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# An Overview of Fall Prevention Strategies Among Adult Patients in Hospital Settings

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## Abstract

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Falls present a major challenge for health care systems: they correlate with poor patient outcomes, extend the length of hospitalization, and increase overall medical expenditure. According to existing literature, risk factors for the occurrence of falls include the male gender, urinary incontinence, muscle weakness, agitation or confusion, and dementia. Studies have shown that the combined practice of identifying risk factors and implementing appropriate fall prevention interventions leads to a reduction in the incidence of falls among hospital patients. As the largest group of health professionals committed to providing high-quality care, nurses play an important role in preventing falls among patient populations. In order to prevent falls and maintain patient safety, it is important to identify the most effective strategies for fall prevention. This study presents an overview of previously published strategies and intervention practices on fall prevention in hospital settings around the world. The most common interventions include fall risk assessment, environment/equipment modifications, patient education/family education on fall prevention interventions, staff education on fall reporting and fall prevention, fall risk alerts, medication management, physical fitness of patients, assistance with transfer and toileting and effective team communication and leadership. Ultimately, it is incumbent upon nurses, other health-care professionals and the entire hospital system to develop effective strategies in order to prevent falls among hospitalised patients.

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## Introduction

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A fall is a preventable incident which frequently occurs in hospital settings. The National Database of Nursing Quality Indicators (NDNQI) established by the American Nurses Association (ANA) defines a fall as an unplanned descent to the floor (or extension of the floor, e.g. trash can or other equipment) with or without injury to the patient which occurs on an eligible reporting nursing unit. Furthermore, the NDNQI definition includes all types of falls, whether they result from physiological reasons (fainting) or environmental reasons (slippery floor), as well as assisted falls, i.e. incidents when a staff member attempts to minimize the impact of the fall. Finally, the NDNQI excludes from its definition falls by visitors, students and staff members; falls on other units not eligible for reporting; falls of patients from eligible reporting units when the patients are not on the units at the time of the fall (e.g. a patient falls in the radiology department) (1). Bittencourt et al. (2017) classify factors associated with the risk of falls in hospitalized adult patients into four categories: hospitalization, comorbidities, intrinsic/psychological factors and extrinsic factors. In their study of 612 patients, they found an association between falls and clinical neurological hospitalization and surgical trauma; diabetes mellitus, systemic arterial hypertension, visual impairment and vertigo; fear of falling (psychological factors) and mats/carpets (extrinsic factors) (2). According to Scheffer et al. (2008), fear of falling correlates with negative consequences such as actual falling, avoidance of everyday activities, decreased physical activity, depression and lower quality of life (3). Other commonly mentioned risk factors include a recent fall; muscle weakness; behavioural disturbance, agitation or confusion; urinary incontinence or frequency; prescription of "culprit" drugs; postural hypotension or syncope (4); age and the male gender (5); and dementia (6). Falls are rarely evenly distributed across units, with much higher rates reported from areas such as elderly care, neurology, and rehabilitation units (7). Hospital falls may cause physical injuries, anxiety, loss of confidence and impaired rehabilitation of the patient (8-10). Approximately 30% of all falls result in injury, particularly among older adults (11). Hospital falls also cause anxiety in hospital staff, as both patients and their family

