

A RETROSPECTIVE STUDY TO IDENTIFY UNIQUE CONTRIBUTORS TO FALLS
IN HOSPITALIZED ADULT HEMATOLOGY PATIENTS

A DISSERTATION
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DEDICATION

For my children, Leroy, Joshua, Chelsea, and Chad, for your unwavering patience, understanding, and support during this journey. For my mother Racheal Nainjora, who would have been so proud of me for this great accomplishment, I know you are dancing with joy in heaven. I love and miss you mom. For my peers who have encouraged me along the way, I would not be who I am today without your support.

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ABSTRACT

CATHERINE MBANGO

A RETROSPECTIVE STUDY TO IDENTIFY UNIQUE CONTRIBUTORS TO FALLS IN HOSPITALIZED ADULT HEMATOLOGY PATIENTS

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A fall may be defined as an event that results in a person coming to rest inadvertently on a lower level surface or an unplanned descent to the floor with or without injury. Fall prevention is a concept associated with hindering a fall from happening through advance care planning or action. The body of knowledge on falls, risk factors, consequences, and prevention originates from studies of older persons who have experienced a fall. The medical community has made several efforts toward fall risk assessment with an emphasis on prevention of the reoccurrence of falls, but this approach could potentially skew attention away from initial fall prevention efforts. The purpose of this retrospective case-control study was to identify unique contributors to falls in hospitalized adult cancer patients with a hematologic diagnosis. Falls in this population are a great safety concern for nurses and other healthcare providers. Patients with hematologic disorders are at an increased risk of sustaining an injury due to their low platelet counts resulting from chemotherapy and radiation treatments. Patient falls, and patient falls with injury are healthcare outcome measures that are currently being used to evaluate the quality of hospital nursing care, and are an integral part of the National Database of Nursing Quality Indicators (NDNQI). The Centers for Medicare and Medicaid Services no longer reimburses hospitals for in-hospital falls with injury, therefore, placing a greater burden

on nursing staff to ensure patient safety through the development of nurse-driven fall prevention strategies, and the implementation of risk reduction plans of care. A total of 94 electronic medical records, which served as the primary sources of data were reviewed in this study and data on ten independent variables and one dependent variable were analyzed. Simple logistic regression between continuous variables and one dependent variable, and cross-tabulation between categorical variables and the dependent variable was used to analyze study results. Stepwise logistic regression was utilized for the final analysis of data. The relationship between fall incident and fall risk assessment score on admission was significant, $X^2(1) = 6.153, p < .013$, Cramer's $V = .256$. Additional research is planned for generalizability.

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CHAPTER I

INTRODUCTION

Falls are the largest reported adverse events in a hospital setting (Vela, Grate, McBride, Devine, & Andritsos, 2018), are the second leading cause of injury, and are a major concern in hospitalized patients with cancer. Patient falls during hospitalization continue to be a challenge across healthcare settings. Few studies have explicitly investigated fall prevention in patients with cancer (Allan-Gibbs, 2010). Falls will cost the health care system nearly \$55 billion by 2020 as they are associated with injuries, functional decline resulting in extended hospitalization, loss of confidence due to fear of a repeat fall, which then could result in immobility. In older patients with cancer, prior falls may result in an increased risk of treatment-related side effects up to death (Wildes et al., 2015). The body of knowledge on falls, risk factors, consequences, and prevention originate from studies of older persons who have experienced a fall. The medical community has made several efforts toward fall risk assessment with an emphasis on prevention of the reoccurrence of falls, but this approach could potentially skew attention away from initial fall prevention efforts (Haslam & Stubbs, 2005). Data on falls in hospitalized adult patients with cancer is scarce and is generally included in the limited reported fall data of hospitalized adult patients without cancer (Spoelstra et al., 2013).

Previous research of patients with cancer has found that patients who fell were more likely to have a hematologic cancer diagnosis (Capone, Albert, Bena, & Tang, 2012). The prevalence of falls in hospitalized cancer patients is unique from other

populations in acute care settings because their fall risk status drastically changes throughout their hospitalization (Filler, Kelly, & Lyon, 2011). Literature has also demonstrated that a correlation exists between cancer diagnosis and fall rates in older adults compared to a like group without cancer. More research is needed to demonstrate the relationship between falls and cancer types (Spoelstra et al., 2013). To date, literature about fall prevention and reduction continues to focus primarily on older populations, medical-surgical patients, or individuals in tertiary care settings (Capone, Albert, Bena, & Morrison, 2010). There is not a descriptive analysis of falls of hospitalized adult patients with hematologic malignancies. Despite this knowledge, fall-related data of hospitalized adult cancer patients is lacking (Walle et al., 2014).

Current literature reveals that the common factors that contribute to an increased risk for falls in the acute care setting include age, an unfamiliar environment, acute illness, and bed rest ensuing from fatigue (Capone et al., 2012). A retrospective study by Goodridge and Marr demonstrated that age and gender played a significant role in falls where fallers were 3.5 years older than those who did not fall, while 70% of men were more likely to fall compared to their women counterparts (Wildes et al., 2015). A majority of the literature has established that a recent history of falls, dizziness or vertigo, confusion, and altered mobility statistically contributed to falls in the general inpatient population (Hendrich, Nyuis, Kippenbrock, & Soja, 1995). In patients with cancer who often have anemia, lab values that are outside normal limits, and increased toileting

activities such as stool incontinence are considered to be at an increased risk of experiencing a fall (O'Hagan & O'Connell, 2005).

Problem of Study

Falls in hospitals continue to be a major safety problem (Sand-Jecklin, Johnson, & Tylka, 2015). Fall-related data of the hospitalized adult cancer patients with hematologic malignancies is lacking (Lorca et al., 2007), and falls have continued to persist despite the implementation of fall risk assessment and prevention measures in the inpatient setting. Falls with injury are of greater concern because this population has an increased risk of developing fall-related complications such as excessive bleeding that may result in death (Capone et al., 2010).

