FACTORS CONTRIBUTING TO FALLS IN HOSPITALIZED PATIENTS: POST-FALL AGGREGATE ANALYSIS

Carla Massengill Jones

A DNP Project submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice in the Healthcare Systems Administration in the School of Nursing.

Chapel Hill
2014

Approved by:

Mary R. Lynn

Cheryl B. Jones

Larry Mandelkehr

ABSTRACT

Carla Massengill Jones: Post-Fall Aggregate Analysis for Contributory Factor Identification to Reduce Falls
(Under the direction of Mary R. Lynn)

Patient falls and related injuries are one of the most common hospital adverse events in the United States, with millions of patient affected annually. The impact of falls to the patient is considerable as it can affect each patient physically and emotionally, likewise affecting health care organizations through non-reimbursement of falls with injuries. Elimination of patient falls within hospitals continues to be multi-faceted and perplexing, and requires further analysis geared toward understanding commonalities in order to prevent and reduce falls.

The aim of the project was to identify and analyze factors contributing to patient falls by performing an aggregate analysis of data about patients who fell while hospitalized at an academic medical center from January 2012 and March 2014. Data were obtained for all adult inpatients that fell from both nursing documentation and post-fall documentation forms.

A secondary analysis of the aforementioned data was conducted using both content analysis and examination of the patterns that could be identified for those patients who fell. Content analysis was done to determine typologies of falls from the written descriptions of the fall. Factors from the fall descriptions and post fall documentation were used to develop the patterns.

Outcomes included common causes of patients that fell to include patterns include: fell within the first 24 hours, were identified to be at risk for falling, and were unassisted while

falling, and were not injured as a result of the fall. Overall, only half of the factors on the post fall documentation routinely were utilized but did align with created typologies from the fall descriptions.

To my Creator, loving husband, beautiful children, wonderful parents and family --- this would not have been possible without your support and encouragement.

Thank you to this esteemed committee that has provided such guidance, dedication, and commitment to this project. Your expertise, insight, and time were invaluable to its success.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AHRQ	Agency for Healthcare Research & Quality
AMC	Academic Medical Center
ANA	American Nurses Association
CDC	Centers for Disease Control and Prevention
CMS	Centers for Medicare and Medicaid Services
FPP	Falls Prevention Protocol
FTTK	Fall Tailoring Interventions for Patient Safety Toolkit
HFRM	Hendrich Falls Risk Model II
IHI	Institute of Healthcare Improvement
IOM	Institute of Medicine
MFS	Morse Fall Scale
NDNQI®	National Database of Nursing Quality Indicators
NPV	Negative predictive value
PFH	Post Fall Huddle
PPV	Positive predictive value
STRATIFY	St. Thomas Risk Assessment Tool in Falling
TJC	The Joint Commission

CHAPTER 1: SIGNIFICANCE AND BACKGROUND

Introduction

Patient safety and prevention of harm are the heart of quality patient care. *To Err is Human: Building a Safer Health System,* released by the Institute of Medicine (IOM) in 1999, followed in 2001 by *Crossing the Quality Chasm: A New Health System for the 21st Century* described the state of medical errors and their cost, and issued a call for action to decrease preventable errors (IOM Reports, 2014). Further, the Centers for Medicare and Medicaid Services (CMS) instituted a ruling effective October 1, 2008, that hospitals will no longer receive reimbursement for eight hospital acquired conditions (Inouye, Brown, & Tinetti, 2009). Thus it is imperative that health care organizations create effective programs to prevent harm to patients and reduce the financial impact of decreased reimbursement (Volz, & Swaim, 2013). Health care leaders are therefore increasingly focused on falls, infection rates, length of stay and other patient safety outcomes in hospitals.

One of the most perplexing of these adverse events is patient falls. Eliminating or at least reducing patient falls continues to be a challenge for health care organizations. Falls and falls with injuries are common among inpatients. It is estimated that patient falls are the most common hospital adverse event in the United States; approximately one million patients fall annually (Minon, et al., 2012). Approximately half of the patients admitted to a hospital are at risk for falling, and almost half of those who fall incur an injury either emotional or physical (Spoelstra, Given, & Given, 2011). Emotional injuries from falling include distress, fear of

Falling again, and feeling unsafe in health care environments; physical injuries can include bruises, lacerations, fractures, hematomas and even death. Any fall with or without injury can have a tremendous, life altering impact that is preventable.

The financial impact of falls is also considerable since it affects health care organizations and patients alike. The Centers for Disease Control and Prevention (CDC) report that direct care costs (to patients and insurance companies) for people who fall are upwards of $30 billion annually and both direct and indirect costs are estimated to increase to $67.7 billion by 2020 (CDC, 2013). Accrediting entities such as The Joint Commission (TJC), the American Nurses' Credentialing Center, and the CMS require hospitals to focus on preventing patient harm, specifically falls and falls with injury. Health care organizations must have a systematic falls prevention program that can ensure that patient falls are prevented to reduce unnecessary impacts to patients, both physically and emotionally, and to health care organizations financially. Identifying common factors that contribute to patient falls is a critical piece of fall prevention programs. Therefore, the findings reported here focused on patient and environmental factors that may contribute to increased chance of falling.

CHAPTER 2: THE FALLS LITERATURE

A fall event is defined by the National Database of Nursing Quality Indicators (NDNQI®), the most common benchmark, as "a sudden, unintentional descent, with or without injury to the patient, that results in the patient coming to rest on the floor, on or against some other surface, on another person, or on an object" (American Nurses Association [ANA], NDNQI Guidelines for Data Collection, 2013, p.2). A fall event includes both assisted and unassisted falls, regardless of injury, but does not include child falls unless the child is injured (ANA, NDNQI Guidelines for Data Collection, 2013). Most health care organizations compare their falls and injury rates (per 1000 patient days) with other organizations as a benchmark through the NDNQI from the American Nurses Association's National Center for Nursing Quality (ANA, NDNQI Guidelines for Data Collection, 2013).

Because falls and falls with injuries are considered indicators of the quality of nursing care provided in hospitals (Currie, 2008), fall prevention efforts are a focus for nurses and hospital administrators alike. Several agencies have developed guidelines to help health care organizations with tools and evidence on related topics. According to Morse (2009), falls have different causes and require different strategies for prevention; therefore they should be classified based on cause. Morse classified falls into three categories: unanticipated physiological falls, accidental falls, and anticipated physiological falls. Unanticipated physiological falls are falls attributable to physiological causes such as seizures; they account for only about 8% of falls. Accidental falls are typically due to environmental problems such as slipping and account for

approximately 14% of falls. Anticipated physiological falls are those identified as risks on a screening tool; they account for approximately 78% of falls. The Morse Fall Scale (MFS) is used by many hospitals to predict the likelihood of anticipated physiological falls. There are six items on the MFS that a nurse scores to determine fall risk; these are:1) patient has a history of falling, either in the immediate or within the last three months; 2) patient has a secondary diagnosis; 3) patient uses an ambulatory aid; 4) patient has an IV/Med lock; 5) patient has a problem with gait or transferring from one physical place to another; and 6) patient has mental status concerns (Appendix 1: Morse Fall Scale).

To prevent falls it is also important to understand the predictors of unanticipated physiological and accidental falls since there is currently no measure used to predict for these types of falls (Morse, 2009). Currently, fall prevention includes assessments for fall risk, post-fall follow-up and quality improvement efforts (Ganz, Huang, Saliba, et al., 2013). According to the AHRQ Toolkit for Preventing Falls in Hospitals, contributory factors in patient falls should be reviewed on both an individual and aggregate level. Analysis of an individual patient fall helps to keep the same patient from falling again, while aggregate analysis identifies contributory causes at the unit, service, or organizational levels (2013).

Oliver et al. (2004) recommended that clinicians focus on identifying causes of falls from post-fall assessments. The focus is on information that can be retrieved post falls in order to better understand and guide patient fall prevention efforts. Clearly, when a patient falls, it is important for nurses to examine the causes of the fall in order to prevent the patient from falling again (Neily, Quigley, & Essen, 2013 & Morse, 2009). Post-fall reviews include an assessment and evaluation of the fall event, and they are done as close to the fall event as possible by the

primary nurse and team. Post-fall follow-up provides an immediate review after a patient has fallen (Degelau, Belz, Bungum, et al., 2012).

Quigley et al. (2009) reported that falls were reduced on units performing 'safety huddles' after a patient fell, in which staff discussed what seemed to contribute and how to modify the patients plan. A post fall huddle sheet includes factors that the primary nurse thinks contributed to a patient's fall. The post fall huddle sheet is intended for use by the nursing team who meets to determine and discuss the fall event. In this discussion they select the factors thought to have contributed to this fall and consider fall prevention interventions to prevent a repeat fall. Post-fall huddles can include patients and families, and the all staff working with the patient at the time of the fall (Ganz, Huang, Saliba, et al., 2013). Post-fall huddles should include what happened during or related to the fall, any falls interventions in place at the time of the fall, patients' injury and risk factors that are identified, patients' medications and comorbidities present at the time of the fall, as well as actions that should be taken to prevent the patient from falling again (Degelau, Belz, Bungum, et al., 2012 & Ganz, Huang, Saliba, et al., 2013). Post-fall huddles should also provide learning opportunities for staff and patients, since they create evidence for unit and hospital fall prevention programs (Degelau, Belz, Bungum, et al., 2012 & Ganz, Huang, Saliba, et al., 2013).