members perceive hospitals as inherently safe environments; any fall disrupts this image, which may in turn lead to complaints or even litigations (5). The frequency of falls of hospitalized patients in Croatia is estimated at 45 falls in 100.000 hospital days (12), with reported rates ranging from 7 to 302. It is important to note that there is still a decrease in the reporting of falls and the submission of data to the Croatian national quality agency. Estimates for the UK range from 210 to 840 per 100.000 hospital days, depending on the type of hospital (5). In the United States, fall-related injuries are among the 20 most expensive medical conditions. The estimated prevalence of falls in the United States based on the NDNQI definition is a rate of 356 per 100.000 hospital days (13). Thus, fall prevention programs represent an important arena in healthcare settings and are crucial in maintaining patient safety. A systematic review of best practices for fall preventions is a major factor in providing quality care to patients. According to the World Health Organization (WHO), nursing encompasses autonomous and collaborative care of individuals of all ages, families, groups and communities, sick or well and in all settings. Nurses are key to preventing falls because they spend the most time with the patient, assess the risk of falls, constantly monitor changes in the patient's medical condition, plan interventions to prevent falls, and educate the patient and caregivers about fall prevention methods. Effective fall prevention strategies are an important factor that can reduce patients' risk of falling and preserve their safety in hospital environments. A better understanding of the most effective strategies to prevent falls in the hospital setting is important in order to preserve patient safety.

The aim of this study is to present an overview of recent literature on strategies and program interventions aimed at fall prevention in hospital settings.

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## Methods

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The search was focused on studies about strategies and program interventions on fall prevention among adults in hospital settings. The first step involved a search to identify relevant studies in the electronic

databases Science Direct and Pub Med. The inclusion criteria were articles in English published between 2009 and 2020 and articles with full texts available online. Upon the entry of the keywords into the database, the titles of potential articles were obtained. After analysing the title of the paper, the second step was the analysis of the abstracts and the full text.

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## Results

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In a 2012 review article, Spoelstra et al. drew on data from published studies to propose evidence-based interventions for the reduction of falls among hospitalized patients. The authors demonstrated the efficacy of multifactorial fall prevention programs, which consist of the following interventions: fall risk assessment, door/bed/patient fall risk alerts, environmental and equipment modifications, staff and patient education, medication management and additional assistance with transfer and toileting (14).

In 2015, a group of Australian researchers conducted a study on an individualized patient education initiative that was a part of the Safe Recovery fall prevention program. The aim was to alert patients to their personal risk of falls, raise their knowledge about falls epidemiology and falls prevention, and to motivate them to engage in falls prevention strategies. In order to prevent falls, the following interventions were carried out: falls risk assessment, environmental modification, medical and mobility interventions, staff education about falls reporting and falls prevention, falls risk alert stickers and nurse-led discussions with patients about falls prevention (15).

In 2015, a group of United States nurses reported on the outcomes of a project entitled "No Fall Zone," designed to decrease the overall total number of falls. This project included a staff education component which relied on a two-part video simulation: the first part re-enacted a real-life fall of a patient that resulted in harm, while the second part showed how the same scenario should have been handled. Staff education also included trainings pertaining to falls policy, documentation requirements, and the Morse Fall Scale. The clinical outcomes of the project demonstrated that the specific interventions the nursing team employed had a measurable impact on fall reduction (16).

Another evidence-based study conducted in 2019 described a fall prevention program which consisted of the following interventions: purposeful rounding; evaluation of nurses' baseline knowledge and identification of gaps through simulation sessions; providing education through a debriefing session after initial simulation; observation of changes in behaviour during simulation; and identifying needs for further education through teach-back methodology and performance validation. The results of the study revealed that the implementation of appropriate interventions decreased patient falls and injuries (17).

In 2016 Eastern Association for the Surgery of Trauma Practice Management Guideline proposed the deployment of the following interventions in fall prevention among elderly individuals: supplementation of vitamin D and calcium, use of hip protectors, performance exercise programs, environment modification, falls risk assessment (18). It should be noted, however, that some of the authors of this study did not approve of vitamin D supplementation and pointed out that dietary substitution of vitamin D is only recommended in people with increased risk of vitamin D deficiency. Therefore, vitamin D supplementation was not unanimously recommended for all patients in aiding fall prevention (19).

A study by Tucker, Sheikholeslami, Farrington et al. (2019) conducted among hospitalized oncology patients suggested the following interventions for fall prevention: patients' engagement in fall risk assessment and management, effective team communication and the creation of a culture of true engagement with appropriate leadership and resources (20).