Falls are costly and are usually under-reported by patients to their care providers due to their perception that their fall is a minor incident (Sattar, Alibhai, Spoelstra, & Puts, 2018). In cancer patients with hematologic malignancies, falls may contribute to and or result in higher complication rates compared to the general population of older adults (Walle et al., 2014). The Centers for Medicare and Medicaid (CMS) no longer reimburse hospitals for patient care resulting from hospital-acquired falls (Fehlberg et al., 2017). This has heightened the awareness of nursing staff to ensure patient safety through the development of nurse-driven fall prevention strategies and the implementation of risk reduction plans of care (Quigley & White, 2013). As determined by the Institute of Medicine's report on "Delivering High-Quality Cancer Care: Charting a Course for a System Crisis" (Levit, Balogh, Nass, & Ganz, 2013) the focus should be fall-risk

identification and subsequently fall prevention for the patient with a cancer diagnosis (Hurria, Naylor, & Cohen, 2013).

Rationale for the Study

Falls in hospitalized adult patients with hematologic malignancies is a nursing-sensitive quality indicator that affects patient outcomes and expounds on nursing care performance (Heslop & Lu, 2014). Medicare reimbursement is not granted for hospital-acquired falls with injury (Centers for Medicare and Medicaid Services, 2018). Hospital costs associated with using bedside staff sitters to assist in keeping high fall-risk patients safe to reduce inpatient falls have been reported to be as high as \$1.3 million per year (Rausch & Bjorklaund, 2010). This short-term intervention contributes to additional staffing constraints in acute care settings. Hospitalized patients with a cancer diagnosis have higher fall frequencies and injury rates than patients without cancer (Hitcho et al., 2004; O'Connell, Baker, Gaskin, & Hawkins, 2007). This study examined unique contributors to falls among hospitalized adult cancer patients with hematologic malignancies.

Falls represent a major cause of morbidity, mortality, and functional decline in hospitalized adult patients with cancer (Walle et al., 2014). Falls may result in various injuries such as bone fractures, loss of independence, and higher medical expenses resulting from increased utilization of healthcare services. Sequelae of falls may also result in post-fall anxiety with a subsequent increase in dependence on healthcare

providers, and fear of a repeat fall (Kuhlenschmidt, Reeber, Wallace, Chen, Barnholtz-Sloan, & Masanec, 2016).

According to the World Health Organization (WHO), it is estimated that 646,000 people die from accidental or unintentional falls globally. Adults 65 years and older are at an increased risk of sustaining falls with injuries, and approximately 37.3 million fall-related injuries require medical attention each year (WHO, 2016). By year 2020, it is estimated that direct and indirect costs of injurious falls in patients 65 years and older will exceed \$54.2 billion (Englader, Hodson, & Terregrossa, 1996). Approximately 30% of in-hospital falls result in injury, with 4-8% resulting in complications that are compounded by the fall incident (Hitcho et al., 2004). Some of the complications that may result from a fall in the cancer patient with a hematologic malignancy include subdural hematoma, excessive bleeding, and death (Capone et al., 2010). Falls are associated with physical and psychological consequences on affected individuals, increased healthcare use, and increased length of hospital stay (Miake-Lye, Hempel, Ganz, & Shekelle, 2013). The identification of strong fall predictors is essential in implementing an effective fall prevention program (Walle et al., 2014).

Variables of interest in this study included intrinsic and extrinsic factors that may contribute to the occurrence of a fall. Intrinsic factors included age, race, gender, underlying diagnoses, and complete blood count (CBC) values: white blood cells (WBC), hemoglobin (Hgb), hematocrit (Hct), and platelet count (plt). Capone et al.'s study (2010) demonstrated that weakness was a prominent reported characteristic (80%) in

hospitalized adult patients with cancer who experienced a fall followed by elimination needs (55%). In this study, patient-self reported symptoms of fatigue and weakness varied among participants, and a lot of data was noted to be missing from electronic health records. Weakness and fatigue were therefore excluded from this study. Extrinsic factors focused on fall risk assessment scores on admission, length of inpatient hospital stay (in days), time and location of fall incident, and environmental modifications such as the utilization of bed alarm, non-slip footwear, and bedside commode inside the patient's room.

Conceptual Framework

Donabedian's quality care model served as the conceptual framework to guide this study (Donabedian, 1988). Originally developed by Avedis Donabedian to evaluate the quality of healthcare, this model has become a model to measure the quality of healthcare and the practice of quality assurance (Ayanian & Markel, 2016). The triad structure (Donabedian, 1966) of this framework underpins (Donabedian, 2005) a platform for evaluating the structure, process, and outcome continuum of healthcare quality.

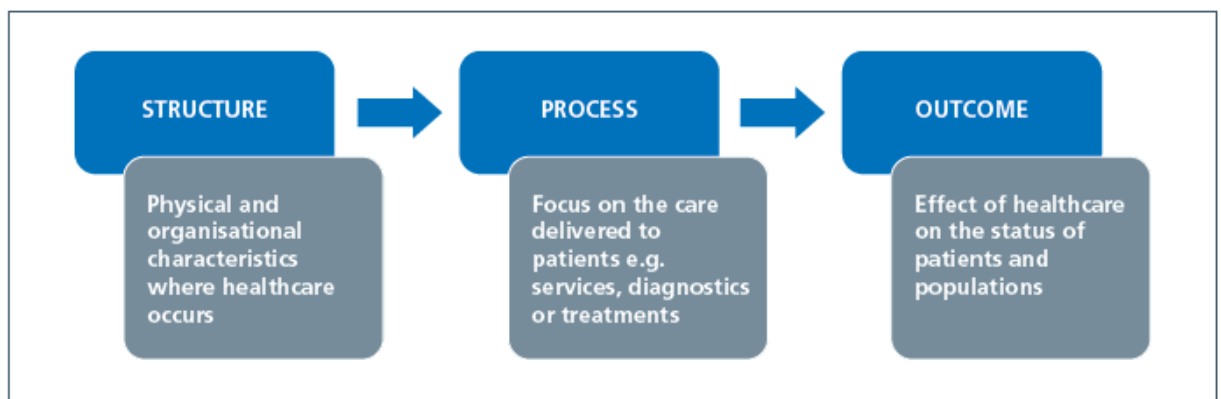


Figure 1. The Donabedian Model of Quality of Care (Donabedian, 2005).

