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Review Article

Impact of fall prevention protocols on Quality of Life in Patients with hospital-acquired pressure ulcers

Nolan R^{1*}, Ryan L² and Gallagher D³

¹Department of Clinical Patient Care Research, Rhine Research Center for Nursing Science, Scotland

²Department of Clinical Patient Care Research, Trent Institute for Advanced Nursing Science, Scotland

³Division of Patient Care Research, Arno Institute for Advanced Nursing Science, Ireland

*Address for Correspondence: Roisin Nolan, Department of Clinical Patient Care Research, Rhine Research Center for Nursing Science, Scotland; E-mail: roisin.nolan@rhine.edu

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Abstract

Background: Falls and hospital-acquired pressure ulcers frequently coexist in the same immobile, comorbid inpatients, yet fall prevention protocols and pressure ulcer prevention bundles are usually designed, delivered and audited as separate quality programs.

Objective: This review synthesizes evidence on how fall prevention protocols intersect with, and influence, the health-related quality of life of patients who develop hospital-acquired pressure ulcers, and examines the shared risk factors, measurement approaches and implementation barriers underlying both.

Methods: We synthesized cohort studies, cluster-randomized trials, systematic reviews and patient-reported outcome studies addressing fall risk, pressure ulcer incidence, mobility restriction and quality of life in hospitalized adults.

Findings: Immobility, advanced age, impaired sensation and reduced perfusion drive both fall risk and pressure ulcer risk, so multicomponent fall prevention protocols that restrict mobility without compensatory repositioning can inadvertently raise pressure ulcer incidence, while patients who develop pressure ulcers report substantial reductions in physical, psychological and social quality of life domains, compounded when a fall or fear of falling follows.

Conclusions: Integrating fall prevention and pressure ulcer prevention into a single mobility-preserving, risk-stratified protocol, supported by validated quality of life instruments, offers a more coherent path to protecting both patient safety and quality of life than managing the two programs in isolation.

Keywords: fall prevention; pressure ulcer; quality of life; hospital-acquired; patient safety

1. Introduction

Falls and hospital-acquired pressure ulcers are the two adverse events that most consistently anchor hospital quality-and-safety dashboards: both are common, both are judged at least partly preventable, and both fall disproportionately on the same population of older, immobile, cognitively impaired inpatients. Pressure ulcer prevalence surveys across acute hospitals have repeatedly found hospital-acquired rates of 5-9% of admitted patients, concentrated in patients with limited mobility, reduced sensory perception and compromised nutrition [1]. Inpatient falls affect a comparable slice of the hospitalized population, with national audit data placing the prevalence of at least one fall during an acute admission at several percent of all stays, rising sharply on geriatric, neurology and orthopedic units [2]. The overlap is not coincidental: the deficits that raise fall risk, reduced mobility, impaired proprioception, sedating medication, cognitive impairment, are largely the same deficits captured by pressure ulcer risk instruments such as the Braden Scale, whose original conceptual schema linked sensory perception, activity, mobility and friction/shear to pressure injury etiology [3].

Despite this shared etiology, fall prevention protocols and pressure ulcer prevention bundles are almost always designed, staffed and audited as separate hospital programs, with separate risk-assessment tools, care plans and assumptions about how a patient should be positioned and mobilized. A protocol that emphasizes bed rest, bed alarms and restricted ambulation to reduce fall risk can work directly against a pressure ulcer protocol that emphasizes regular repositioning and progressive mobilization, leaving the patient at risk of both to navigate two loosely coordinated systems of care. This review synthesizes what the nursing and patient-safety literature has established about fall prevention protocols, hospital-acquired pressure ulcers and health-related quality of life, with particular attention to where the two programs reinforce or conflict with one another, and how

they can be integrated around a shared, mobility-preserving model of care.

2. Shared risk factors for falls and pressure ulcers in hospitalized patients

The clinical literature on both adverse events converges on a strikingly similar risk profile. Immobility is the dominant shared driver: patients unable to reposition themselves independently accumulate sustained tissue pressure over bony prominences, the proximate cause of pressure injury, while the same reduced mobility, combined with muscle weakness and gait instability, is the strongest single predictor on validated fall-risk instruments such as the Morse Fall Scale and the Hendrich II Fall Risk Model [4,5]. Advanced age compounds both risks through sarcopenia, reduced skin elasticity and a higher prevalence of sedating polypharmacy that raises fall risk while also, through reduced spontaneous movement, raising pressure ulcer risk. Jaul and colleagues' review of comorbidities in pressure ulcer development identified diabetes, peripheral vascular disease, malnutrition and cognitive impairment as recurrent contributors, each of which also appears on validated fall-risk instruments as an independent predictor [6].