Fall Prevention Programs

A systematic review by Maike-Lye et al. (2013) of programs consisting of multi-component interventions including signage, wristbands, medication reviews, scheduled toileting, risk assessments, and staff and patient education concluded, that these multi-component strategies, can reduce falls rates in hospital by as much as 30%. However, before specific interventions are applied, a gap analysis comparing best practice recommendations and current

organizational state is recommended by the AHRQ Toolkit and National Guideline Clearing House Prevention of Falls Guidelines (Ganz, Huang, Saliba, et al., 2013; Degelau, Belz, Bungum, et al., 2012).

Health care organizations can also reduce falls by establishing an infrastructure that focuses on fall prevention at an organizational level. Weinberg et al. (2011) suggested that such an infrastructure should include evaluation of existing fall prevention practices and gaps, validation of a fall risk assessment tool, policy changes to support gaps identified in fall prevention practices, and nurse manager involvement in review of fall risk assessments for new admissions and follow-ups with nurses after patient falls, through root cause analysis. In the falls prevention initiative infrastructure Weinberg implemented, nurse managers and nurses were held accountable for documentation and performance on falls risk assessments, and root cause analysis was reviewed at a hospital-wide level to identify trends, accountability, and missed opportunities. Through changing organizational culture related to falls through policy changes, root cause analysis, and identification of trends at the organizational level, the fall rate in the organization was reduced by 64%.

Numerous fall prevention and injury prevention guidelines and toolkits are available to assist health care organizations. Guidelines typically provide evidence-based strategies to guide health care organizations, while toolkits include the tools to support these guidelines, such as forms and measures. The AHRQ Toolkit, National Guideline Clearing House Prevention of Falls Guidelines, and VA National Center for Patient Safety Reducing Preventable Falls Guidelines are the most commonly used. All of these guidelines and toolkits provide evidence-based components of fall prevention with recommendations on organizational structure, support and culture; risk assessment and identification of risk factors; communication and education of

staff and patients; integration of technology; risk factor interventions; and post-fall follow-up and quality improvement (Degelau, Belz, Bungum, et al., 2012; Neily, Quigley, & Essen, 2013; McArthur, 2013; Ganz, Huang, Saliba, et al., 2013; & Boushon, Nielsen, Quigley, et al., 2012).

Major recommendations within the guidelines are organizational structure, support, and organizational support for a falls prevention program and ensuring that there is a committee or team structure to support falls reduction initiatives (Degelau, Belz, Bungum, et al., 2012; Spoelstra, Given, & Given, 2011; Neily, Quigley, & Essen, 2013; McArthur, 2013; & Ganz, Huang, Saliba, et al., 2013). A key component of a falls prevention program is strong leadership on the falls team, including senior leadership, front line staff, and multi-disciplinary team members, as well as a member from the organization's quality improvement team (Ganz, Huang, Saliba, et al., 2013). Team members provide the expertise necessary to establish a culture of falls prevention (2013). Further, having a senior leader as a part of the team not only can foster accountability, but also assist with minimizing barriers that the team may encounter (2013). Senior leadership can also increase safety awareness across the health care organization through communication (Spoelstra, Given, & Given, 2011).

A key study of a falls reduction program was conducted by Weinberg et al. (2011) who implemented a two-phased intervention: (1) an evaluation of fall prevention efforts and (2) a fall prevention intervention program that addressed fall risk assessments, investigation, planning and identification of falls. This program reduced the fall rate by 64% and the rate of falls with moderate injury by 64%. The initiative included a step-by-step process that held staff accountable with support from senior leadership (2011). The dramatic reductions in fall rates

were achieved by creating a culture of safety, accountability and continuous quality improvement with a focused initiative by senior leadership and front line nurses (2011).

Communication with and education of staff and patients are key pieces of a fall prevention program is the integration of technology (Spoelstra, Given, & Given, 2011; Neily, Quigley, & Essen, 2013; McArthur, 2013; Ganz, Huang, Saliba, et al., 2013; & Boushon, Nielsen, Quigley, et al., 2012). Dykes et al. (2010) conducted a three-phase study to identify why patients fell and to create and test a Fall Tailoring Interventions for Patient Safety Toolkit (FTTK). The study found that the FTTK reduced falls when technology was integrated at the bedside and generated tailored interventions for nurses to follow (2010). One of the study conclusions was that nurses should tailor patient education to the patient's risk factors (2010). Dykes et al. showed a 22% reduction in falls with an accurate plan and interventions; however, they noted that patient and staff compliance with prevention strategies should be continually addressed, through post-fall follow-up and quality improvement initiatives.

Measurement

There are a variety of measures used to assess falls, both before and after a fall has occurred. To benchmark fall rates, many health care organizations that participate in NDNQI measure and compare their falls and fall injury rates with other organizations through NDNQI quarterly reporting. NDNQI gathers data from hospitals and reports four standard fall and injury rates quarterly: "falls, injury falls, unassisted falls, and intentional falls" (ANA, NDNQI Guidelines for Data Collection, 2013, p.2). Each indicator is reported for a standard 1,000 patient days for a total falls rate.

Suspected intentional falls, a recent addition to the falls indicator list, include falls by patients who are greater than 5 years old, and who staff suspect to have fallen on purpose or

falsely report having fallen (ANA, NDNQI Guidelines for Data Collection, 2013). While reported as falls, suspected intentional falls are categorized separately and are not counted as a fall. Every fall has a potential injury level identified, which is reported to NDNQI. As mandated by the NDNQI fall reporting guidelines, hospitals have the responsibility to ensure that injury level is determined within 24 hours (ANA, NDNQI Guidelines for Data Collection, 2013).

Injury classifications are:

- None - resulted in no signs or symptoms of injury as determined by post-fall evaluation (which may include x-ray or CT scan)
- Minor - resulted in application of ice or dressing, cleaning of a wound, limb elevation, topical medication, pain, bruise or abrasion
- Moderate - resulted in suturing, application of steri-strips or skin glue, splinting, or muscle/joint strain
- Major - resulted in surgery, casting, traction, required consultation for neurological (basilar skull fracture, small subdural hematoma) or internal injury (rib fracture, small liver laceration), or patients with any type of fracture regardless of treatment, or patients for have coagulopathy who receive blood products as a result of a fall
- Death - the patient died as a result of injuries sustained from the fall (not from physiological events causing the fall) (ANA, NDNQI Guidelines for Data Collection, 2013, p.5-6)

Fall risk assessments and identification of risk factors for falls are necessary for a fall prevention program. In fact, every hospitalized patient is required to have a fall-risk assessment within 24 hours of admission in order to meet the Joint Commission standards. Therefore, all health care organizations use some type of fall screening tool to identify every patient's fall risk.

Several falls risk assessment tools are available for health care organizations, which either create or modify these falls risk assessment tools. The most common falls risk assessment tools used by health care organizations are the MFS, mentioned earlier, the St. Thomas Risk Assessment Tool in Falling (STRATIFY), and the Hendrich Falls Risk Model II (HFRM) (Spoelstra, Given, & Given, 2011). A systematic review on risk factors and risk assessment

tools recommended accurate risk assessments in designing fall program interventions, noting that even the best risk assessment tools will sometimes fail to capture those who fall (Oliver, et al., 2004). There is no evidence that any of the assessment tools is a solid predictor of falls (Degelau, Belz, Bungum, et al., 2012). However, Ganz, et al. (2013), note that performing a standardized fall risk assessment does initiate care planning and communication, and assist in clinical decision making for patient-specific considerations. Also, Morse (2009) pointed out that the MFS assesses a patient's risk for anticipated physiological falls.

STRATIFY, commonly used in acute and rehabilitative care hospitals, and was created in the United Kingdom for elderly patients using a 5-point scoring system to identify high and low risk of falling (Oliver, et al., 2008). In a systematic review Oliver et al found that though STRATIFY was comparable to other fall risk assessment tools in adherence, speed of use, and reliability, the tool's sensitivity and positive predictive value (PPV) were too low to identify patients of high risk for falling in hospitals. The authors noted that the findings demonstrated that patient population and setting does affect the performance of the STRATIFY fall risk assessment tool (2008).

Another fall risk assessment tool commonly used in acute hospitals is the HFRM. Originally created in 1995 and revised as the HFRM II in 2003, the HFRM has been tested on general medical-surgical patients and found to identify, low and high falls risk. In a study on elderly patients, the HFRM was found to be easy for nurses to use, and it had high sensitivity, at 0.86, and low specificity, of 0.43, with PPV of 0.11 and negative predictive value (NPV) 0.97 (Ivziku, et al., 2011).

Falls Assessment and Follow-up the study site

Though no risk assessment tool has proven to be the "gold standard" for identifying high risk patients for falling, risk assessment is an essential process in quality improvement efforts. Although several falls risk assessment tools exist, the health care organization examined in this project uses their Morse Falls Scale (MFS) as the fall risk assessment tool (Appendix 1). The MFS tool was created in 1989-1992 (Morse, 2009). The MFS has six items for scoring: history of falling, secondary diagnosis, ambulatory aid, intravenous therapy, gait, and mental status (2009). Construction of the scale began with testing 100 patients who fell and 100 selected control patients in order to identify variables for the scale (2009). The inter-rater reliability scores (21 raters) for five of the items was r=0.96 with a range of 0.82-1.0 the NPV was 0.992 and the PPV was 0.73 (2009). Validity for the MFS was tested by discriminatory analysis, examining those cases that were not classified correctly during the analysis, and by prospective testing in three different clinical areas (2009). Chapman et al. (2011) studied 1540 patients in acute and critical care units and found sensitivity of 77.2 and specificity of 72.8.