This conceptual framework illustrates how structure (administrative systems) provides an avenue through which care takes place. Process (components of care delivered) and outcome (restoration of function) are also essential for the management of the context in which care occurs, the process of care for patients, and the resulting outcomes. In this study, the structure, also known as input, measured the delivery of nursing care through fall risk assessment and the implementation of fall prevention measures, process measured the utilization of fall prevention measures such as bed alarm activation, non-slip footwear for patients, and availability of a bedside commode inside the patient's hospital room, and outcome measured fall incident. The arrows in the visual diagram of the model validate that structure measures affect process measures, which in turn affect outcome measures (Donabedian, 2005).

Assumptions

The study assumed that,

Falls in the acute care setting can be prevented.

Nursing documentation in the Safety Intelligence database accurately and completely recorded the fall event.

Research Question

The following research question guided the study:

What unique predictors of falls exist in hospitalized adult hematology patients?

Definition of Terms

The following conceptual and operational definitions aided in the comprehension of the context of the study.

Fall: A fall is defined as an event that results in a person coming to rest inadvertently on the ground or floor or other lower level (WHO, 2016). The Agency of Healthcare Research and Quality (AHRQ) defines a fall as an unplanned descent to the floor with or without injury to the patient (AHRQ, 2013a). Falls may be categorized as accidental, anticipated, and unanticipated physiological falls. In the context of hospital National Database of Nursing Quality Indicators (NDNQI, 2012) and Magnet Standards (ANCC, 2018) reporting, and for this study, the following definition of a fall was utilized: An event in which there is loss of an upright, lying, standing, or sitting position that results in the patient landing on the floor, ground, or other object. It is unintentional and non-purposeful. Falls were categorized as assisted (health care provider was present and

assisted the patient to the floor) and unassisted (health care provider was not present during fall incident).

Fall Rates: The measurement of fall incidents per 1,000 occupied bed days. This is achieved by counting the number of falls and the number of occupied bed days on a particular inpatient unit over a given period for example, monthly or quarterly etcetera (AHRQ, 2013a). This was operationalized by monthly reviews of fall incidents.

Fallers and non-fallers: Fallers are participants who experienced a fall, while non-fallers are participants who did not experience a fall. This concept was used to categorize the two groups of study participants.

Reporting: a formal or official written or spoken description of an account, record, or event, etc. (Merriam-Webster, 2019). For this study measurement of fall incidents were operationalized by counting the number of fall incident reports that were entered into the institutional fall incident reporting system.

Hematologic malignancy: cancer that begins in blood-forming tissue, such as bone marrow, or the cells of the immune system. For this study: patients with the following hematologic cancers were included in the study; leukemia, lymphoma, multiple myeloma, and patients who have undergone stem cell transplantation (NCI Dictionary of Cancer Terms, 2019).

Hester Davis Scale (HDS): The measurement of the risk for sustaining a fall in an acute care setting. A nine-factor scale with scores ranging from 0-77 (Hester & Davis, 2013). Each factor/sub-category has multiple items to choose from, and each factor is scored 0-

4, except for age (0-3). A total score is calculated, and a high score in any sub-category can trigger interventions even when the total score is low.

Limitations

The following limitations were identified in this study. First, data were collected through retrospective review of medical records. Collected data was dependent on the nursing accuracy of documentation. The dependence on the incident reporting system as the main tool in the identification of patients who fell is a secondary limitation. Although all staff at the cancer center are expected to report a fall in the incident reporting system, under-reporting fall events are probable due to staff time constraints and perception of blame (Haines, Cornwell, Fleming, Varghese, & Gray, 2008).

The acuity of care is a concept that was utilized to determine nursing workload requirements and staffing needs. Acuity may be determined based on the various activities that need to be completed for the patient, and in the hematology-oncology patient population, acuity tends to be higher compared to other oncology patients (Daly, Dawson, Higgins, Jones, Madigan, & Meulen, 2012). Patients with hematologic malignancies undergo multiple chemotherapy treatments leading to a prolonged duration of severe cytopenias. The severity of their underlying disease, coupled with the common use of corticosteroids places them at a higher risk for falls than the general population of patients due to steroid-induced muscular weakness or myopathy. The higher risk for falls among this population is a limitation to the generalizability of this study to other oncology patients (Vela et al., 2018).

Summary

According to the Elderly Falls Prevention Legislation and Statutes Report, falls are an inevitable part of aging but are largely preventable through strategies that aim at the reduction of falls such as risk assessment, evidence-based fall prevention programs, and the facilitation of better medication management practices (NCLS, 2018). Patient falls, and patient falls with injury are healthcare outcome measures that are currently being utilized to evaluate the quality of hospital nursing care, and are an integral part of the National Database of Nursing Quality Indicators (NDNQI, 2012). When it comes to fall prevention in hospitalized adult patients with a hematologic malignancy, there is a lack of consistent implementation of fall prevention measures and a lack of consistent reassessment of risk factors that increase with a rapid decline in status due to cancer-associated treatments.

Variability in the rate of falls reported, and methods of falls assessment have contributed to the inconsistency in conclusions relating to whether falls are more common in older adults with cancer (Wildes et al., 2015). Conversely, patients with cancer are a vulnerable population that may need ongoing risk assessment due to their increased dependence on activities of daily living after receiving chemotherapy, which potentiates their risk of sustaining a fall (Goodridge & Marr, 2002). Healthcare providers must conduct ongoing risk assessment that not only increases nursing staffs 'awareness of impending risk but also facilitate early implementation of fall prevention measures. This

approach will have a positive impact on patient experiences and outcomes as well as have implications for nursing practice that include providing a platform for continued research.

