Effectiveness of patient-centered interventions on falls in the acute care setting: a quantitative systematic review protocol

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Review objective: The quantitative objective of this review is to identify the effectiveness of patient-centered interventions on fall rates in adult patients in the acute care setting.

Keywords Acute care; fall prevention; falls; hospital; patient-centered care


Background

Unintentional falls during hospitalization remain an ongoing concern for healthcare institutions on a global level, despite implementation of various improvement strategies. The World Health Organization (WHO) defines falls as an event that results in a person coming to rest inadvertently on the ground, floor or other lower level. Although the incidence of falls has been of heightened focus for many years and numerous studies have been done evaluating different approaches for falls prevention, fall rates continue to remain high in acute care settings. Recent estimates of the incidence of falls in the United States during an acute care admission range from an average rate of 3.3 to 11.5 per 1000 patient-days. A patient-day is a unit in a system of accounting by healthcare facilities and healthcare planners and is defined as the number of days that patients are hospitalized. The day of admission, but not the day of discharge, is counted as a patient-day.

In the United States, up to 50 per cent of hospitalized patients are at risk for falls. Between 30 and 50 per cent of all falls that occur during a hospitalization will result in injury and falls are the leading cause of sentinel events: an unanticipated event in a healthcare setting resulting in death or serious physical or psychological injury to a patient, not related to the natural course of the patient’s illness. The most common fall-related injuries include soft tissue injuries, bone fractures, head injuries, decreased mobility and independence, anxiety and death. The WHO estimates that 424,000 individuals will die from unintentional or accidental falls globally and approximately 37.3 million individuals will require medical attention. These estimates are probably under-representative of actual fall rates because not all falls are reported. Falls and fall-related injuries have a great impact on patients, physically, mentally, socially and emotionally. Unintentional falls may also have an economic impact on healthcare institutions as a result of an increase in medical costs from additional treatment of fall injuries and an increase in the length of a hospital stay. Patients who fall have on average a 12.3 day longer length of stay and injuries from falls have led to a 61 per cent increase in patient care costs. In 2010, costs of unintentional falls per individual patient, not resulting in injury, were between US$1586 and 3500; those resulting in minor injuries were US$9996-13,316 and those resulting in serious injury were US$24,249-27,000. Wong et al., examined costs of falls in three Midwest hospitals in the United States and reported an increased length of stay of 6.3 days per patient resulting in an average cost of US$14,000.

Assessment of individuals at risk for falls is paramount for prevention. Various fall risk scales have been developed to assist registered nurses in the assessment of patients at risk for falls including
the Hendrich II Fall Risk Model, Morse Fall Scale and New York Presbyterian Hospital fall risk instrument. The available fall risk assessment tools have varying reliability and validity, and the majority are geared toward the assessment of the geriatric patient. Only the Morse Fall Scale shows promise for its international applicability.

In the hospitalized patient, risk factors leading to unintentional falls can be divided into two categories: intrinsic and extrinsic factors. Intrinsic factors include physiological conditions such as low vision, dizziness, incontinence, age, cognitive difficulties, balance and gait difficulties and polypharmacy. Extrinsic factors refer to an individual’s immediate environment including cluttered hospital rooms, loose electrical cords and spills. Patient falls risk scales tend to address only particular intrinsic and extrinsic factors, but do not adequately assess the patients’ current fall risk status, subsequently highlighting a need for more patient-centered risk assessments and interventions.

Environmental hazards in the acute care setting have also been identified with increased fall risk. Several studies examined the usefulness of specially designed patient care rooms, low beds, flooring and safety alarms (bed and chair alarms), skid proof socks and hourly checks. Various combinations of these factors have been incorporated in the fall assessment tools developed so far, but no single tool has been adopted universally. Institutions tend to develop their own assessment tools, which are investigated in these institutions only, and thus have not been independently evaluated for validity and reliability.

