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The effect of a translating research into practice intervention to promote use of evidence-based fall prevention interventions in hospitalized adults: A prospective pre–post implementation study in the U.S.

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ABSTRACT

Background: Falls are a major public health problem internationally. Many hospitals have implemented fall risk assessment tools, but few have implemented interventions to mitigate patient-specific fall risks. Little research has been done to examine the effect of implementing evidence-based fall prevention interventions to mitigate patient-specific fall risk factors in hospitalized adults.
Objectives: To evaluate the impact of implementing, in 3 U.S. hospitals, evidence-based fall prevention interventions targeted to patient-specific fall risk factors (Targeted Risk Factor Fall Prevention Bundle). Fall rates, fall injury rates, types of fall injuries and adoption of the Targeted Risk Factor Fall Prevention Bundle were compared prior to and following implementation.
Design: A prospective pre–post implementation cohort design.
Setting: Thirteen adult medical-surgical units from three community hospitals in the Midwest region of the U.S.
Participants: Nurses who were employed at least 20 hours/week, provided direct patient care, and licensed as an RN (n = 157 pre; 140 post); and medical records of patients 21 years of age or older, who received care on the study unit for more than 24 hours during the designated data collection period (n = 390 pre and post).
Methods: A multi-faceted Translating Research Into Practice Intervention was used to implement the Targeted Risk Factor Fall Prevention Bundle composed of evidence-based fall prevention interventions designed to mitigate patient-specific fall risks. Dependent variables (fall rates, fall injury rates, fall injury type, use of Targeted Risk Factor Fall Prevention Bundle) were collected at baseline, and following completion of the 15 month implementation phase. Nurse questionnaires included the Stage of Adoption Scale, and the Use of Research Findings in Practice Scale to measure adoption of evidence-based fall prevention practices. A Medical Record Abstract Form was used to abstract data about use of targeted risk-specific fall prevention interventions. Number of falls, and number and types of fall injuries were collected for each study unit for 3 months pre- and post-implementation. Data were analyzed using multivariate analysis.
Results: Fall rates declined 22% ($p = 0.09$). Types of fall injuries changed from major and moderate to minor injuries. Fall injury rates did not decline. Use of fall prevention interventions improved significantly ($p < 0.001$) for mobility, toileting, cognition, and risk reduction for injury, but did not change for those targeting medications.
Conclusions: Using the Translating Research Into Practice intervention promoted use of many evidence-based fall prevention interventions to mitigate patient-specific fall risk factors in hospitalized adults.

1. Introduction

Falls are the most common reported patient safety incident in hospitals (Anonymous, 2011; Oliver, 2008a; Rubenstein, 2006), and are a major public health problem internationally (Caldevilla et al., 2013; Higaonna, 2015; Quigley & White, 2013; Shmueli et al., 2014). Up to 30% of falls result in injury including fractures, soft tissue trauma and death (Oliver, 2008a; Rubenstein, 2006). Additional consequences include prolonged hospital stay, discharge to long term care facilities, increased hospital costs, patient anxiety, and loss of confidence in mobility and activities of daily living (Boltz et al., 2014; Caldevilla et al., 2013; Oliver et al., 2004; Rubenstein, 2006; Tinetti & Kumar, 2010).

Hospitals have instituted fall risk assessment scales to identify patients at risk for falls followed by implementation of general fall

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prevention interventions (e.g., putting signs on the door for those at risk) (Caldevilla et al., 2013; Oliver, 2008b). Although fall prevention interventions should be customized to the individual's identified risk factors (Anonymous, 2011; Cameron et al., 2012), hospitals have not yet promoted use of fall prevention interventions targeted to patient-specific risks (e.g., ambulation or refer to physical therapy for unsteady gait) (Coussement et al., 2008; Hempel et al., 2013; Oliver, Healey, & Haines, 2010). Because falls are complex and risks for falls are multifactorial, beneficial effects of fall reduction interventions may increase when interventions target patient-specific fall risk factors (Anonymous, 2011; Cameron et al., 2012; Coussement et al., 2008; Tinetti, 2003). Few studies however have examined the effect of implementing evidence-based fall prevention interventions to mitigate patient-specific fall risk factors in hospitalized adults (Dykes et al., 2010).

The purpose of this 18 month study was to implement evidence-based fall prevention interventions targeted to patient-specific fall risk factors (Targeted Risk Factor Fall Prevention Bundle) and evaluate the impact on reducing falls and fall related injuries. A multifaceted Translating Research Into Practice intervention was used to promote uptake and use of the Targeted Risk Factor Fall Prevention Bundle in 13 adult medical surgical units in three community hospitals in the U.S. Specific aims of the study were to (1) compare fall rates, fall injury rates, and types of fall injuries prior to and following implementation of the evidence-based Targeted Risk Factor Fall Prevention Bundle, and (2) evaluate adoption of the evidence-based Targeted Risk Factor Fall Prevention Bundle.