CHAPTER II

REVIEW OF LITERATURE

A review of hospital-acquired fall incidents from a global perspective was necessary to demonstrate the impact of falls and its sequelae on patients, as well as the cost of healthcare-associated with hospital-acquired falls. These sections provide an introduction of falls from a global perspective, falls in patients with cancer diagnoses, and the identified themes on fall prevention that led to the examination of unique contributors to falls in hospitalized adult patients with hematologic malignancies.

Hospital-Acquired Falls: A Global Perspective

Rates of falls range from 3.3 to 11.5 falls per 1,000 hospital days in US hospitals (Fischer et al., 2005), and accidental falls are among the most common incidents reported in hospital settings (Morsw, 2002). A study that examined normative data on fall prevalence in medical, surgical, and medical-surgical nursing units in US acute care hospitals demonstrated that fall rates varied by units. In this study, neurosurgery, neurology, and medicine units had the highest fall rates, while surgical and intensive care units had lower fall rates. Common factors associated with falls included age, mental status, illness severity, and use of assistive devices (Bouldin et al., 2013). A national assessment of prevalence and trends data collected from July 1, 2006, through September 30, 2008, from 6,100 nursing units in 1,263 hospitals reported 345,800 falls, of which 315,817 had a level of injury recorded. Except for unit type, there was no trend in fall or injurious fall rates by staffing level or by hospital size (Bouldin et al., 2013).

Scientific, comprehensive health, and medical literature reviews on accidental falls in hospitalized older adults over 15 years demonstrated that falls are the fifth leading cause of death and the second leading cause of morbidity from related injuries among Americans aged 65 and older (Cozart & Cesario, 2009). Patient falls in the acute care hospital setting continue to be a great safety concern for nurses, other healthcare providers, and healthcare organizations.

A review of root causes of falls in an acute hospital setting in China demonstrated that anticipated physiological falls that may be due to age, medications, etcetera are easily preventable and have the highest incident of occurrence in a hospital setting (Gu, Balcaen, Ni, Ampe, & Goffin, 2016). Capone et al. (2012) established that characteristics such as the age of hospitalized patients with a cancer diagnosis are similar to those of general medical-surgical hospitalized patients. However, weakness was a unique characteristic in 80% of hospitalized patients with cancer who had experienced a fall compared to medical-surgical hospitalized patients who had a fall event (Capone et al., 2010). Other studies that have investigated fall prevention solely in the patient with cancer demonstrated that patients with cancer reported fatigue as a severe, distressing symptom that interfered with their activities of daily living, which could eventually contribute to a fall event. Insufficient data are available to conclude that fatigue contributes to falls in hospitalized patients with cancer (Allan-Gibbs, 2010).

A prospective analysis of characteristics and circumstances of all inpatient falls in the medicine, cardiology, neurology, orthopedics, surgery, oncology, and women and

infant services in a 1,300 urban academic hospital setting revealed that prior studies focused on fall risk factors and did not examine contributing factors or actual triggers of the falls (Hitcho et al., 2004). In this analysis, 79% of total falls were unassisted, and 50% were elimination related where the patient was ambulating to or from the bathroom or bedside commode without assistance from a healthcare provider (Hitcho et al., 2004).

Falls in Patients with a Cancer Diagnosis

A systematic review of 31 studies on falls in older adults with cancer suggested that this population is more prone to experiencing falls compared to those without cancer due to cancer-related risk factors (Wildes et al., 2015). Fall risk assessment in this population is requisite to the implementation of interventions to reduce this risk (Wildes et al., 2015). This review revealed that a majority of fall incidents were reviewed through a retrospective case-control study where it was noted that fallers, those that fell, had an average length of stay of 15 days. Some of the variables that were examined in these case-control studies included age, race, and gender. One study demonstrated that advanced age was a contributing factor to falls, two studies found that people of the white race were more likely to experience injurious falls, and one study showed that women had significantly greater odds of injurious falls than men (Stone, Lawlor, Savva, Bennette, & Kenny, 2012). Saliba et al. (2001) stated that hospitalized patients with cancer who were in less distress and had increased activity according to the Edmonton Symptom Assessment Scale (ESAS) were the ones who fell more frequently.

Stone, Lawlor, & Kenny's, 2011 review of the evidence of seven studies designed to identify the risk factors for falls in patients with a cancer diagnosis demonstrated that it is unknown whether the risk factors for falls and effective interventions for falls risk reduction in patients with cancer are different from those in older persons. According to Filler, Kelly & Lyon (2011) patients with cancer receive treatments during long hospital stays are at risk for rapidly changing health status and need a different kind of fall surveillance than patients admitted in other inpatient units. A multicenter prospective study in two academic hospitals in Belgium from October 2009 to July 2011 of 937 patients suggested that fall history was the main predictor of future falls after cancer treatment, but the effectiveness of fall screening tools remain unclear (Walle et al., 2014).

A prospective analysis of characteristics and circumstances of falls in a hospital setting demonstrated that patients with cancer have higher fall frequencies and higher fall injury rates (Hitcho et al., 2004). However, published reports do not describe the characteristics nor describe factors that might be related to falling events in hospitalized patients with a cancer diagnosis compared with general hospitalized patients who fall (Capone et al., 2010).