Cognitive impairment compounds both risks through a different mechanism: a confused or delirious patient may attempt unsupervised transfers despite genuine mobility limitations, elevating fall risk, while being unable to reliably communicate discomfort from sustained pressure or participate in scheduled repositioning, elevating pressure ulcer risk. Perell and colleagues' analytic review of fall-risk assessment measures found that most validated instruments incorporate cognitive status alongside mobility and continence as core predictive items, precisely because impaired cognition amplifies the risk carried by physical impairment [7]. Medical devices add a further shared pathway: patients with catheters, intravenous lines or compression devices are frequently

mobilized less, and the devices themselves can cause medical device-related pressure injury, a phenomenon documented in a substantial minority of intensive care patients in prospective device-tracking studies [8].

Table 1: Risk factors common to both falls and hospital-acquired pressure ulcers in hospitalized adults [3,4,6,7].

Risk factor	Contribution to fall risk	Contribution to pressure ulcer risk
Impaired mobility	Reduced balance and gait stability	Sustained tissue loading, reduced repositioning
Advanced age	Sarcopenia, slower reflexive correction	Reduced skin elasticity and perfusion
Cognitive impairment	Unsupervised transfer attempts	Reduced ability to report discomfort or reposition
Sedating medication	Drowsiness, impaired coordination	Reduced spontaneous movement in bed
Malnutrition / comorbidity	Generalized weakness	Reduced tissue tolerance to pressure and shear

3. Fall prevention protocols: components and evidence

Modern inpatient fall prevention protocols are almost universally multicomponent, combining a validated risk-screening instrument, environmental modification, staff and patient education, and targeted interventions triggered by risk level. The Hendrich II Fall Risk Model, validated in a large case-control study of hospitalized patients, remains among the most widely adopted screening tools, capturing confusion, depression, altered elimination, dizziness and prescribed sedatives in a brief bedside assessment [5]. Dykes and colleagues' randomized trial of a fall-prevention toolkit that translated risk-assessment results into tailored, bedside prevention plans demonstrated a significant reduction in fall rate compared with usual care, establishing that structured translation of risk data into an individualized plan, not screening alone, is the component that changes outcomes [9]. Schwendimann and colleagues' evaluation of an interdisciplinary fall prevention program similarly found that involving physical therapy, pharmacy and nursing together reduced both fall incidence and fall-related injury [10].

Table 2: Selected fall prevention protocol components and their reported effect on inpatient fall or injury rate.

Study	Intervention component	Setting	Reported effect
[9]	Individualized, risk-tailored fall prevention toolkit	Acute medical-surgical units	Significant reduction in fall rate vs usual care
[12]	Low-low bed introduction (cluster-randomized)	General hospital wards	Modest reduction in fall-related injury
[10]	Interdisciplinary fall prevention program	General hospital population	Reduced fall incidence and injury severity
[11]	Bedrail use (systematic review)	Multiple acute/long-term settings	No consistent protective effect; injury risk if climbed over
[14]	Multifactorial risk-based interventions (Cochrane review)	Care facilities and hospitals	Modest reduction in fall rate; heterogeneous certainty

Environmental and equipment-based interventions form a second protocol component, though the evidence for individual measures is uneven. Healey and colleagues' systematic review of bedrail use found no consistent protective effect against falls and some evidence of increased injury severity when patients climbed over raised rails, prompting many protocols to shift toward low-low beds instead [11]. Haines and colleagues' cluster-randomized trial of introducing low-low beds across hospital wards found a modest but measurable reduction in fall-related injury, supporting environmental modification as a complement to individualized risk-based planning [12]. Barker and colleagues found that supplementing a general fall-risk tool such as STRATIFY with functional and cognitive items improved predictive accuracy and reduced fall rates in inpatient rehabilitation [13].

Systematic reviews of aggregate evidence reach cautiously positive but heterogeneous conclusions. Cameron and colleagues' Cochrane review of interventions for preventing falls in care facilities and hospitals found that multifactorial interventions produced a modest reduction

in fall rate, though certainty of evidence varied across intervention types [14]. Miake-Lye and colleagues' systematic review of inpatient fall prevention programs reached a similar conclusion, noting that multicomponent programs with strong organizational buy-in outperformed single-element interventions [15]. Oliver, Healey and Haines' synthesis of the falls literature likewise emphasized that no single intervention reliably prevents falls across all settings, and that protocol design must be tailored to the population and staffing model of the implementing unit [16].