At the institution studied, the current process of falls assessment is that the nurse identifies a patient's fall risk factors within 24 hours of admission, and again each shift (every 12 hours), as well as when there is any change in the patient's status (mental status change, procedure) by completing the MFS. According to the hospital policy, if the patient scores above 45 on the MFS assessment, a Falls Prevention Protocol (FPP) is implemented, which includes specific nursing evidence-based interventions. Even if the patient scores less than 45 on the MFS if, in the nurse's judgment, the patient is at risk for falling, the nurse initiates the FPP. The FPP includes evidence-based interventions including placing a yellow arm band indicating falls risk, moving the patient closer to the nursing station, putting signage on the door indicating FPP,

and considering bed alarm activation. If the patient falls, the nurse provides care that includes assessing the patient for injury, taking vital signs, notifying the physician and nurse manager, providing patient and family education, documenting fall in the medical record, completing a MFS assessment, and completing the Post-Fall Safety Huddle Form (Appendix 2: Post-Fall Huddle).

As part of the post-fall event analysis, a Post-Fall Safety Huddle Form was created to be used by nurses after a fall event to identify and 'huddle' about the reasons a patient fell in efforts to prevent the patient from falling again. The form was developed by members of the health care organization's Falls Committee, led by Lean Six Sigma Express Work-Out Session as a part of a process improvement methodology. It is unknown from what source the Post-Fall Huddle factors were derived. The Post-Fall Safety Huddle Form includes pre-populated data items pulled from the post-fall electronic documentation and is printed out for use as soon as the nurse completes the post fall documentation. The primary nurse selects the factors that contributed to the fall on the form. The 24 factors that may have contributed to the fall are grouped in these categories: factors related to the patient's diagnostic and cognitive status, the environment, family and staff presence, effects of medication, and activities involved in the fall, if any. Within each category the following are factors are listed:

- Patient factors: Does not follow commands, patient confused, neutropenia, orthopedic issues, off service patient, repeat fall
- Environmental factors: Environmental clutter, no gripping socks on patient, call bell promptness, no bed alarm activated, foley on bed, IV pump, reaching
- Human factors: family present, sitter present
- Medication factors: sedatives, diuretics, chemotherapy
- Activity factors: in/out of chair, ambulating room/hall, toileting bedside commode, toileting bathroom, in/out of shower

The primary nurse completes the Post-Fall Safety Huddle Form, the nurse then leads a "huddle" or meeting with all the staff within 30 minutes of the fall. The huddle includes a discussion of all of the information on the Post-Fall Safety Huddle Form. Once the huddle is completed, the form is given to the nurse manager of the unit for further review and follow-up with team members if necessary. The nurse manager is required to review the Post-Fall Safety Huddle Form within 24 hours of the fall event to assess the patient for injury and review the medical record for documentation of compliance. If the patient is injured, the next steps are pre-determined and stated in the policy. If additional information is required, the nurse manager holds a discussion with the nurse and other team members to clarify any questions before the Post-Fall Safety Huddle form is signed and sent to the Co-Chair of the institution's Falls Committee.

The Problem Studied

Patient falls remain a challenge for hospitalized patients: there is not a single solution to prevent falls, nor a tool for accurately identifying patients that are at highest risk for falling. There are no "gold standard" fall prevention techniques either a single intervention or interventions used in combination. However, an analysis of existing patient falls data can aid in understanding the common causes of falls and the characteristics of patients who fall so that an effective fall prevention program can be developed.

Therefore the question addressed in this project was:

> What patient characteristics, activities or other factors that contribute to falls in a large academic medical center (AMC)?

CHAPTER 3: GUIDING THEORY

Theoretical Framework

After identifying a problem where improvement is needed, a central tenant in process improvement is to analyze the current process to determine why the process is inadequate (Butts & Rich, 2011). Quality assessment often begins with Donabedian's central tenets of (1988) 'structure, process, outcome', which provided the framework to address falls in this study. Structure refers to the attributes of the setting and organization, including resources, physical structure, and personnel. Process is what is specifically done in either giving or receiving care, including patient activities. Of particular interest in this project, a falls prevention program is the chief structural component. Related processes within such a program include reporting of falls, a communication feedback loop, the way the falls are analyzed, and the way the policy/protocol outlines nursing interventions (For a graphic see Figure 1 Theoretical Framework). Donabedian's model would predict that improving structures and processes should lead to better patient outcomes, or the effects of care (1988).

Analysis of patient falls should provide information to guide clinicians with interventions for patients. A strong falls prevention program and a tool that captures systemic factors are important pieces in improving falls outcomes. An analysis of the specific factors that contribute to the patient's fall will enable the organization to target the most important areas for falls interventions.

CHAPTER 4: METHODS

Overview

The Post-Fall Safety Huddle data have never been aggregated at the institution where this project was conducted and were the focus of this project. The results of this project will be an essential step in building an evidence-based falls program for the institution. Data came from the post-fall huddle sheet and the medical record (Appendix 3: Data sources, study variable, and variable values), and these data were merged and validated. In preparation for the analysis, the first step was to recode all of the text variables to numeric data to eliminate text entries for such variables as gender (male=1and female=2). The 24 factors from the post-fall huddle (PFH) Forms also converted to numeric values (Appendix 4: PFH Factor Descriptions). Typologies were also created based on an analysis of nurses' descriptions of fall events in the medical record. Demographic data gathered via the PFH forms were also examined.

Variables were assigned a numerical value and entered into SPSS® and prepared for data analysis. The institution report all fall events and fall injury using NDNQI measures. Frequencies and percentages were calculated for each variable (Appendix 5: Typologies and descriptions of fall events, Table 1: Demographics of patients who fell). During the period of time under study –January 2012 to March 2014 -- there were 400 patients who experienced a fall. A PFH form was completed for each patient fall and typologies were derived from data provided in these forms. To generalize text and numerical data for analysis, content analysis of

the event descriptions was done to identify themes in the descriptions (See Table 9: Groups (Themes) with corresponding PFH factors and Typology terms). Other data in the Fall Description section of the Post-Fall Safety Huddle tool (e.g., date/time, location, incident type, level of injury, safety precautions, and use of restraints) were analyzed descriptively. Using content analysis the descriptions were then examined to see whether typologies could be identified from the most frequently occurring words or phrases (e.g., chair/bedside commode to bed transfer, no injury, no restraints). Factors related to the post-fall huddle were identified within typologies to see if there were common patterns that could be used to develop interventions to reduce falls in the institution. These were grouped and compared.

Clinical Questions

1. What are common factors of patients who fall?
2. Does the Post-Fall Safety Huddle Form capture the data necessary to analyze falls after the event has occurred?
3. Is the Post-Fall Safety Huddle Form consistent with current practice guidelines?
4. Are there recommendations for the falls prevention program that can be generated from these findings?

Setting

The setting of the project was an AMC in the southeast U.S. This AMC has over 800 licensed beds organized in more than 50 patient care units. The data were from all adult inpatient units on which falls occurred. The organization has several safety and quality initiatives, and a multi-disciplinary active Falls Reduction Committee includes medicine, nursing, pharmacy, therapies, home health, patient equipment, environmental services, and

representatives from all of the institution's service line areas. As with virtually all hospitals, decreasing falls and falls with injury is an organizational priority.

Participants

The data for this project came from all adult patients admitted between January 2012 to March 2014 who fell sometime during their hospital stay (n=1,264). All fall events were analyzed, including repeat falls by the same patient and falls that occurred for the same patient but during different admissions within the project period.

Approvals

Approvals to conduct this project were obtained from the leadership of the AMC, and The University of North Carolina at Chapel Hill Institutional Review Board. Post-Fall Safety Huddle Forms were retrieved from the institution's Falls Committee and all data it extracted. Data were provided by a collaborative effort between the health care organization's committees that focus on safety, performance improvement, and efficiencies. All data files were merged into a SPSS® file after validation. Data validation included the inspection of data from a random sampling of 100 patients to ensure that data transfer was accurate and complete.

CHAPTER 5: RESULTS AND DISCUSSION

Overview

The fall aggregate analysis included 1,251 patients who fell on one of the adult inpatient units at the project AMC between January 2012 and March 2014. The data set originally included 1,264 patients who fell, but 13 patients were removed from the data set either because they were duplicates (2) or admitted to newly opened units (11). PFH forms were available for 400 of the patients who fell.

Demographics

Of the 1,251 patients who fell between January 1, 2012, and March 31, 2014, the typical patient was hospitalized in an acute care unit (84.7%), assessed to be at risk for falling (72.6%), did not require any type of ambulatory assistance (86.7%), did not require the use of any special type of equipment (88.4%), and experienced a fall from an inpatient hospital bed (23.8%). For all patients, the FPP was activated (81.5%), and patients were neither restrained (99.6%), nor injured (71.2%). The average age of patients who fell was 56 years, ranging from 18 to 96 years (mean = 56.28, *SD* = 16.94). (For more information, see Table 1: Demographics of patients who fell.)

Data on Falls

The most common day on which falls occurred was within the first 24 hours of being hospitalized (21.6%), with successive days accounting for falls ranging from 4% to 9% on each day (Table 2: Frequency of patient falls by day of hospitalization). One patient fell five times during one 24 hour period. Most patients who fell did so before the twelfth day of

hospitalization (91%). The patients who fell had a range of days in the hospital from 0 (less than a full 24 hour stay) to 36 days (mean days=5.6, *SD*=5.6).