Literature Review

An integrative and comprehensive computerized database and journal hand search utilizing the Whittemore and Knafl methodology (2005) (Polit & Beck, 2012) was conducted from the discipline of medicine, nursing, psychology, occupational therapy rehabilitation, and physical therapy. The decision for purposive sampling of patients with

cancer was used to narrow down the literature search process. Searches were limited to English-language and inclusion criteria included adult patients 18 years and older hospitalized in an acute care setting and hospitalized adult patients with cancer. Randomized controlled trials, systematic reviews, descriptive prospective, and retrospective medical reviews were explored. Studies that included children, patients hospitalized in other non-hospital care settings, unpublished manuscripts, dissertations, and editorials were excluded. Search terms or phrases on accidental falls, fall prevention, accidental falls in adult patients, and fall prevention in adult patients with cancer were utilized.

With the assistance of a medical librarian, the search for relevant literature was conducted in the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medical Literature On-Line (MEDLINE), ProQuest-Nursing and Allied Health, Scopus, and EbscoHost databases. The initial search parameters of five years, utilizing MeSH terms of accidental falls, AND hospitalization, AND hematologic neoplasms did not result in any studies. The search was expanded to relevant literature in the past ten years. A search from 2007-2018 using the ancestry approach was used (Polit & Beck, 2012). Eight articles were located from CINAHL, and ProQuest-Nursing and Allied Health. A search of relevant literature from the WHO and the AHRQ resulted in two articles. Primary sources that address the variables of interest resulted in eight relevant articles that were included in this review (see Table 1).

A purposive search was conducted to identify a validated instrument analyzing medical record data abstraction methodology. An electronic search was conducted in nursing databases of Cochrane, PubMed, CINAHL, Scopus plus Tests & Measurements databases of Mental Measurements and HAPI to no avail. An additional search was conducted in Federal Internet gateway sources like the Centers for Disease Control (CDC), Federal and international falls analysis data sources, again unsuccessful. Search limits included the English language, human subjects, and adults 19 years and older. This search demonstrated the lack of a validated medical record data abstraction instrument on the subject of accidental falls in hospitals. Literature in medical record review studies developed data collection tools based on factors contributing to falls (Hitcho et al., 2004) while others tasked statisticians and computer experts to design an algorithm, program, or scheme to extract electronic medical records in failed attempts using voice recognition programs, and even to hand-search the records (Lane, 1999). In this study, the institutional incident reporting database was the primary source reported a fall incident. An excel data collection spreadsheet was developed to guide participant medical records and incident report data extrapolation.

Fall Prevention Themes in the Inpatient Setting

Three themes that emerged from the review included care processes, technology-related interventions, and physical environment modifications. Discussions related to these fall prevention themes focused on patient and caregiver education and fall risk assessment.

Care Processes and Interventions

A two-group prospective randomized controlled study by Kuhlenschmidt et al. (2016) of 91 adult patients on their perception of their fall risk demonstrated that one-third of them perceived a lower risk compared to the nurses' rating. The nurse-delivered interventions (video and printed education tailored to the nurses' risk assessment), which are the independent variables in this convenience sample. The dependent variable was the patient's perception of their fall risk. A statistically significant difference in the proportion of patients who perceived themselves to be at high risk after the intervention was $p < 0.01$.

A systematic review of the evidence of seven studies to identify research designed (1) to ascertain the risk factors for falls in adults with cancer or (2) demonstrate the effectiveness of falls prevention strategies in patients with cancer was conducted within a cancer network in the United Kingdom. A strength in this study was the utilization of statistical methods designed to control for the confounding effects of one or more than one variable. Descriptive data analysis demonstrated that age, low blood pressure, visual, and cognitive impairment were found to be associated with falls in univariate analysis (Pearse et al., 2004). Critical appraisal of the seven studies demonstrated significant methodological limitations and identified the need for further research.

O'Connell, Baker, Gaskin, and Hawkins (2007) conducted a study to determine whether items on a falls risk-assessment tool (FRAT) differentiated fallers and non-fallers in oncology and medical settings. The FRAT, was used to collect data within 48

hours of the first admission to the hospital. Muscle strength measurement was one of the items on the FRAT tool, and this was evaluated by assessing the upper and lower limb strength of participants. A strength in this study is that findings demonstrated that muscle strength distinguished between fallers and non-fallers, and these findings could be used to identify patients who may be at risk of falling, hence the early implementation of fall prevention interventions (O'Connel et al., 2007).

Two out of the 11 studies by Allan-Gibbs (2010) on falls and hospitalized patients with cancer exclusively reported on falls in the hospital setting. The author examined the characteristics of patients with cancer that may contribute to fall risk and the relationship between falls and cancer diagnosis. Characteristics included age, gender, functional status and fatigue, radiation treatment, surgery, chemotherapy and biotherapy treatment, endocrine therapy, cognitive state, depression, polypharmacy, anemia, and nutritional status. Findings demonstrated that 15% of patients with hematologic cancers experienced a fall while in the hospital. (Allan-Gibbs, 2010).

A quasi-experimental design was used to investigate the effectiveness of the Fall Prevention Participatory Program (FPPP) to address knowledge and competency gaps in fall risk management among cancer patients. A pretest of the patient's knowledge and self-efficacy on fall prevention was tested on admission and day three, a post-test was delivered to evaluate the effectiveness of the intervention. Findings demonstrated that the FPPP intervention increased the fall prevention knowledge to 88.8% in the post-test, with a statistical significance of $p < 0.001$ (Huang, Ma, Li, Liang, Tsai, & Chang, 2014).

A systematic review by Hempel et al. (2013) of 59 studies was conducted to document implementation strategies, intervention components, and comparators, adherence information, and the effectiveness of published fall prevention approaches in U.S. acute care hospitals. Components only applied to patients who were at high risk for falls included fall alert signs in the rooms, doors, patient records, call button within reach, safety, and toileting rounds and ambulation assistance; bed exit alarms, identification wrist bands or other markers; bedside rails; use of sitters; low beds; nonskid footwear; moving high-risk patients closer to the nurses' station; communicating the care plan; and medication review (Hempel et al., 2013). Review findings demonstrated that larger intervention effects were observed in studies with greater evidence of adherence to intervention components although the effect was not replicated in the analysis comparing pre and post-intervention data (Hempel et al., 2013).