2. Fall Prevention Conceptual Framework

The conceptual framework used in this study was informed by a taxonomy that classifies types of fall prevention interventions (Cameron et al., 2012; Hook & Winchel, 2006; McCarter-Bayer, Bayer, & Hall, 2005). Interventions are conceptualized as Universal Fall Precautions (e.g., reducing environmental risks for falls such as patient room and hall free of clutter), General Fall Prevention Interventions (e.g., bedside table, call light and other personnel items within reach) and Targeted Individual Risk-Specific Interventions (interventions that target patient-specific fall risk factors).

Individual risk factors that consistently contribute to falls in hospitalized adults are gait instability and lower limb weakness; urinary incontinence, frequency or need for toileting assistance; previous fall history; agitation/confusion or impaired judgment; and polypharmacy and prescription of "culprit" drugs, in particular centrally acting sedatives and hypnotics (Oliver et al., 2004; Titler et al., 2011). Mitigating as many of these risk factors as possible is an effective way to reduce falling (Cameron et al., 2012; Oliver, 2008a).

The Targeted Risk Factor Fall Prevention Bundle, developed for this study, focused on interventions that reduce or modify patient-specific fall risk factors as outlined in Table 1. Fall prevention interventions were grouped by categories of risk to address (1) previous falls, (2) mobility limitations, (3) elimination, (4) medications, (5) factors that increase risk for serious injury from a fall (e.g., anticoagulants), and (6) cognitive and mental status. Some fall prevention interventions such as purposeful rounding are effective to address multiple risk factors (e.g., mobility impairments, elimination, comfort) (Fischer et al., 2005; Woodard, 2009). Others such as physical therapy referral, passive and active range of motions, and ambulation are important interventions targeted to mobility impairments, a risk factor for falls as well as functional decline (Markey & Brown, 2002; Ross & Morris, 2010; Tucker, Molsberger, & Clark, 2004). Medication management addresses vigilance and modification of types and number of medications that patients receive as well as the time of the day they are administered (e.g., diuretics) (Agostini, Concato, & Inouye, 2008; Agostini, Zhang, & Inouye, 2007). Medication reviews with pharmacist are helpful in decreasing falls (P.P.S. Advisory, 2008).

Table 1
Targeted risk factor fall prevention bundle.

Common risk factors*	Fall reduction interventions suggested for each risk factor type**
Mobility (gait instability, lower limb weakness or required assistance getting out of bed)	1. Ambulate 3 to 4 times per day with assistance as needed unless contraindicated. 2. Refer to Physical Therapy for assessment and gait and strength training as needed. 3. Active range of motion three times per day 4. Minimize use of immobilizing equipment (e.g., indwelling urinary catheters, restraints) 5. Assure proper assist equipment (e.g., walker, cane) is readily available and in proper working condition
Elimination: Fecal or urinary incontinence (urgency, need for toileting assistance, diuretics)	1. Schedule toileting and assistance to the bathroom (e.g., every two hours) 2. Bedside commode available for use 3. Administer diuretics before 5 p.m. to minimize nighttime toileting 4. Look for signs of urinary tract infection and notify physician 5. Stay within arm's reach during toileting
Medications (sedatives, antidepressants, anticonvulsants, benzodiazepines and polypharmacy)	1. Pharmacy review of medications for recommendations 2. Review medications to minimize number. 3. Assist with toileting prior to administration of analgesics unless pain is too severe.
Cognition/mental status (agitation, confusion, disorientation, cognitive impairment,)	1. Delirium screen — use a delirium screening tool to assess 2. If possible avoid high risk drugs (e.g., opiates, sedatives, antidepressants) 3. Monitor electrolytes 4. Encourage nighttime sleep — use non-pharmacological mechanisms first 5. Encourage use of visual aids (e.g., glasses); use adaptive equipment such as large illuminated telephone key pads, and fluorescent tape on call button with reinforcement to use call button. 6. Assess pain control at regular intervals 7. Rounding every 1–2 hours
Risk for serious injury from a fall (osteoporosis or osteoporosis risk factors, medications/anticoagulants, postoperative.)	1. Indicate as high risk for injury from fall 2. Conduct hour toileting rounds 3. Use low bed (6 inches from the floor) 4. Consider placing a bedside mat on the floor when patient is in bed. 5. Assist with toileting prior to administration of analgesics.

* Factors repeatedly found as significant risk factors for falls in hospitalized older adults (Oliver et al., 2004; Tinetti & Kumar, 2010).
** Suggested interventions for each risk factor group (Cameron et al., 2012; Cumming, 2002; Dykes et al., 2010; Fischer et al., 2005; Healey et al., 2004; Hook & Winchel, 2006; Inouye, Brown, & Tinetti, 2009; Inouye et al., 2000; Oliver et al., 2004, 2007; Quigley et al., 2009; Ross & Morris, 2010; Shever et al., 2011; Tzeng, 2011).

3. Methods

A prospective, pre–post cohort implementation design using a participatory partnership research approach was used for this study. We chose a participatory partnership approach to foster engagement, ownership of the study, as well as use of findings to improve quality of care (Cornwall & Jewkes, 1995; Gold & Taylor, 2007; Green, Daniel, & Novick, 2001).

3.1. Setting

The study setting was three community hospitals in the Midwest region of the U.S. representing small (90 acute care beds), medium (243