Most patients who fell were identified as at risk for falling in the electronic medical record (72.6%); 98.8% of patients on these units had a MFS assessment, and the patients who fell had a MFS mean score of 60.5 (median = 60.0, *SD*=24.89) (See Table 3: MFS frequencies for patients who fell for more information). Over 81% of the patients who fell had a fall prevention protocol activated.

The most common times of the day for falling were (range of 2.6%-6% per hour) 10AM (6%) and 4PM (6%) (Table 4: Percentage of patients who fell per hour across 24 hour period). When patients who fell were divided into the typical 12-hour shifts their nursing team members work, 56% of the patients fell on the 7AM-7PM shift, while 43% fell on the 7PM-7AM shift (Table 5: Percentage of patients who fell 7AM-7PM, and Table 6: Percentage of patients who fell 7PM-7AM).

The top five factors reported by nurses as factors contributing to patient falls are these listed below (Table 7: Frequency of PFH categories and factors for the patients who fell[1]):

1. Does not follow commands (n = 151)
2. Patient confused (n = 107)
3. Ambulating room/hall (n = 99)
4. In/out of chair (n = 98)
5. Toileting bathroom (n = 98).

[1] While the total sample of patients who fell was 1172, Post Fall Huddle sheets (PFH) were available for only 400 patients

The two most common factors selected were in the *Patient Factors* category, selected 258 times out of 1,251 notations, while the remaining three most common factors were in the *Activity Factors* category (373 selections). The least common factors selected were *Human Factors* (n = 76) and *Medication Factors* (n = 104). Over half of the factors were rarely selected as a cause of the patient's fall, that is they were selected fewer than 50 times out of the more than 1,000 selections. A total of 1,172 factor selections were noted on the 400 PFH sheets, with 1-9 factors selected for each patient who fell (Table 8: Typology frequency and percent of the patients who fell and did not have PFH forms).

The most common typologies listed for all patients who fell (n = 1,251) were the following, based on the nurse's fall description:

1. Toileting, did not call, and Moving/getting up (30%)
2. Moving/getting up and did not call (21.3%)
3. Moving/getting up (18.7%)
4. Toileting and Moving/getting up (6.9%)
5. Physiological (6.5%)

Patients not calling for assistance and moving/getting up were noted for 51.3% of the patients who fell, while toileting accounted for 38.5% of the falls (Table 9: Groups (Themes) with corresponding PFH factors and Typology terms).

When the typologies were examined for the 400 patients who fell and who also had a PFH, the most common typologies were:

1. Toileting, did not call, and Moving/getting up (27.8%)
2. Moving/getting up (21%)
3. Moving/getting up and did not call (20.5%)

4. Physiological (7.3%)
5. Toileting and Moving/getting up (5.5%)

Although the top five typologies were the same in both the total group of patients who fell (n = 1,251) and those with a PFH (n = 400), the rankings differed.

In further analysis of the patients who had both PFH and a typology (n = 400), the 'like' factors were combined to form five groups. Some groups included factors from either the PFH or the typology or both. The five groups were toileting, following commands, environmental, showering, and moving/getting up (Table 9: Groups (Themes) with corresponding PFH factors and Typology terms).

Group 1 factors were all related to toileting. PFH factors included *Toileting bedside commode* and *Toileting bathroom*; typology factors for this group were *Toileting*, *Toileting and Did not call*, *Toileting and Moving/getting up,* and *Toileting, Did not call, and Moving/getting up*. PFH factors related to toileting were selected 150 times, whereas in the typologies only 139 patient falls were related to toileting.

Group 2 factors included all factors from the PFH that involved *Does not follow commands* and all factors from the typologies involving *Did not call*. Among the PFH factors, the *Does not follow commands* were involved in 151 falls, while *Did not call* was involved in total of 201 falls.

Group 3 factors included environmental factors from both the PFH and the typologies. The PFH factors *Environmental clutter, Foley to bed*, *IV pump*, and *Reaching*. *Trip/Environmental trip* were also included in the typologies. The environmental PFH factors mentioned were a total of 96 falls, but only in 25 typologies.

Group 4 was the most straightforward; this included one PFH factor and one typology factor showering. *Showering* was identified 16 times on the PFH, while the typologies identified it 15 times.

Group 5 factors revolved around moving, getting up, and walking in both groups. Among PFH factors, *In/out of chair* and *Ambulating in room/hall* were noted, while from among typology factors *Moving/getting up* and *Moving/getting up and Did not call* were noted. The PFH factors resulted in 197, while the typology factors resulted in 166.

Discussion of Results

Only 72.6% of the patients examined in this project who fell were scored as at risk for falling. Reasons for the not documenting this risk may be that nurses did not fully understand the items on the MFS, scored the patient's risk correctly, or the scale did not include adequate information necessary for the patients to be assessed and scored as at risk. Also, since the MFS is measures risk of falls of anticipated physiological falls, the patients who fell who may have not been at risk of anticipated physiological falls (Morse, 2009). Additionally, 155 patients (12.5%) were scored either 35 or 40 on the MFS, the difference of a single item on the MFS could have made the patient at risk for falling. A total of 81.5% of the patients were on placed on FPP (nurse initiated falls interventions), 8.4% more than were deemed to be at risk using the MFS alone (score $\geq$ 45). This could indicate the nurses believed these patients should be on falls prevention even though the patient did not score at risk.

Patients fell at all times of the day, so time of day was not a factor in the analysis, except to note that 10:00 AM and 4:00 PM had the highest frequency of falls (6%). It is important to note that the highest percentage of patients fell during the first 24 hours of admission, dropping from 21.6% on the day of admission to 8.8% the next day.

The most common risk factors selected by the nurses on the PFH sheet were *Patient, Activity,* and *Environmental Factors,* while *Human* and *Medication Factors* were selected only 15% of the time. Of the 24 factors listed, 13 were selected less than 50 times as contributing factors, which may suggest that these factors should not be included on the PFH sheet.

Data on the *Activity Factors* from the PFH Forms, *in/out of chair* (n = 98), *ambulating room/hall* (n = 99), and *toileting bedside commode* (n = 98) indicate that patient activities were frequent contributors to patient falls. Although no *Environmental Factors* were top contributors of patient falls, the category of *environmental factors,* represented over 20% of the causes for patient falls.

Based on data on patients who fell and who had both the PFH and a typology, similarities were found between the two. For example, *showering* was noted almost exactly the same on the PFH sheet and the typology. This outcome suggests using the PFH factors in future analysis.

However, there were differences in other groupings, for example, following commands. The typologies included *did not call,* since these were the specific words used in fall descriptions by nurses. The PFH factor most similar to the typology was *does not follow commands*. Although these two phrases have different meanings, *does not follow commands* may have seemed the best option for the nurse to select on the PFH sheet when the nurse stated in the fall description that 'patient states that he/she "forgot to call'. However, the PFH sheet could benefit from including a *did not call* factor, to differentiate the two variables.

Environmental factors encompassed a range of items in the PFH, while the typologies included specific phrases such as 'trip', 'slip', 'tangled', or 'clutter'. This group was least used.

In group 5, *Moving/getting up*, the typology was not specific about the location from which the patient was moving, while the PFH factor specifically included where the patient was

moving ‘from’ and ‘to’. The difference in the frequency of noting this factor on the PFH and the typology was probably due to the fact that on the PFH sheet, the only options for moving/getting up were via chair or ambulating, while the typology included moving/getting up from any position and included moving/getting up from bed, which is where most patients spend their time and the location from which most patients are likely to move. The PFH form did not offer ‘from bed’ as an option.

Recommendations

Any post-fall review should include: an assessment and evaluation of a patient fall completed by the primary nurse as close as possible to the fall event and could include team members, the patient, and/or the family; it should provide meaningful information such as fall event, interventions, time, date, injury level, risk or contributory factors associated with the fall event, and interventions that could prevent this patient from falling again (Degelau, Belz, Bungum, et al., 2012 & Ganz, Huang, Saliba, et al., 2013).

The AMC where this project was conducted uses a PFH form that addresses each of these components. At the project site, after a patient falls, the nurse has to re-assess the patient’s MFS on the PHF print out. The instruction section of the PHF includes a note that the completed PFH is to be submitted by the end of the shift to the unit manager. The fall description that is typed into the documentation system by the primary nurse, along with the date, time, injury level, and interventions applied, are pre-populated on the PFH. Finally, there are check boxes with 24 risk and/or contributory factors listed on the PFH for nurses to select as a way to think through and prevent the patient from having a repeat fall. As with any process, there are ways to improve the PFH sheet; however, the PFH meets current evidence-based practice guidelines.

Although the falls prevention program at the study AMC is in alignment with current clinical practice guidelines, the analysis performed provides insight into several recommendations that can be made to improve the falls prevention program. As would be suggested within the structure component of Donobedian's model, the falls prevention program should require completing the MFS on admission for all adult patients, rather than allowing the assessment to be completed anytime within the first 24 hours of hospitalization. With 21.6% of patient falls occurring in the first 24 hours of admission, assessing patients' fall risk on admission is critical. A process enhancement of the falls program would be for the nurse to provide falls prevention education, also at admission, specifically explaining that they are in a different place, medications may alter their cognition and ability to move as they normally do, and so forth. This could then be reinforced with each nurses' shift assessment of the MFS falls risk of specific ways that this patient is at risk for falling based on their plan of care. Making specific interventions and education tailored to the patient is key in preventing falls (Dykes et al., 2010).

Secondly, 10:00 AM and 4:00 PM were the most common times for patients to fall during this time period. Further analysis is recommended to determine what is important about these times, especially if there is a structural or process issue that needs to be addressed; a first step could be to perform intentional rounding on patients determined to be at risk for falling hourly and with a special emphasis at these times.