Systematic literature review of 34 studies assessed the effectiveness and characteristics of fall prevention interventions in hospitals identified (1) the physical environment, (2) the care process and culture, and (3) technology as distinct characteristics of fall prevention interventions (Choi, Lawler, Boenecke, Ponatoski, & Zimring, 2011). Review findings demonstrated that no studies had tested the efficacy of environmental modifications as a single-intervention, identification bracelets were of no benefit in reducing falls among high-risk patients, and bed alarm systems did not demonstrate a statistically significant reduction in the number of falls.

A one-year prospective before-and-after study of 1,968 patients admitted in elderly care hospital wards found a significant decline in the number of fall-related injuries after the bedrail reduction and staff education programs were introduced. A medication review and modification study demonstrated a reduction in falls by 47%. Medication review interventions included reviewing all medications, listing medications associated with dizziness falls or fractures, educating nurses on medication administration precautions, and recommending medication frequency or dosage reduction that promoted collaboration with doctors. An exercise program in addition to a multifaceted fall prevention program effectively reduced the number of falls (p , 0.007), patient education program with a multifaceted fall prevention program significantly lowered the incidence of falls in a randomized controlled trial ($N = 626$).

A study by Capone et al. (2010) examining characteristics of hospitalized cancer patients who fall was conducted at a 100-plus Northeast Ohio tertiary care medical center from February 2006 through January 2007. This study was both a descriptive prospective and retrospective medical record review study. Patient characteristics data were collected on hospitalized cancer patients on the hematology, oncology, and palliative units who had a fall event during the study period and were compared to a general hospitalized patient population. Examining cancer-care related variables besides, to fall-related variables was a study strength. Study weaknesses included the utilization of falls data found in the literature for hospitalized adult medical-surgical patients to compare risk factors found in patients with cancer. A comparison between the descriptions of the two populations could

have been affected by unequal sample size and variation of data collection methodologies, which may potentially result in reporting errors (Capone et al., 2010).

Technology-Related Interventions

Technology related interventions applied to patients identified as high risk of falling included nurse call button within reach, bed exit alarms, and electronic low beds. Choi, Lawler, Boenecke, Panatoski, and Zimring's (2011) evaluation of a multifaceted approach to fall prevention suggested that studies investigating the efficacy of a bed alarm system did not observe a statistically significant reduction in the number of falls.

Environmental Modifications

Environmental modifications include the application of bedside rails, utilization of low beds, and use of sitters, assistive devices such as walkers, non-skid footwear, and rooming patients closer to the nurses' station. Capone, Albert, and Bena's (2012) study demonstrated that 14.5% of the 158 falls experienced by hospitalized adult hematology/oncology patients were as a result of medical equipment; intravenous poles (4%), portable compression stocking device (<1%), or other medical equipment (9.6%). A multi-systemic fall prevention model demonstrated that falls occur through complex interactions between patient-related and environmental risk factors (Choi et al., 2011). A study of three acute medical wards involving 1609 patients showed that ward layout was an important independent risk for falls as it offers visual access to a patient's bed (Choi et al., 2011). The multifaceted approach to implementing interventions made it difficult to

isolate the effect of an individual intervention to determine which component of the intervention was associated with the fall reduction outcome.

Discussion

Research supported the implementation of an ongoing fall risk assessment for hospitalized adult hematology patients which could increase fall risk awareness and improve early initiation of fall prevention measures, which could improve patient outcomes. Fall prevention research conducted in hospitalized patients has not examined patients with cancer independently to determine why they are at greater risk for falls and fall-related injuries (Allan-Gibbs, 2010). Studies that presented the strongest evidence included the effectiveness of the participatory programs on fall prevention in oncology patients regarding their knowledge and self-efficacy on fall prevention. A significant difference ($P = 0.001$) was noted on knowledge transfer post-intervention, a fall incidence of 0% per 100 patient-days was noted in the intervention group in 2011, compared to the control group 19.3% (per 100 patient-days on 2011: Huang et al., 2014).

A systematic review of 11 studies in U.S. acute care hospitals by Hempel et al., 2013 demonstrated that although most studies addressed fall prevention using multiple components, most interventions targeted primary healthcare provider behavior. It was evident that interventions often aimed at improving documentation and the use of existing fall prevention measures rather than introducing new care processes. It was noted in this review that intervention implementation strategies were sparsely documented (Hempel et al., 2013).

A review of the literature of studies on falls and hospitalized patients with cancer from 1985-2009 demonstrated that a relationship does exist between falls and cancer diagnosis. Risk factors examined by the author included age, gender, cognition, functional state, depression, polypharmacy, anemia, chemotherapy and biotherapy treatment, hormone (endocrine) therapy, radiation treatment, surgery, and nutritional state. In this review, the strongest evidence about risk factors includes age, fatigue, chemotherapy, and hormone (endocrine) therapy, depression, and polypharmacy.

A descriptive prospective and retrospective medical review study examining the characteristics of hospitalized cancer patients who fell was conducted at a 1,000-plus bed tertiary care medical center. Cancer-related variables collected included age, gender, comorbid conditions, cancer diagnosis details, clinical characteristics such as elimination needs, length of hospital stay, and fall characteristics such as time of fall etcetera. 41 (26%) study participants had a hematology diagnosis, more than one-half of falls were related to elimination needs as 20% of patients who fell were experiencing urinary or bowel incontinence during the hospital stay. Mean length of stay for patients who had a fall event ($n = 138$) was 15 days, and 80% of falls occurred in the patient's room, of which 5.8% (8 cases) patients called for help and staff found them after the fall event. Fall occurrence by the time of day revealed that 37% of the falls occurred on the night shift (11 pm-7 am), 30% on day shift, and 32% on the evening shift. Fall risk associated with elimination needs in hospitalized patients with cancer should, therefore, be prioritized in addition to encouraging patients to call for help prior to getting out of bed,

frequent staff rounding on identified patients, and timely availability of bedside commodes in hospital rooms (Capone et al., 2010).

