, the deficit in mobility-based measures may be reflective of bed-rest order conventions in the USA, where a majority of the included literature was from. Publication bias is always possible, with the bibliographic databases used favouring the English language, physician-led, formally-funded research over less formal work led by other professional groups and published in different languages.

In conclusion, the literature on hospital-acquired deconditioning is large, diverse and incohesive. While authors largely agree on the importance of the phenomenon, they describe it in sufficiently different ways so that it is not entirely clear that they are talking about the same thing. If we are to accept that within the concept of hospital-acquired deconditioning lies an opportunity to predict, prevent and/or intervene to minimise adverse outcomes, then we need first to arrive at a consensus around the definition and diagnostic criteria. This would enable more focused science around the epidemiology and natural history of the condition so that logical and evidence-based prevention and management strategies could be proposed.

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Contributors MW, KR, AC and ALG contributed to the design, undertaking and writing up of this scoping review manuscript. MW conducted the initial and subsequent searches. LH acted as a second reviewer for title and abstract screening. MW is the guarantor.

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Competing interests AG has received honoraria from Gilead Sciences in 2021 and Pfizer Inc in 2023 for consultancy work. MW, KR and AC have no competing interests to declare.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

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