Third, The PFH forms do capture some important information about the patient demographics, activity during the fall, risk assessment scores before and after the fall. However, the PFH form is not always completed and does not capture causes for the patient falling; changing the falls assessment process is in order. With a primary focus on recommended that

clinicians focus on identifying causes of falls from post-fall assessments, the information retrieved from the PFH should guide patient fall prevention efforts (Oliver et al., 2004). Therefore, specific recommendations on what happens after a patient falls including the PFH are essential. One essential process change is to ensure that the PFH is completed for all patient falls, which might be facilitated by coupling the PFH sheet and the required PFH incident report.

Based on the number of PFH forms retrieved (400) relative to the number of patients who fell (1,251), it is recommended that a process be instituted to ensure tracking and follow-up for PFH forms not received. Additionally, it is clear that some data were not captured by the PFH that would assist in fall prevention. Specifically missing from the PFH form were factors that addressed patients getting out of bed, other types of medications like narcotics, and not calling for assistance, each of which was found to be relevant to falls prevention, but were not captured on the form. The tool needs to be considered for revisions to include these factors.

Establishing a database of PFH data for on-going analysis would be optimum for both aggregate and individual analyses. Next, the PFH form should be integrated into the electronic health record so the process is automated. This would reduce double charting (electronic and then PFH written form), encourage nurses' to complete of the PFH or make it a required field to complete, and create an electronic data base for the reporting of data at the aggregate level.

One way to accomplish the PFH form revisions would be to include and engage the patient and family in the post-fall huddle itself to enhance the process of fall analysis. If able to describe their fall, the information provided by patients can potentially lead to identification of additional factors to consider when assessing falls risk, as well as provide an educational opportunity for the nursing staff.

Further evaluation of the each PFH factor would provide insights into data that are not currently being captured. Half of the PFH factors were rarely selected, indicating that those factors are either not common causes of patient falls, or the meaning of the factor is not clear. Also, most PFH forms had as many as 9 factors marked (range 1-9), which suggests that there may be too many factors from which to choose, the factors not clearly defined, or that nurses believe they must mark at least one factor in each of the five sections. Improving instructions for the use of the PFH sheet and eliminating factors rarely chosen might improve the its utility. The PFH form factors should be analyzed to determine further the clarity and use of each factor as a guide for keeping them as factors that contribute to patient falls or if additional factors need to be added, or limiting the nurse to select only the top five contributing factors.

Finally, further clarification of the definition *Does not follow commands* on the PFH sheet is needed. The fall descriptions revealed that often patients did not call for assistance. Many of these descriptions included comments like 'patient did not call for assistance', 'reminded patient to call for assistance', 'patient's stating forgot to call' indicating that there is need for data on these factors. *Did not call for assistance* is not part of the PFH. However, over 200 of the post fall descriptions included a variant text entry related to the patient not calling for assistance. Therefore, including such a category/response option could be added to the PFH sheet to more thoroughly explain the reasons for falls. Including a patient as part of the falls team as a structural component of the falls prevention program. Patients can provide valuable insight into falls inventions that worked and did not work, creative ways to prevent falls, deeper understanding of when and what fall prevention education is best, call bell response and hourly rounding aims, and the overall patient experience related to falls.

Limitations

As with any secondary analysis, there were limitations to this project, including the omission of PFH forms for some patients who fell, and the comparison of data to patients who did not fall during the same time period. There were only 400 PFH forms for the 1,251 patients who fell. Explanation of common risk factors was done for almost two-thirds of the patients, who fell was not done, limiting the extent to which the results can be extrapolated to even this one institution. Another limitation of this study was that the analysis was done only at one academic medical center. Including a larger sample of similar patient populations would strengthen the generalizability of the results.

Future Work

Future work on this data set could include a comparison of the nurse's fall descriptions with the PFH factors. This would make it possible to determine whether the PFH factors capture the essence of the fall descriptions. Also, all patients admitted could be compared to patients who fell in regard to gender, age, length of stay, admitting and discharging diagnosis, and MFS. For example, patients who fell might include a larger proportion of patients with a specific disease or patients older than those who did not fall. Further, a review of FPP successes in preventing falls could help better identify effective interventions. Also, a future study could evaluate the impact of patients' inclusion and engagement into the post-fall huddle and the impact that this has on the identification of PFH factors.

An evaluation of the Falls Prevention Program and the effectiveness of changes instituted is an essential step in process improvement. Finally, this existing falls data set can be further analyzed, both at a service line and unit level.

In summary, preventing patient falls is a challenge for all health care institutions. Identifying common causes of falls requires a systematic and continuous analysis of data supported by leaders at all organizational levels. It is essential to continue work to prevent falls due to the injuries to patients and the associated costs. This secondary analysis of patients who fell indicated that the majority of patients who fell were in acute care beds, identified as at risk for falling, most occurred within the first 24 hours of admission, and patients often fell as they were getting up to toilet without calling. The PFH forms, though they were not available for every patient, appeared to capture some causes for falls. However, it is recommended that the PFH be revised to scale down factor selections, since over half of the possible items were rarely selected. Typologies derived from fall descriptions were comparable to the PFH factors. This data set is large and presents opportunities to analyze further acute and critical care, service line areas, as well as compare patients who fell to patients who did not fall.

APPENDIX 1: MORSE FALL SCALE

Item	Scale
1. History of falling; immediate or within 3 months	No 0 Yes 25
2. Secondary Diagnosis	No 0 Yes 25
3. Ambulatory Aid • None/bed rest/nurse assist • Crutches/cane/walker • Furniture	 0 15 30
4. IV/Med Lock	No 0 Yes 20
5. Gait/Transferring • Normal/bed rest/immobile • Weak • Impaired	 0 10 20
6. Mental status • Oriented to own ability • Forgets limitations	 0 15

APPENDIX 2: POST-FALL HUDDLE SHEET

Name: Age: Gender:

MRN: Account# Patient Location:

Instructions:

1. Complete by end of shift and deliver to Nurse Manager.
2. Manager send to Chair of Falls Committee within 7 days.
3. Re-Assess Falls Risk Score.
4. Up-date "Falls Risk" Goal.
5. Up-date G-Chart/Days since last fall.

Pre-Fall Score____ Post-Fall Score___

Fall Description Date/Time: Fall Location:

Incident Type: Level of Injury:

Description:

Post-Fall Huddle

Primary RN Name: NA Name:

Patient Factors:

{} Does not follow directions
{} Patient confused
{} Neutropenia
{} Orthopedic issues
{} Off service patient
{} Repeat fall

Environment:

{} Environmental clutter
{} No gripping socks on patient
{} Call bell promptness
{} No bed alarm activated
{} Foley on bed (tethered)
{} IV pump (tethered)
{} Reaching

Activity

{} In/out of chair
{} Ambulating room/hall
{} Toileting-bedside commode
{} Toileting-bathroom
{} In/out of shower

Medications:

{} Sedatives
{} Diuretics
{} Chemotherapy

Human Factors:

{} Family present
{} Sitter present

Other_____

APPENDIX 3: DATA SOURCES, STUDY VARIABLES, AND VARIABLE VALUES

Data Source	Levels of Variable
Post Fall Huddle Sheet (PFH)	
Post fall contributory factors	does not follow commands
	patient confused
	neutropenia
	orthopedic issues
	off-service patient
	repeat fall
	environmental clutter
	no gripping socks on patient
	call bell promptness
	no bed alarm activated
	foley on bed
	IV pump
	reaching
	family present
	sitter present
	sedatives
	diuretics
	chemotherapy
	in/out of chair
	ambulating room/hall
	toileting bedside commode
	toileting bathroom
	in/out of shower
	other
Medical Record	
Gender	male, female
Date	month/day/year
Time	hour:minutes, AM/PM
Day patient fell	days
Typology of fall description	toileting
	moving/getting up
	did not call
	toileting and did not call
	toileting and moving/getting up
	toileting, did not call, moving/getting up
	physiological
	showering
	trip/environmental hazard

Data Source	Levels of Variable
	moving/getting up and did not call unknown
Morse Fall Scale (MFS)	range of 0-125
Age	years
Assisted fall	yes, no
Fall equipment	yes, no
Restraints	yes, no
Physiological fall	yes, no
Risk for falling	yes, no
Level of injury	none, minor, moderate, major, death

APPENDIX 4: POST FALL HUDDLE FACTOR DESCRIPTIONS

Patient Category *Factors*	**Description**
Does not follow commands	May be due to confusion or does/did not follow prior commands
Patient confused	Patient is continuously or intermittently confused
Neutropenia	Neutropenia based on lab values and/or diagnosis
Orthopedic Issues	Any current orthopedic issues involving care
Off-Service patient	Patient with diagnosis or situation unfamiliar to staff
Repeat fall	Fell more than once during same hospitalization
Environmental Factors	
Environmental clutter	Clutter in room or environment of moving/ambulation
No gripping socks on patient	Patient not wearing gripping socks while moving/ambulating
Call bell promptness	The promptness of staff when patient requested assistance using the call bell
No bed alarm activated	Bed alarm not activated at time of fall
Foley on bed	Foley attached to bed frame
IV pump	IV pump plugged into outlet
Reaching	Patient reaching for an out-of-reach item