Conclusion

A review of current literature revealed that the common factors that contribute to an increased risk for falls in the acute care setting include an unfamiliar environment, acute illness and bed rest, length of stay, medications, treatments, and catheters. Despite this knowledge, fall-related data of hospitalized adult patients with a cancer diagnosis is lacking (Walle et al., 2014). The complexities that surround falls and fall prevention in patients with cancer necessitate the development of individualized plans of care after comprehensive risk assessment. Research is needed to understand risk factors unique to hospitalized patients with cancer (Allan-Gibbs, 2010) as well as unique contributors to falls in hospitalized adult patients with hematologic malignancy. Evidence of effective prevention strategies that target multiple risk factors is an emerging trend throughout healthcare organizations. The vulnerability of falling by patients with a cancer diagnosis has not gone unrecognized; however, it is not clear what risk factors or modifiable risk factors should be prioritized in this population (Stone, Lawlor, & Kenny, 2011).

CHAPTER III

METHODOLOGY

Previous Study

A prior study was done to examine the impact of a video-based educational intervention on the occurrence of falls among hematology patients hospitalized for the management of cancer treatment and complications. The study period was September 1st, 2012, through August 31, 2013. This randomized controlled intervention study consisted of a population of 2,472 individuals who were hospitalized for care associated with leukemia, lymphoma, multiple myeloma or stem cell transplantation. Study participants comprised of 1,236 enrolled in the intervention group and 1,236 in the control group. Study participants in the control group received standard of care fall prevention education while participants enrolled in the intervention group received standard of care in combination with the fall prevention video-based educational intervention.

Demographic data were collected from participant medical records and study variables such as fall risk assessment was collected from the Hester Davis Scale (Hester & Davis, 2013) for fall risk assessment scoring tool which identifies patients as either medium (defined as a score of eight or less) or high (defined as a score of nine or greater) fall risk. Data related to the events surrounding a fall was collected from a Patient Safety Network (PSN) electronic database, which is an incident reporting tool that stores various data points such as contributing factors to a fall. The outcome in this study was a total of 47 falls (23 control group, 24 intervention group) were reported during the study period.

This fifty percent fall rate therefore demonstrated that the video-based educational intervention was not effective in reducing the occurrence of falls in the intervention group.

Current Study

For this study, the prior study was referred to as the parent study. The current study sample was drawn from the parent study. The Donabedian quality care model (2005) of structure, process, and outcomes was applied as follows: 1) structure was the risk assessment and scoring utilizing the Hester Davis Scale (Hester & Davis, 2013); 2) process included current institutional fall prevention program that outlined fall protocol implementation. Fall protocol included utilization of bed alarms, bedside commode, and non-skid footwear for patients who had been identified as high fall risk; and 3) outcome measures were patients who experienced a fall and those who did not fall.

A retrospective case-control research design was used for this study. Demographic data of gender and diagnosis from 47 fallers was matched to 47 non-fallers to obtain a minimum sample size of 94 participants. Pair matching of the gender percentages of the male and female participants, as well as diagnoses percentages in the fallers group, as compared to similar percentages from the non-fallers group. A web calculator known as GraphPad (GraphPad, n.d.) was used to randomly select a subset of subjects to match for gender and diagnosis from the non-fallers group. A sequence of random numbers was selected by a web calculator from which 47 non-fallers were

randomly selected. This design examined unique contributors to falls. A stepwise logistic regression analysis was utilized to identify predictors of falls.

For this study, a priori power analysis was conducted using G*Power 3.1.9 to determine the minimum sample size that is required to find a difference with a desired level of power set at .80, an alpha (α) level at .05, and a moderate effect size of 1.4 (odds ratio) with two-tailed for logistic regression. It was determined that a minimum of 93 participants would ensure adequate power for the current study. No additional patient enrollment occurred.

Setting

The setting for this study was a major cancer center located in the medical center of a large south-central city located in the United States. Participant data of hospitalized adult hematology patients was initially gathered during the parent study period of September 1, 2012, through August 31, 2013. A retrospective examination of medical records of the 47 patients who experienced a fall as well as 47 other patients who did not experience a fall during the parent study period was conducted to help answer the following research question; “What unique predictors of falls exist in hospitalized adult hematology patients?”

Population and Sample

The population and inclusion criteria for the parent study were adult (18 years and older) patients on the first admission to the designated hematology inpatient setting of lymphoma, myeloma, leukemia, and stem cell transplantation units. Participants were expected to be able to read and understand English, and this criterion was evaluated through self-reporting. Exclusion criteria included patients with non-hematologic diagnoses admitted to the study units.

Protection of Human Subjects

An administrative Institutional Review Board (IRB) protocol amendment approval to the parent study was granted by the cancer center (see Appendix A), and Institutional Authorization Agreement (IAA) approval for this study was granted by the Texas Woman's University's IRB (see Appendix B). The principal investigator did not collect additional data. A waiver of informed consent was obtained for the parent study as the data collected was consistent with the standard of care procedures, and the consent for treatment included consent for data to be evaluated and tracked for quality and care purposes.

Reported fall incident data is safely kept in the cancer center's incident reporting electronic database. Pertinent medical record review data were entered into an excel spreadsheet that was kept in the investigator's institutional Dropbox cloud. The second location of the data was stored on the investigator's personal computer in a locked private office. Extrapolated data were entered into an SPSS data file for calculations.

Instrument

As reflected in the review of the literature, no specific medical record review instrument was located. Since a reliable and validated instrument for analyzing medical record data abstraction methodology was not located in the electronic literature search, the cancer center's hospital-based incident reporting database data points were utilized to extract participant fall incident data from the electronic medical record. The cancer center's incident reporting form is a 23-item questionnaire that is generally used to report patient-related events such as fall incidents, location of fall, time of fall, and contributing factors etcetera. An Excel demographic data collection sheet was used to collect demographic variables in addition to pertinent incident data that is currently located in the incident reporting database (see Table 2; list of tables).