Tan, Khoo, Chinna et al. (2018) presented a multifactorial intervention scheme with demonstrable success in the reduction of fall rates among older adults in South-East Asia. Authors proposed the following interventions: a modified Otago exercise program, home hazards modification, visual intervention, cardiovascular intervention, medication review and falls education (21).

Toren and Lipschuetz's study (2017) on falls in hospital settings proposed an individualized intervention program employing the following strategies: estimation of the patient's medical condition; estimation of the patient's participation in the assessment process and their understanding of their medical condition; and evaluation of their behavioural intentions (22). This customized approach is based on the patient's specific profile.

Pearson and Coburn's evidence-based study (2011) assessed improvements to falls prevention measures in the context of the "Flex Program" (the Medicare Rural Hospital Flexibility Program in the United States) and Critical Access Hospitals (CAHs). These prevention programs included: tracking and analysis of falls; identifying and monitoring patients at high risk of falls; providing education for staff; use of special equipment (e.g. bed/chair alarms, lift devices); and implementation of physical therapy and exercise programs. The authors highlighted that effective falls prevention interventions must be interdisciplinary, ideally involving pharmacy, nursing, medical and physical therapy and quality officers. Furthermore, the study recommended additional interventions in falls prevention: toileting regimens for elderly patients who may be cognitively impaired or incontinent; medication review; the use of bed alarms and personal alarms; staff education; and restraints (including, among other methods, limiting restraint use or lowering bedrails). The authors indicated that the published evidence on the preventive use of bedrails is conflicting, since some studies report that their use increases the risk of falls, and others conclude the opposite (23).

France, Slayton, Moore et al. (2017) presented a multicomponent fall prevention strategy implemented hospital-wide at an academic medical centre, the Vanderbilt University Hospital (VUH) in the United States (24). The strategy is summarized in Table 1.

A study conducted in 2017 among hospital inpatients in England and Wales identified the following multifactorial fall risk assessment elements for fall prevention: assessment of mobility, toileting and continence needs, medication review, vision, confusion (dementia and delirium) and orthostatic blood pressure. The proposed ways of reducing environmental risks included the use of mobility aids (canes and walking frames), environmental modifications such as minimising clutter, clear (pictorial) signage coupled with attention to appropriate footwear, spectacles and hearing aid (25). The overview of studies on strategies and program interventions on fall prevention among adults in hospital settings included in the analysis is summarized in Table 2.

Available reviews agree that multicomponent fall prevention interventions have better patient outcomes than single interventions. Stern and Jayasekara (2009) suggest that it is possible that certain multifactorial interventions are more effective than

others and that increasing patient education or targeting fall risk factors may be especially beneficial (26). Oliver et al. (2010) also conclude that fall prevention programs in the hospital setting have usually only been successful in reducing falls when multiple interventions were deployed (7). However, Sherrington et al. (2011) conclude that exercise as a single intervention can prevent falls and that the effects of exercise as a single fall prevention intervention are comparable to those from multifaceted interventions (27).

**Table 1. A fall prevention strategy implemented at the VUH academic medical centre (24)**

### **1. Leadership**

- a. Unit-based fall champions and committees
- b. Weekly fall prevention audit rounds with real-time coaching, mentoring, and recognition
- c. Unit celebrations to recognize and reward success

### **2. Education**

- a. Fall prevention campaign focused on improving staff education and unit culture
- b. Revising patient and family education and engagement
- c. Environmental safety education on use of bed and chair alarms
- d. Re-educating staff on standardized risk assessment tool (Morse Scale)

### **3. Rounding**

- a. Targeted toileting focus during purposeful rounding
- b. Shift safety huddles
- c. Safety rounding with quality partner
- d. Shift leader rounding

### **4. Environment**

- a. Systems engineering assessment of physical environment
- b. Keeping doors open
- c. Moving patients closer to nursing station with more regularity
- d. Visual cues of high fall risk patients with yellow socks, yellow armband, and door sign
- e. Increased accessibility and use of existing bed alarms