Human factors	
Family present	Family present at patient's bedside
Sitter present	Personal nursing assistant/sitter at patient's bedside
Medication factors	
Sedatives	Patient sedated by prescribed medication
Diuretics	Medication causing diuresis effect for patient
Chemotherapy	Patient receiving chemotherapy
Activity factors	
In/out of chair	Patient getting in or out of any type of chair or recliner
Ambulating room/hall	Patient ambulating in room or hallway
Toileting bedside commode	Patient on bedside commode for elimination
Toileting bathroom	Patient in bathroom to use toilet
In/out of shower	Patient getting in or out of shower

APPENDIX 5: TYPOLOGIES AND DESCRIPTIONS OF FALL EVENTS

Typology	Description
Toileting	Patient actively toileting with assistance from staff
Moving/getting up	Patient moving or getting up from a position with assistance from staff
Did not call	Patient did not call for assistance from staff
Toileting and *Did not call*	Patient getting up to use toilet in bathroom or bedside commode, urinal, etc. and did not call for assistance from staff
Toileting and *Moving/getting up*	Patient getting up to toilet and moving or getting up from any position with assistance from staff
Toileting, *Did not call*, and *Moving/getting up*	Patient got up from any position, without calling for assistance from staff to toilet
Physiological	Descriptors stating physiological symptoms such as 'dizzy,' 'light-headed,' 'low blood sugar,' 'orthostatic,' 'seizure'
Showering	Patient actively showering, getting in or out of shower
Trip/environmental hazard	Descriptors stating 'trip', 'slip', 'tangled', 'clutter'
Moving/getting up and *Did not call*	Patient got up from any position and did not call staff for assistance
Unknown	Reason or for circumstances for fall not described

Table 1: Demographics of patients who fell

Variable	n	Percent
Gender		
Male	624	49.9
Female	627	50.1
Location of bed		
Acute Care	1059	84.7
Critical Care	192	15.3
At risk for falling		
Yes	908	72.6
No	343	27.4
Assisted fall		
Yes	166	13.3
No	1085	86.7
Fall equipment in use		
Yes	145	11.6
No/Unknown	1106	88.4
What patient doing at time of fall?		
From bed	298	23.8
From chair	155	12.4
From equipment	8	0.6
From toilet/bedside commode	164	13.1
From wheelchair	45	3.6
Unknown	193	15.4
Running/playing	3	0.2
Shower/tub	28	2.2
Transfer	10	0.8
While Ambulating	189	15.1
While Standing	156	12.5
Missing	1	0.1

Variable	n	Percent
Fall prevention protocol activated		
Yes	1019	81.5
No	232	18.5
Level of fall injury		
None	891	71.2
Minor	326	26.1
Moderate	16	1.3
Major	18	1.4
Physiological fall		
Yes	307	24.5
No	92	7.4
Unknown	852	68.1
Previous fall risk score		
Yes	1236	98.8
No	15	1.2
Restraints on at time of fall		
Yes	5	0.4
No	1246	99.6
Risks for falling		
Yes	908	72.6
No	343	27.4

Table 2: Frequency of patient falls by day of hospitalization

Day of admission	n	Percent
0	267	21.6
1	109	8.8
2	86	7.0
3	83	6.7
4	67	5.4
5	69	5.6
6	80	6.5
7	76	6.1
8	82	6.6
9	62	5.0
10	53	4.3
11	69	5.6
12	23	1.9
13	9	0.7
14	17	1.4
15	15	1.2
16	7	0.6
17	15	1.2
18	7	0.6
19	7	0.6
20	8	0.6
21	4	0.3
22	2	0.2
23	5	0.4
24	3	0.2
25	5	0.4
26	0	0
27	0	0
28	1	0.1
29	0	0
30	0	0
31	1	0.1
32	0	0
33	1	0.1
34	0	0
35	1	0.1
36	2	0.2
Missing	15	1.2
Total	1251	100.0

Table 3: MFS frequency for patients who fell

(Mean = 60.5, Median = 60.0, *SD* = 24.9)

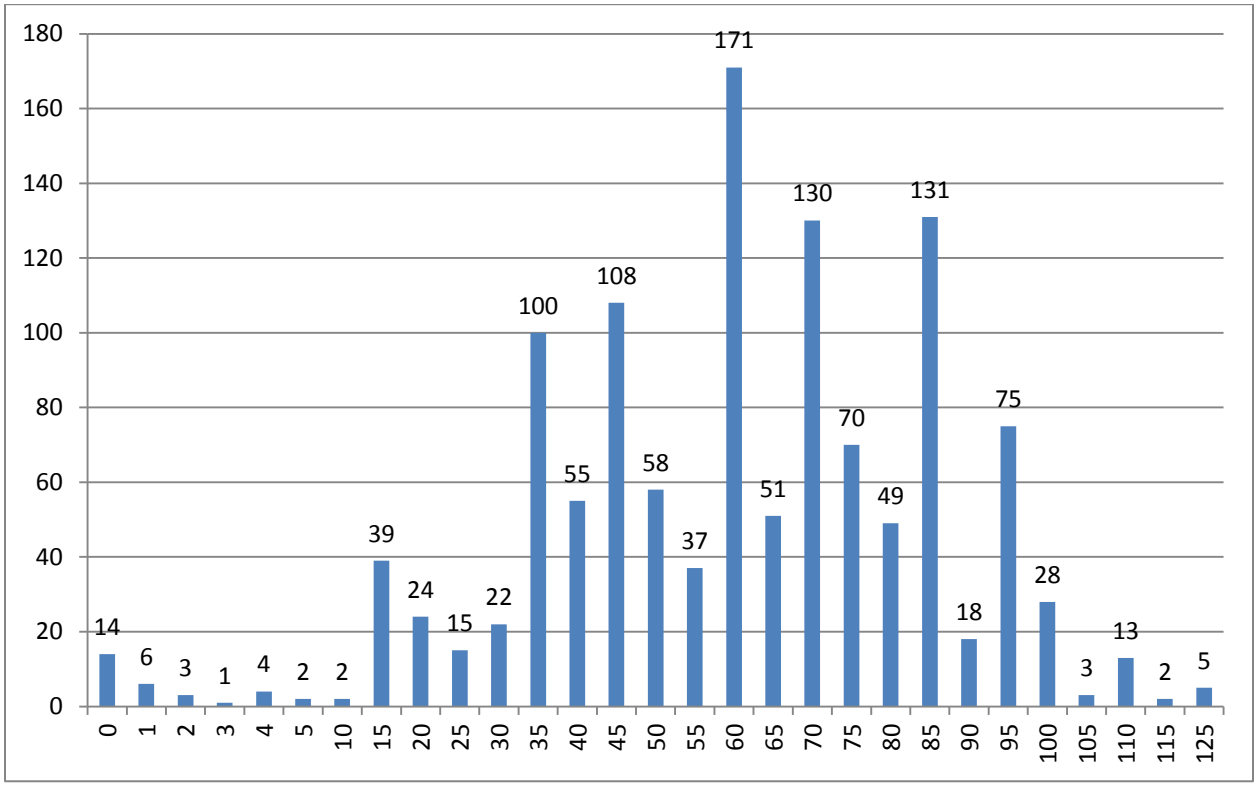


Table 4: Percentage of patients who fell per hour across 24 hour period

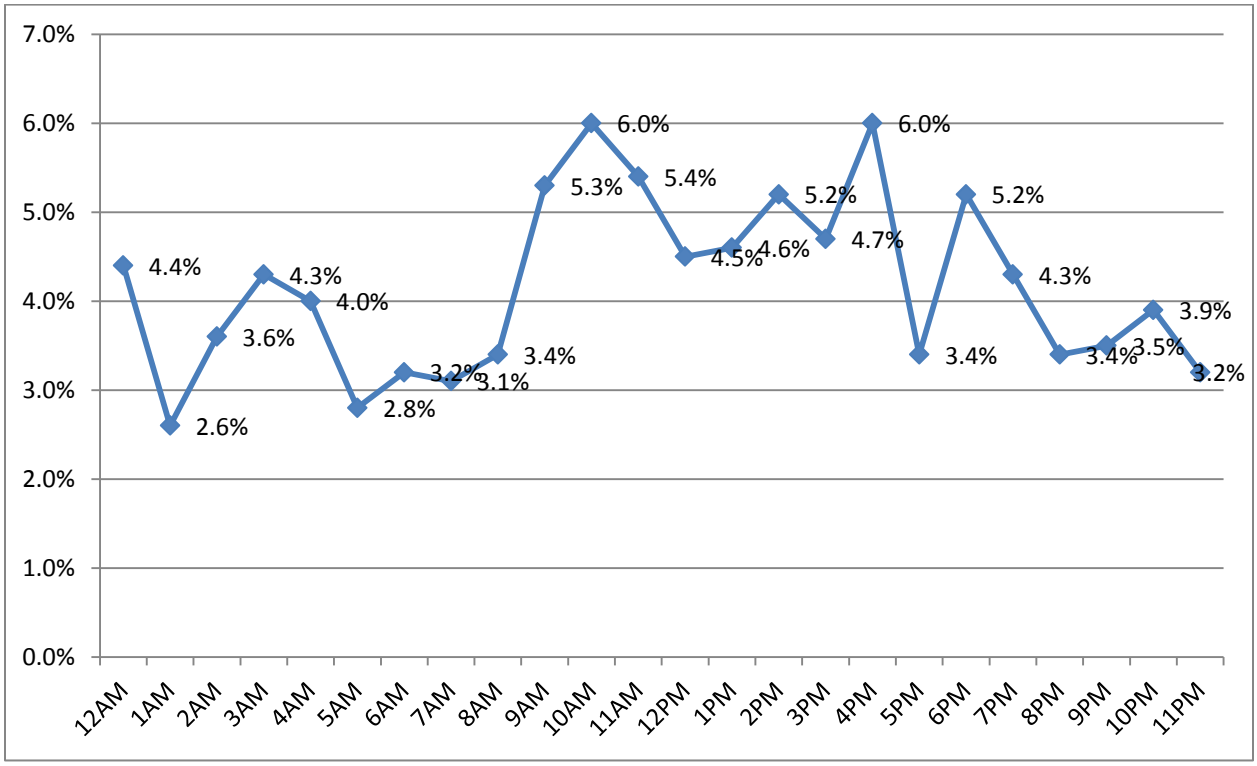


Table 5: Percentage of patients who fell between 7am-7pm (56% of total falls)