A systematic review of seven randomized controlled trials (RCTs) conducted in three countries found that certain interventions may be effective in reducing the incidence of falls in older adults in the acute care setting. Interventions identified included the use of fall risk cards, short-term administration of vitamin D supplementation, one-on-one patient-centered education focusing on the individual patient’s risk factors and preventative strategies, and targeted fall risk factor reduction intervention that includes fall risk factor screening. The findings of this review concluded that there may be an added benefit in multi-disciplinary, multi-factorial interventions focused on the systematic assessment and treatment of identified risk factors. The findings further identified the need for better designed RCTs targeted to specific sub-groups of patients including patients with cognitive impairments for active management of post-operative complications, not just for a generalized adult population across multiple acute care settings. The authors concluded that fall prevention programs that are more patient specific and can be used in providing care for adults in multiple acute care settings are needed to reduce fall rates.

Falls prevention evidence has changed and evolved over time with positive and negative studies revealing that a one-size-fits-all approach is not the solution. Patient education has been identified in the literature as having a potential benefit in the reduction of falls. In an RCT, Haines et al. found that patient education programs that provided written information as a part of a targeted multi-factorial program prevented falls. In addition, other recommended strategies included the use of web-based education programs and videos, utilization of various equipments such as gait belts or chair/bed alarms and interventions geared toward frequent toileting have also been well documented in the literature.

Conventional methods, such as the use of fall risk assessment tools, have not been consistently effective in reducing fall rates. Since in-patient falls can be caused by many intrinsic and extrinsic factors and patients who fall often have numerous fall risk factors, it may be more beneficial to adopt a multi-modal patient-centered approach to preventing falls, which is tailored to a patient’s needs and incorporates multiple fall prevention interventions.

Patient-centered care replaces our current provider-centered system with one that revolves around the patient. Effective care is generally defined by or in consultation with patients rather than by provider-dependent tools or standards. Although the phrase patient-centered care was coined several decades ago, it entered the health policy lexicon in 2001, when it was featured as one of the six aims for high-quality health care in the Institute of Medicine’s landmark report, Crossing the Quality Chasm. The Institute of Medicine defined patient-centered care as “providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions.”

Patient-centered care includes: knowledge of shared responsibility between patients and caregivers; communication approaches that allow
patient access to information and achieve patient understanding; consideration of patients’ individuality, values and needs; and focus on the use of related population-based strategies to improve appropriate use of health services. In accordance with patient-centeredness as one of the six goals for a 21st century healthcare system, the Patient Protection and Affordable Care Act has mandated the use of measures of the quality of care, public reporting and performance payments that reflect this ambitious aim. The law repeatedly refers to patient-centeredness, patient satisfaction, patient experience of care, patient engagement and shared decision making in its provisions. Even when the law only uses the more general term, “quality measures”, patient-centered assessments will be required when these provisions are turned into regulations for specific programs such as with Medicare’s Value-Based Purchasing Program. In October 2007, the Centers for Medicare and Medicaid Services introduced a regulation that was reinforced in 2008 stating that hospitals will no longer receive reimbursement for treating injuries related to falls of patients admitted to hospitals. Therefore, healthcare institutions have a major financial motivation to re-evaluate their fall prevention plans for hospitalized patients and to adopt and implement newer more effective methods that would reduce the amount of falls from occurring.

Multiple studies have shown that patient-centered care improves patient satisfaction, quality of care and health outcomes while reducing healthcare costs and disparities in healthcare. Providers practicing patient-centered care may improve their patients’ clinical outcomes and satisfaction rates by improving the quality of the provider-patient relationship, while at the same time decreasing the utilization of diagnostic testing, prescriptions, hospitalizations and referrals. Stewart et al. showed that expert opinion could not be correlated with positive results, but patient-perceived patient-centered care correlated with “better recovery from their discomfort and concern, better emotional health 2 months later, and fewer diagnostic tests and referrals.” Bertakis and Azari concluded that patient-centered care was associated with decreased utilization of healthcare services and lower total annual charges. Reduced annual medical care charges may be an important outcome of medical visits that are patient-centered. While not specific to fall risk prevention, these studies highlighted the importance of patient-centered care on improving patient-specific outcomes.