### **5. Data Transparency**

- a. Performance boards to display and monitor current and historical performance
- b. Daily e-mail reports of daily and monthly fall data to unit and hospital leadership

**Table 2. Overview of the studies on strategies and program interventions on fall prevention among adults in hospital settings included in the analysis**

Author	Fall risk assessment	Environment/ equipment modifications	Patient education/ family education on fall prevention interventions	Staff education about falls reporting and falls prevention	Fall risk alerts	Medication management	Physical fitness of patients	Assistance with transfer and toileting	Leadership/ effective team communication
Spoelstra et al. (14)	x	x	x	x	x	x		x	
Hill et al. (15)	x	x	x	x	x		x		
Cangany et al. (16)				x					
Fridman et al. (17)				x					
Crandall et al. (18)	x	x				x	x		
Tucker et al. (20)	x								x
Tanet al. (21)		x	x			x	x		
Toren et al. (22)			x						
Pearson et al. (23)	x	x		x		x	x	x	
France et al. (24)		x	x	x				x	x
Morris et al. (25)	x	x			x	x			

## Conclusion

The present study provides an overview of recent literature on best practices for fall prevention in hospital settings around the world. The results of the various studies identified the most frequent interventions: fall risk assessment, environment/equipment modifications, patient education/family education on fall prevention interventions, staff edu-

cation on falls reporting and falls prevention, fall risk alerts, medication management, physical fitness of patients, assistance with transfer and toileting and effective team communication and leadership. In order to ensure quality of care and implement effective interventions aimed at preventing falls, it is essential to employ a multidisciplinary team approach. Great responsibility is placed on nurses, other healthcare professionals, and the entire hospital organization to develop effective strategies for preventing falls among hospitalised patients.

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## PREGLED LITERATURE O STRATEGIJAMA U PREVENCIJI PADA KOD ODRASLIH PACIJENATA U BOLNIČKIM UVJETIMA

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### Sažetak

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Padovi predstavljaju velik problem zdravstvenog sustava. Povezani su s lošim ishodima bolesti, produžuju dužinu boravka u bolnici i uzrokuju povećane troškove za zdravstveni sustav. Prema postojećoj literaturi, postoje mnogi faktori rizika za pad: muški spol, urinarna inkontinencija, slabost mišića, uznemirenost ili konfuzija, demencija. Identifikacija rizičnih čimbenika povezanih s provedbom odgovarajućih intervencija sprječavanja pada pokazala se učinkovitom u smanjenju učestalosti padova među bolničkim pacijentima. Medicinske sestre čine najveću skupinu zdravstvenih radnika. Cilj im je pružiti visokokvalitetnu zdravstvenu njegu. Također, imaju važnu ulogu u prevenciji pada. Da bi se spriječio pad i održala sigurnost pacijenta, važno je identificirati najučinkovitije strategije prevencije pada. Cilj je ovog rada predstaviti pregled objavljenih strategija i intervencijskih programa o prevenciji pada u bolničkim uvjetima. Rezultati različitih studija širom svijeta identificirali su sljedeće najučestalije intervencije za prevenciju pada: procjena rizika od pada, modifikacija okoline, edukacija pacijenata/obitelji o intervencijama za prevenciju pada, edukacija medicinskih sestara o dokumentiranju padova i strategijama prevencije pada, upozorenja o riziku za pad, učinkovita primjena lijekova, poticanje fizičke aktivnosti, osiguranje pomoći pri kretanju i odlasku do toaleta te učinkovita komunikacija unutar tima i vodstvo tima. Važno je naglasiti da je velika odgovornost na medicinskim sestrama, drugim zdravstvenim radnicima i cijeloj bolničkoj organizaciji da razviju učinkovite strategije kako bi se spriječio pad.

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**Ključne riječi:** padovi, strategije prevencije padova, intervencije, pacijent, medicinske sestre

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