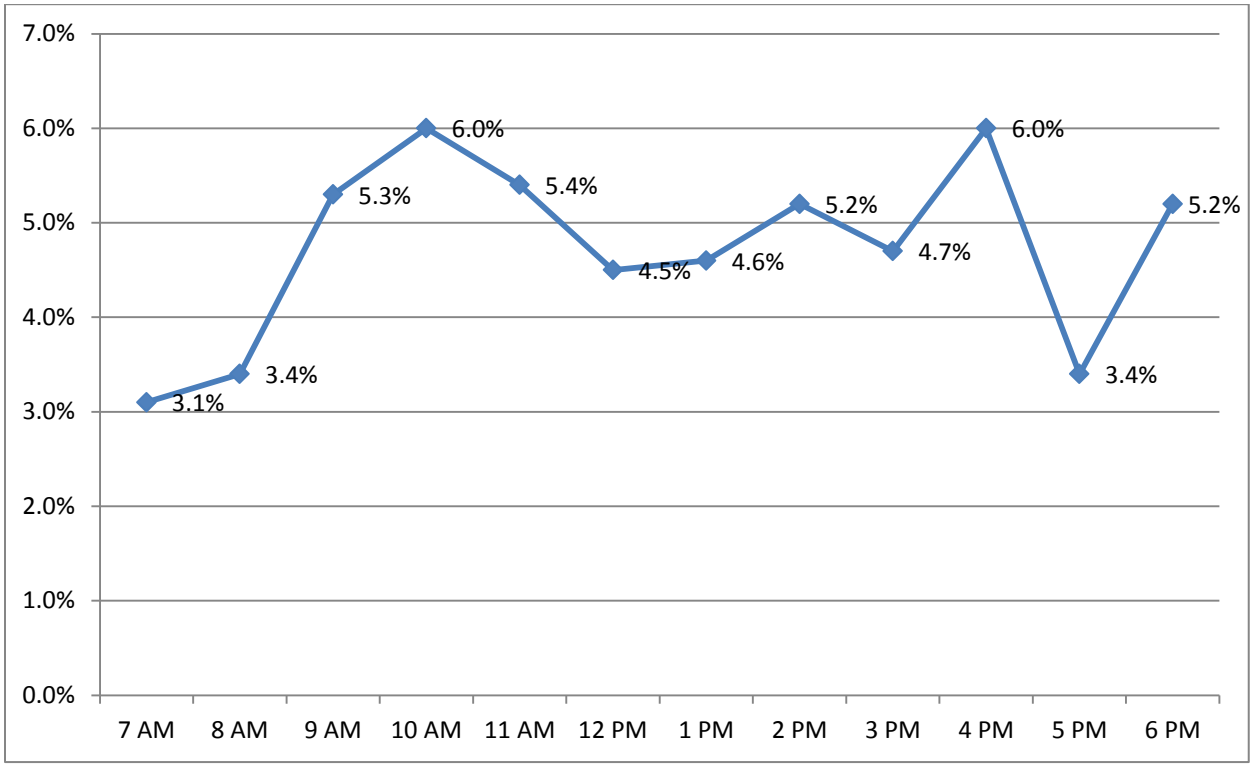


Table 6: Percentage of patients who fell between 7pm-7am (43% of total falls)

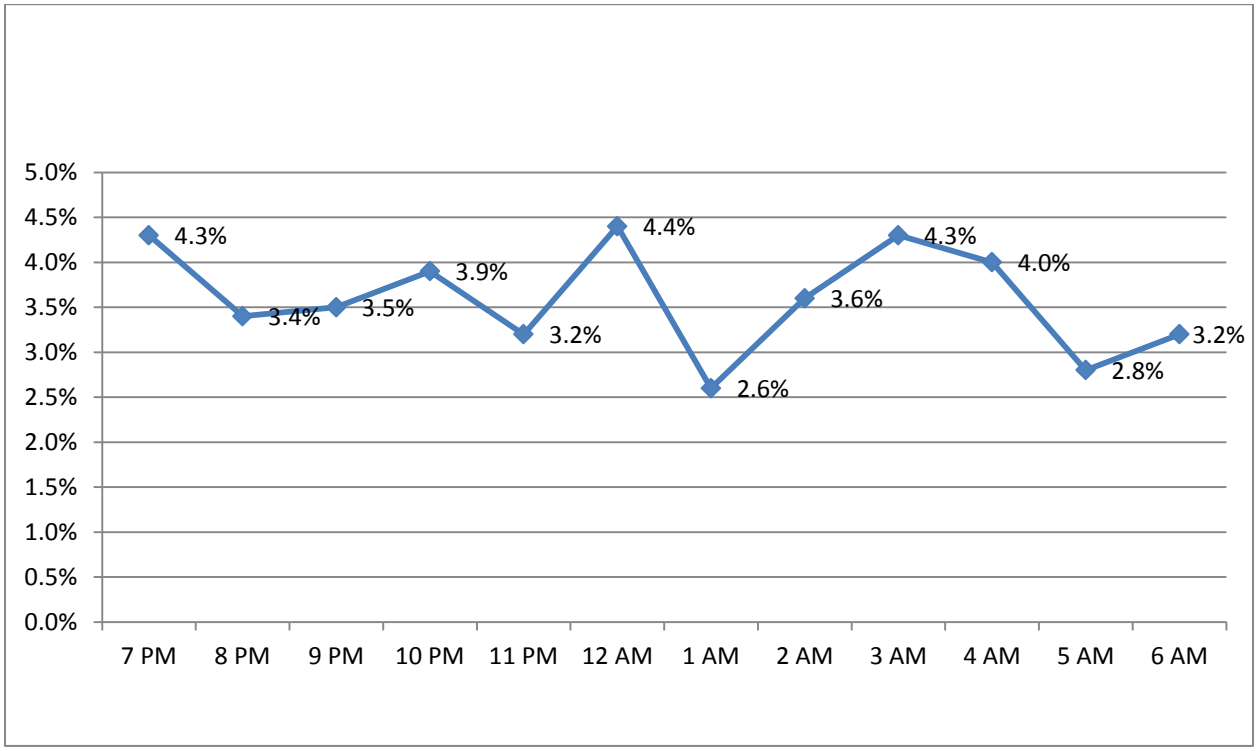


Table 7: Frequency of PFH categories and factors for the patients who fell[2]

PFH Categories Factors	**Frequency**
Patient category	
Does not follow commands	151
Patient confused	107
Neutropenia	18
Orthopedic Issues	33
Off-Service patient	19
Repeat fall	55
Total frequency	**383**
Environmental category	
Environmental clutter	12
No gripping socks on patient	51
Call bell promptness	8
No bed alarm activated	81
Foley on bed	10
IV pump	49
Reaching	25
Total frequency	**236**
Human category	
Family present	68
Sitter present	8
Total frequency	**76**
Medication category	
Sedatives	72
Diuretics	23
Chemotherapy	9
Total frequency	**104**
Activity category	
In/out of chair	98
Ambulating room/hall	99
Toileting bedside commode	52
Toileting bathroom	98
In/out of shower	16
Unknown	10
Total frequency	**373**

[2] While the total sample of patients who fell was 1172, Post Fall Huddle sheets (PFH) were available for only 400 patients

Table 8: Typology frequency and percent of the patients that fell who did and did not have PFH forms[3]

	Without PFH forms		With PFH forms	
Typology	**Frequency**	**Percent**	**Frequency**	**Percent**
Toileting	6	0.5	1	0.3
Moving/getting up	234	18.7	84	21.0
Did not call	4	0.3	2	0.5
Toileting & Did not call for assistance	14	1.1	6	1.5
Toileting & Moving/getting up	86	6.9	22	5.5
Toileting & Did not call & Moving/getting up	375	30.0	111	27.8
Physiological	81	6.5	29	7.3
Shower	39	3.1	15	3.8
Trip/environmental	67	6.1	25	6.3
Moving/getting up & Did not call	266	21.3	82	20.5
Unknown	70	5.6	0	0