4. Quality of life impact of hospital-acquired pressure ulcers

Beyond their clinical and financial burden, hospital-acquired pressure ulcers carry a substantial cost to patients' health-related quality of life. Gorecki and colleagues' systematic review of pressure ulcer impact on quality of life in older patients found consistent impairment across physical, psychological and social domains, with pain, reduced mobility, sleep disturbance, altered body image and social isolation reported across the included studies [17]. Pain emerged as a dominant, frequently under-recognized symptom: Gorecki, Closs, Nixon and Briggs' mixed-methods review of patient-reported pressure ulcer pain found it present in the substantial majority of patients, often continuous and worsened by dressing changes, and inconsistently assessed in routine practice [18].

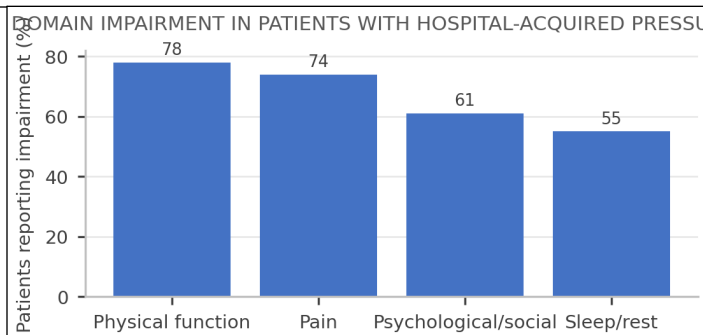


Figure 1: Proportion of patients with hospital-acquired pressure ulcers reporting impairment across four health-related quality of life domains, drawn from systematic review and qualitative synthesis of patient-reported outcomes [17,18,20].

Qualitative accounts add texture to these findings. Fox's descriptive study of patients living with a pressure ulcer described a pervasive loss of control, embarrassment about odor and exudate, and disruption to valued social roles [19]. Spilsbury and colleagues' study of hospital inpatients similarly found that the wound itself was only part of the burden; associated immobility, dependence on staff and disrupted sleep compounded the physical symptoms in ways generic health status measures did not fully capture [20]. Gorecki, Lamping and colleagues developed a conceptual framework of pressure ulcer-specific quality of life derived directly from patients' accounts, distinguishing physical, psychological and social domains and providing the empirical foundation for later pressure ulcer-specific outcome measures [21]. A subsequent qualitative exploration by the same group identified wound-related factors such as pain and exudate, alongside personal factors such as coping style and social support, as key moderators of the magnitude of impact [22].

Prevalence data situate these accounts within the broader hospital population. Vanderwee and colleagues' pilot study of pressure ulcer prevalence across European hospitals confirmed the burden is not confined to any single national system, with grade 2-and-above prevalence in the low single digits, translating into a substantial number of affected patients at any time [23]. Demarre and colleagues' systematic review of prevention

and treatment costs found treatment costs consistently exceeding prevention costs and rising sharply with severity [24]. Padula and Delarmente's costing analysis of hospital-acquired pressure injuries in the United States similarly found the national cost burden runs into billions of dollars annually, concentrated in patients who progress to more severe stages, the same patients in whom quality-of-life impairment is most pronounced [25].

5. Intersection: mobility restriction, fall prevention and pressure ulcer-related quality of life

The point at which fall prevention and pressure ulcer prevention most directly interact is mobility management, where the two programs can reinforce or undermine each other. A protocol driven primarily by restriction, extended bed rest, minimized ambulation, low activity orders, reduces the immediate mechanical opportunity for a fall but increases the duration of tissue loading over bony prominences, raising pressure ulcer risk through the exact mechanism the pressure ulcer protocol is designed to counter. Conversely, a mobility program aggressive enough to protect against pressure injury, frequent repositioning, progressive out-of-bed activity, necessarily increases the number of transfer and ambulation events during which a fall can occur.

The quality-of-life consequences of this tension are cumulative rather than independent. A patient who develops a hospital-acquired pressure ulcer already faces the pain, altered body image and disrupted activity documented above [17,18]; if that patient also experiences a fall, or develops a fear of falling, the resulting activity avoidance can prolong immobility and worsen healing, creating a self-reinforcing cycle in which each event increases vulnerability to the other. Bergquist-Beringer and colleagues' analysis of staff perspectives following implementation of a pressure ulcer prevention program found that competing safety priorities, particularly fall prevention orders conflicting with mobilization goals, were a persistent barrier to consistent repositioning,

direct evidence that this tension is recognized, and not resolved, at the bedside [26].