Challenges in evaluating patient-centered interventions include: lack of theoretical and conceptual clarity, unexamined assumptions, lack of adequate control for patient characteristics and social contexts, modest correlations between survey and observational measures, and overlap of patient-centered care with other constructs. Despite these challenges, studies evaluating patient-centered target interventions aimed at reducing falls have shown positive outcomes.

An RCT by Ang et al. evaluated the effectiveness of multiple targeted interventions in the reduction of fall rates in an acute care hospital in Singapore in patients identified as high risk for falls. Patients randomized to the intervention arm of the study received targeted interventions based on their Hendrich II Fall Risk Model Score in addition to usual care. Results of this study demonstrated a fall incidence rate of 1.5% (95% confidence interval [CI]: 0.9-2/6) in the control arm and 0.4% (95% CI: 0.2–1.1) in the intervention arm. Furthermore, the investigators noted that there was an increased time to first fall in the intervention group compared to the control group (hazard ratio = 0.29).

Haines et al., in a RCT conducted in a sub-acute hospital setting in Sydney, Australia, examined the effectiveness of targeted falls interventions on all patients admitted. Targeted interventions were selected by nursing staff based on patients fall risk assessment. Potential interventions included fall risk alert cards with information brochures, exercise programs and hip protectors. Results of this study demonstrated a 30% (P = 0.045) reduction of first-time falls. This study further demonstrated a reduction in recurrent fall events (relative risk 0.78; 95% CI 0.56–1.06) in those individuals randomized to the intervention arm.

An initial search of the JBI Database of Systematic Reviews and Implementation Reports, the Cochrane Database of Systematic Reviews, the Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PubMed was conducted for existing reviews on fall risk prevention. A number of systematic reviews evaluated the effectiveness of various fall intervention strategies, including educating nursing staff, implementation of fall risk assessment scales or falls risks and
prevention were identified. However, none of these reviews looked specifically at patient-centered interventions to reduce the risk of falls. Therefore, this review seeks to determine the effectiveness of patient-centered interventions on falls rates of adult patients hospitalized in acute care settings.

**Inclusion criteria**

**Types of participants**
The current review will consider studies that include adult patients, aged 18 years and older, of any race, ethnicity or gender who are admitted to medical or surgical acute care unit for any condition or illness.

**Types of intervention**
The current review will consider all studies that include fall prevention interventions that are identified as patient-centered. For the purpose of this review, patient-centered intervention is defined as any intervention geared toward a patient’s assessed individual needs, values and preferences.

**Comparator**
The current review will consider studies that compare patient-centered fall prevention interventions with usual care or general, non-patient-centered fall prevention interventions.

**Outcomes**
The current review will consider studies that include reported incidence of falls and fall rates as measured by the number of falls during an acute care admission.

**Types of studies**
The current review will consider both experimental and epidemiological study designs including RCTs, quasi-experimental studies, before and after studies, prospective and retrospective cohort studies, case-control studies and analytical cross-sectional studies for inclusion. In the absence of these, this review will also consider descriptive epidemiological study designs including case series, individual case reports and descriptive cross-sectional studies for inclusion.

**Search strategy**
The search strategy aims to find both published and unpublished studies. A three-step search strategy will be utilized in this review. An initial limited search of MEDLINE and CINAHL will be undertaken using EBSCOhost, followed by analysis of the text words contained in the title and abstract, and of the index terms used to describe the article. A second search using all identified keywords and index terms will then be undertaken across all included databases. Third, the reference list of all identified reports and articles will be searched for additional studies. Studies published in English will be considered for inclusion in this review. Studies published from the inception of databases to the present date will be considered for inclusion in this review.

The databases to be searched include: PubMed, CINAHL, Embase and Nursing/Academic edition.