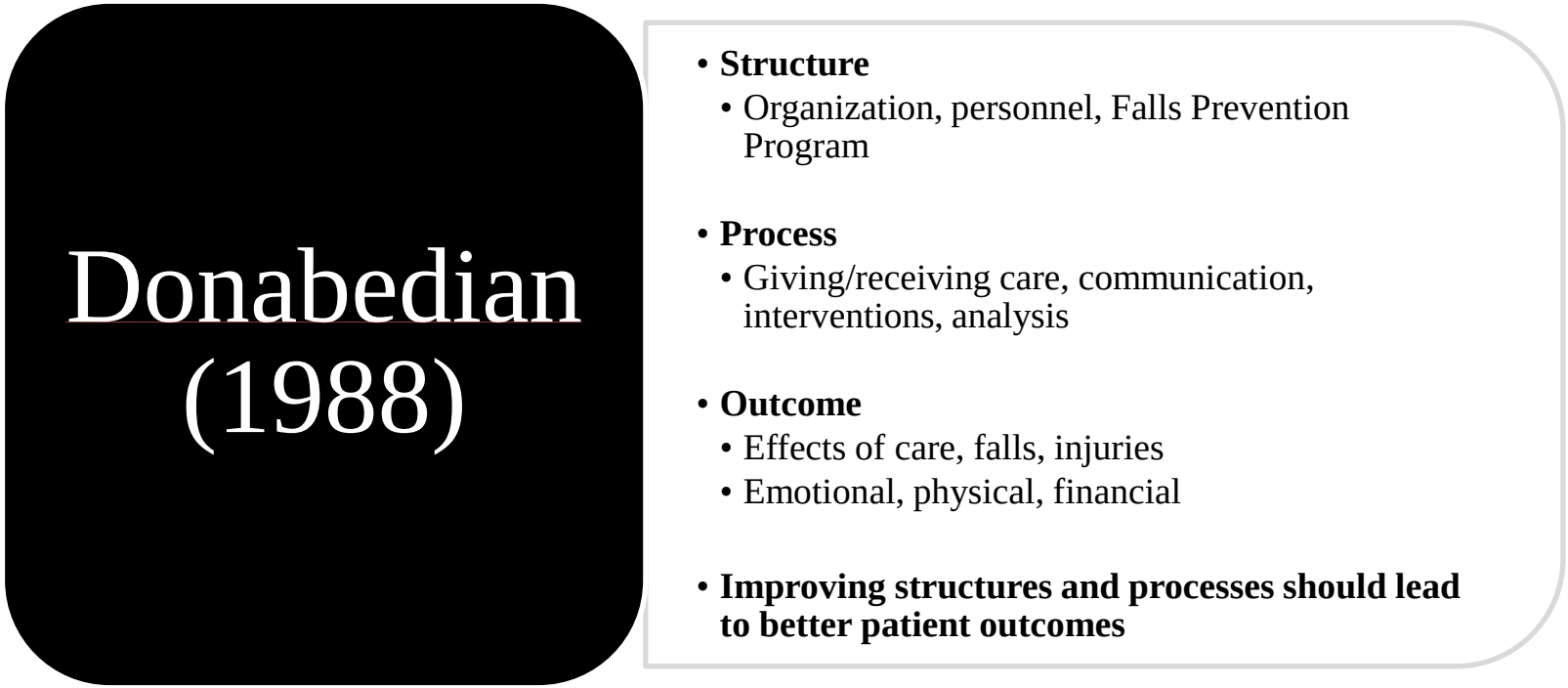
[3] Patients that fell without PFH forms (n = 1251) and with PFH forms (n = 400)

Table 9: Groups (Themes) with corresponding PFH factors and Typology terms[4]

Groups	Themes	PFH Factors	Frequency	Typology	Frequency
1	Toileting	*Toileting bedside*	52	*Toileting*	1
		Toileting bathroom	98	*Toileting and Did not call*	6
				Toileting, did not call, and Moving/getting up	111
				Toileting and Moving/getting up	22
		Total	**150**	**Total**	**139**
2	Following	*Does not follow*	151	*Did not call*	2
				Toileting and Did not call	6
				Toileting, did not call, and Moving/getting up	111
				Moving/getting up and Did not call	82
		Total	**151**	**Total**	**201**
3	Environmental	*Environmental clutter*	12	*Trip/Environmental hazard*	25
		Foley on bed	10		
		IV pump	49		
		Reaching	25		
		Total	**96**	**Total**	**25**
4	Showering	*In/out of shower*	16	*Shower*	15
		Total	**16**	**Total**	**15**
5	Moving/getting up	*In/out of chair*	98	*Moving/getting up*	84
		Ambulating room/hall	99	*Moving/getting up and Did not call*	82
		Total	**197**	**Total**	**166**

[4] Patients who fell that had both PFH and fall description

Figure 1: Theoretical Framework



REFERENCES

American Nurses Association (ANA), NDNQI Guidelines for Data Collection and Submission on Patient Falls. (2013). Retrieved December 17, 2013, from http://www.nursingquality.org/Content/Documents/NQF-Data-Collection-Guidelines.pdf

Boushon B., Nielsen G., Quigley P., Rutherford P., Taylor J., Shannon D., & Rita S. (2012) *How-to Guide: Reducing Patient Injuries from Falls*. Cambridge, MA: Institute for Healthcare Improvement.

Butts, J., & Rich, K. (2011). *Philosophies and Theories for Advanced Nursing Practice* Sudburry, MA: Jones & Barlett.

Centers for Disease Control. (2013). Cost Among Falls of Older Adults. Retrieved December 2, 2013 from http://www.cdc.gov/HomeandRecreationalSafety/Falls/fallcost.html

Chapman, J., Bachand, D., & Hyrkas, K. (2011). Testing the sensitivity, specificity and feasibility of four falls risk assessment tools in a clinical setting. *Journal of Nursing Management, 19*(1), 133-142. doi:10.1111/j.1365-2834.2010.01218.x [doi]

Currie, L. (2008). Fall and injury prevention. *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. Rockville, MD: Agency for Healthcare Research and Quality.

Degelau, J., Belz., M., Bungum, L., Flavin, P., Harper, C…Webb, B. (2012). Institute for Clinical Systems Improvement. *Prevention of Falls (Acute Care)*. Retrieved March 10, 2014 from http://bit.ly/Falls0412.

Donabedian, A. (1988). The quality of care: How can it be assessed? *Journal of the American Medical Association, 260,* 1743-1748. doi:10.1001/jama.1988.03410120089033.

Dykes, P. C., I-Ching, E. H., Soukup, J. R., Chang, F., & Lipsitz, S. (2012). A case control study to improve accuracy of an electronic fall prevention toolkit. *AMIA ...Annual Symposium Proceedings / AMIA Symposium.AMIA Symposium, 2012,* 170-179.

Ganz D.A., Huang C., Saliba D., et al. (2013). *Preventing falls in hospitals: A toolkit for improving quality of care*. Rockville, MD: Agency for Healthcare Research and Quality; AHRQ Publication No. 13-0015-EF.

Inouye, S. K., Brown, C. J., & Tinetti, M. E. (2009). Medicare nonpayment, hospital falls, and unintended consequences. *New England Journal of Medicine, 360,* 2390-2393. doi:10.1056/NEJMp0900963

Institute of Medicine. (2001). *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, D.C.: National Academy Press.

Institute of Medicine (IOM) Reports. (2014). Retrieved March 21, 2014, from http://www.iom.edu/Reports.aspx?Series={4EC47331-CA08-4A25-80E6-D4CEB54A485C}&page=2

Ivziku, D., Matarese, M., & Pedone, C. (2011). Predictive validity of the Hendrich fall risk model II in an acute geriatric unit. *International Journal of Nursing Studies, 48*(4), 468-474. doi:http://dx.doi.org.libproxy.lib.unc.edu/10.1016/j.ijnurstu.2010.09.002

McArthur, A., (2013). The Joanna Briggs Institute *Falls prevention strategies: Acute in-hospital setting* Accession Number: JBI8367.

Minon, L.C., Chandler, A., Waters, T., Dietrich, M., Kessler,L, & Shorr, M. (2012). Is it possible to identify risks for injurious falls in hospitalized patients? *The Joint Commission Journal on Quality and Patient Safety. 38*(9), 408-413.

Morse. J.M. (2009). *Preventing Patient Falls: Establishing a Fall Intervention Program.* 2nd ed. New York: Springer.

Neily, J., Quigley P., & Essen, K. (2013). *Reducing preventable falls and fall-related injuries* Veterans Affairs (VA) National Center for Patient Safety (NCPS). Retrieved on April 3, 2014 from http://www.patientcarelink.org/uploadDocs/1/Implementation-Guide-for-Fall-Injury-Reduction-VA-NCPS-508.pdf

Oliver, D., Papaioannou, A., Giangregorio, L., Thabane, L., Reizgys, K., & Foster, G. (2008). A systematic review and meta-analysis of studies using the STRATIFY tool for prediction of falls in hospital patients: How well does it work? *Age and Ageing, 37*(6), 621-627. doi:10.1093/ageing/afn203 [doi]

Oliver, D., Daly, F., Martin, F., & McMurdo, M. (2004). Risk factors and risk assessment tools for falls in hospital in-patients: a systematic review. *Age and Ageing, 33*(2), 122-130.

Quigley, P.A., Hahm, B., Collazo, S., Gibson, W., Janzen, S., Powell-Cope, G. et al., White, S.V. (2009). Reducing serious injury from falls in two Veterans' Hospital medical-surgical units. Journal of Nursing Care Quality, 24(1), 33-41. doi:10.1097/NCQ.Ob013e31818f528e

Spoelstra, S., Given, B., & Given, C. (2011). Fall prevention in hospitals: An integrative review. *Clinical Nursing Research*. 21(1), 92-112. doi:10.1177/1054773811418106

UNC Health Care Mission. Who we are. Retrieved on September 21, 2013 from http://www.unchealthcare.org/site/aboutus/about-the-university-of-north-carolina-health-care-system.html

Volz, T.M. & Swaim, T.J. (2013). Partnering to prevent falls: Using a multimodal multidisciplinary team. *The Journal of Nursing Administration* 43, 336-341.

Weinberg, J., Proske, D., Szerszen, A., Lefkovic, K., Cline, C…Weiserbs, K. (2011). An inpatient fall prevention initiative in a tertiary care hospital. *The Joint Commission Journal on Quality and Patient Safety*. 37, 317-327.