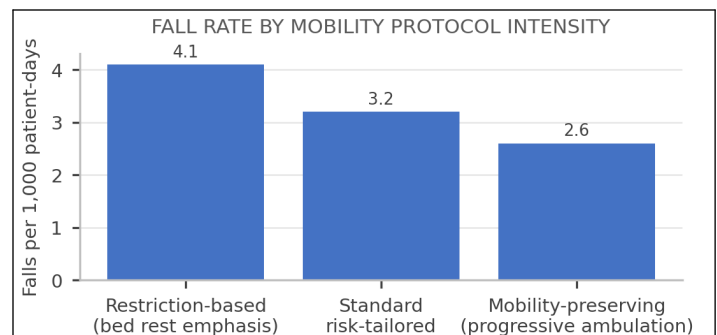


Figure 2: Inpatient fall rate per 1,000 patient-days by mobility protocol intensity, illustrating the trade-off between restriction-based and mobility-preserving fall prevention approaches [12,14,9].

6. Measurement instruments and methodological considerations

Comparing outcomes across the two literatures is complicated by historically non-overlapping outcome frameworks. Fall prevention research reports fall rate, injurious fall rate and time-to-first-fall drawn from incident reporting, while pressure ulcer research increasingly reports patient-centered quality-of-life outcomes. Generic instruments such as the EuroQol five-dimension index and the 36-item Short Form Health Survey have been used in both literatures and allow some cross-comparison, covering mobility, self-care, usual activities, pain and psychological distress relevant to both fall risk and pressure ulcer impact [27,28]. Their generality is also their limitation: neither instrument captures wound-specific symptoms such as exudate or odor, which the pressure ulcer-specific quality-of-life literature has identified as clinically important [21].

Risk-assessment instruments carry their own measurement challenges. Moore and Cowman's Cochrane review of pressure ulcer risk assessment tools found no strong evidence that a structured instrument, compared with clinical judgment alone, reduces incidence, complicating any protocol built primarily around screening rather than the response it triggers [29].

Perell and colleagues reached an analogous conclusion for fall-risk instruments, noting predictive accuracy varies by population and that no single tool performs best across all settings [7].

7. Implementation barriers and integrated prevention strategies

Translating this evidence into a coherent bedside protocol faces recurring barriers. Staffing intensity is chief among them: frequent repositioning and safe, assisted ambulation are both labor-intensive interventions competing for the same limited nursing time. Bergquist-Beringer and colleagues' staff-perspective analysis found time pressure and competing priorities were the most frequently cited barriers to consistent pressure ulcer prevention practice, mapping directly onto documented barriers to consistent fall prevention rounding [26]. Guideline bodies have responded by emphasizing integrated, rather than parallel, protocol design; the EPUAP/NPIAP/PPPIA guideline frames pressure ulcer prevention around a mobility and repositioning schedule individualized to risk level, an approach structurally compatible with the risk-stratified fall prevention planning Dykes and colleagues validated [30,9].

A genuinely integrated protocol would screen for both fall risk and pressure ulcer risk at admission, generate a single mobility plan specifying both the frequency and manner of position change and assisted ambulation, and track both incident rates and a shared quality-of-life measure rather than auditing the two programs independently. Schwendimann and colleagues' interdisciplinary model, bringing physical therapy, pharmacy and nursing together around a shared care plan, offers a template that could be extended to pressure ulcer risk [10]. Cameron and colleagues' Cochrane synthesis likewise found multifactorial interventions outperformed single-element interventions for fall prevention, a structural argument for combining fall and pressure ulcer risk management within

one program rather than two competing ones [14].

8. Conclusion

Fall prevention and hospital-acquired pressure ulcer prevention are not separate clinical problems that happen to share a patient population; they are two safety outcomes driven substantially by the same underlying deficits in mobility, sensation, cognition and physiological reserve, measured with overlapping but historically disconnected instruments, and capable of either reinforcing or undermining one another depending on how a hospital's mobility protocols are designed [3,5,6]. Patients who develop hospital-acquired pressure ulcers experience well-documented, multidimensional reductions in quality of life, spanning pain, altered body image, disrupted sleep and social withdrawal, and these losses compound further when a fall, or the fear of falling, adds a second source of activity restriction and psychological distress to an already vulnerable patient [17,18,19]. The evidence reviewed here supports moving away from parallel, independently audited fall prevention and pressure ulcer prevention programs toward a single, risk-stratified, mobility-preserving protocol that specifies both the frequency of repositioning and the manner of safe ambulation for each patient, is delivered by an interdisciplinary team, and is evaluated against shared, validated quality-of-life outcomes rather than incident counts alone [30,14]. Achieving this integration will require deliberate organizational investment in staffing, training and shared documentation, but the alternative, two well-intentioned protocols working against each other at the bedside, leaves patients exposed to preventable harm on two fronts at once, and to a quality-of-life cost that neither program, measured in isolation, fully captures.

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