The search for unpublished studies will include: ProQuest Dissertations and Thesis, the New York Academy of Medicine and the Virginia Henderson Global Nursing e-Respository.

Initial keywords to be used will be: acute care, hospital, patient-centered care, falls and fall prevention.

**Assessment of methodological quality**
Papers selected for retrieval will be assessed by two independent reviewers for methodological validity prior to inclusion in the review, using standardized critical appraisal instruments from the Joanna Briggs Institute Meta Analysis of Statistics Assessment and Review Instrument (JBI-MAStARI) (Appendix I). Any disagreements that arise between the reviewers will be resolved through discussion or with a third reviewer.

**Data extraction**
Data will be extracted from papers included in the review using the standardized data extraction tool from JBI-MAStARI (Appendix II). The data extracted will include specific details about the interventions, populations, study methods and outcomes of significance to the review question and specific objectives. Reviewers will attempt to contact study authors to seek missing data or provide clarity in reported results.

**Data synthesis**
Quantitative data will, where possible, be pooled in statistical meta-analysis using JBI-MAStARI. All results will be subject to double data entry. Effect sizes are expressed as odds ratio (for categorical
data), and their 95% CIs will be calculated for analysis. Heterogeneity will be assessed statistically using the standard chi-square and also explored using sub-group analyses based on the different study designs included in this review. Where statistical pooling is not possible, the findings will be presented in narrative form including tables and figures to aid in data presentation where appropriate.

Acknowledgements
The current review will partially fulfill degree requirements for successful completion of the Doctor of Nursing Practice Program at Pace University, College of Health Professions, New York, New York, for Donna Avanecean, Dawn Calliste, Teresa Contreras, Yeogyeong Lim.

References
25. Haines TP, Bell RAR, Varghese PN. Pragmatic, cluster randomized trial of a policy to introduce low-low beds to


Appendix I: Appraisal instruments

**MAStARI appraisal instrument**

### JBI Critical Appraisal Checklist for Randomised Control / Pseudo-randomised Trial

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<th>Question</th>
<th>Yes</th>
<th>No</th>
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<td>1. Was the assignment to treatment groups truly random?</td>
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<td>2. Were participants blinded to treatment allocation?</td>
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<td>4. Were the outcomes of people who withdrew described and included in the analysis?</td>
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<td>6. Were the control and treatment groups comparable at entry?</td>
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<td>7. Were groups treated identically other than for the named interventions</td>
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<td>8. Were outcomes measured in the same way for all groups?</td>
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<td>9. Were outcomes measured in a reliable way?</td>
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<td>10. Was appropriate statistical analysis used?</td>
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Overall appraisal: Include □ Exclude □ Seek further info. □

Comments (including reason for exclusion):

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**Overall appraisal:**
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- Seek further info. ☐

**Comments (including reason for exclusion)**

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# JBI Critical Appraisal Checklist for Comparable Cohort/ Case Control

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<th>Question</th>
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<td>1. Is sample representative of patients in the population as a whole?</td>
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<td>3. Has bias been minimised in relation to selection of cases and of controls?</td>
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<td>4. Are confounding factors identified and strategies to deal with them stated?</td>
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<td>5. Are outcomes assessed using objective criteria?</td>
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Overall appraisal: Include □ Exclude □ Seek further info. □

Comments (including reason for exclusion)

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Appendix II: Data extraction instruments

MAStARI data extraction instrument

**JBI Data Extraction Form for Experimental / Observational Studies**

Reviewer .......................... Date ..........................

Author .......................... Year ..........................

Journal .......................... Record Number ..........................

**Study Method**

- RCT
- Quasi-RCT
- Longitudinal
- Retrospective
- Observational
- Other

**Participants**

Setting

Population

**Sample size**

Group A ___________________ Group B ___________________

**Interventions**

Intervention A

Intervention B

Authors Conclusions:

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Reviewers Conclusions:

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## Study results

### Dichotomous data

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