In relation to the Hester Davis Scale for fall risk assessment tool, conversation with Dr. Hester revealed that a copy of the tool could not be included; neither could it be replicated in this dissertation due to intellectual property and copyright conflict of interest.

Data Collection Procedure

Data from the parent study was deduced through an extensive systematic retrospective electronic health record (EHR) analysis. Data were extrapolated from the EHR of each participant and entered to an 18-item Excel spreadsheet, consistent with the 23-item institutional incident reporting form standards. Included data consisted of incident reports data points such as demographic data, basic fall information which

includes the date of fall incident, discovery and time of fall incident, assisted versus unassisted falls, fall prevention protocol (e.g., utilization of bed alarm, bedside commode, non-skid footwear), and activity before the fall. Event exact location (room, bathroom), and expert opinion description of event detail (what happened during the event) was also examined. Additional data points will include admission and discharge date, and length of stay. The anonymity of the participants will be protected by blotting out names or study ID numbers.

Pilot Study

A retrospective case-control pilot analysis was conducted to explore contributors to falls among hospitalized adult hematology patients. A sample size of 10 was needed to achieve power at 0.80. In this pilot study, clinical and demographic data of five participants who had experienced a fall as compared to that of five participants who did not experience a fall during a parent study period that was conducted between the dates of September 1, 2012 to August 31, 2013. Pilot study participants were selected from a population of 100 patients that were enrolled in the parent study that was evaluating the effect of a video-based fall prevention education intervention.

Statistical conclusion and construct validity was not a concern in this pilot study as the educational intervention on fall prevention was provided and evaluated during the parent study. An external validity threat was the sample homogeneity, which consisted of medical record reviews of hospitalized adult patients who were diagnosed with hematologic malignancies. Sample homogeneity may limit the generalizability of study

findings to patients with non-hematologic cancer diagnoses (Polit & Beck, 2012). An internal validity threat of concern was temporal ambiguity “inferring that the cause must precede the effect” (Polit & Beck, 2012).

Data Analysis

Data were extrapolated from the participant medical record and the cancer center’s incident reporting database and entered on an Excel spreadsheet. Data from the Excel spreadsheet was then entered into a Statistical Package for Social Sciences (SPSS) v.24 software for analysis. Variables of interest included age, gender, race, length of hospital stay (in days), underlying diagnosis, fall risk assessment score, complete blood count values (white blood cells, hemoglobin, hematocrit, and platelets), and fall incident.

Data were evaluated for impossible values. Abnormal white blood cell count values were identified as some values fell below the normal range of 4,000K/uL to 11,000K/uL. Although abnormal, these values are possible for the patient with hematologic malignancy. Percentage and patterns of missing data were first evaluated, then assumption tests were performed to examine normality and outliers on continuous variables. No duplicate or missing data was identified. Mean and standard deviation for continuous variables and frequency and percentage for categorical variables were used to describe demographic data. Simple logistic regression between continuous variables and dependent variable, and cross-tabulation between categorical variables and the dependent variable was used to analyze study results.

CHAPTER IV

ANALYSIS OF DATA

The purpose of this retrospective case-control study was to answer the following research question “What unique predictors of falls exist in hospitalized adult hematology patients?”. Demographic data was extrapolated from electronic medical records of participants from a prior study and transferred to an excel data collection spreadsheet that was utilized in the data collection procedure. A total of 94 electronic medical records were reviewed in this study. Data on ten independent variables and one dependent variable were analyzed. Independent variables included age, gender, race, underlying diagnoses, fall risk assessment scores on admission using the Hester Davis fall risk scale, length of inpatient hospital stay (in days), and blood counts (white blood cells, hemoglobin, hematocrit, and platelets). The dependent variable was fall/no-fall.

Demographic data of gender and diagnosis from 47 participants with hematologic malignancies who experienced a fall (fallers) was matched to 47 participants with the same diagnoses who did not experience a fall (non-fallers) to obtain a minimum sample size of 94 participants. Simple logistic regression between continuous variables and dependent variable, and cross-tabulation between categorical variables and the dependent variable was used to analyze study results. Stepwise logistic regression was utilized for the final analysis of data.

Description of the Sample

The sample for this study was drawn from a parent study that was conducted between September 1, 2012, through August 31, 2013, to examine the impact of a video-based educational intervention on the occurrence of falls among hospitalized hematology patients. A retrospective medical record review was conducted to extrapolate relevant data. Crosstabulation using Pearson's chi-square and Cramer's V tests were utilized to examine the relationship between fall incident and 10 identified variables of interest. Categorical variables for fall incidents were analyzed and reported individually. As shown in Table 3, the relationship between fall incident and fall risk assessment score on admission was significant, $X^2 (1) = 6.153, p = .013$, Cramer's $V = .256$. More than half of participants who fell were identified to be at a higher risk for falling (63.6%) than medium fall risk (38%).

Table 3

Frequencies and Percentages of Fall Incident By Fall Risk Assessment on Admission

	Medium Fall Risk		High Fall Risk				
Fall Incident	<i>n</i>	%	<i>n</i>	%	X ²	<i>p</i>	Cramer's V
Fallers	19a	38%	28b	63.6%	6.153	.013	0.256
Non-fall	31a	62%	16b	36.4%			
* $p < .013$							

Due to the resulting small sample size of non-Caucasian races (African American = 8, Hispanic = 6, Asian = 2, and other = 6), these races were combined into the non-Caucasian category. As shown in Table 4 the relationship between fall incident and race was not significant, $X^2 (1) = 2.136$, $p = .144$, Cramer's $V = .151$. There was an evenly distributed number of falls in both groups, although more than half of the non-Caucasian's experienced a fall (63.6%) than Caucasian (45.8%).

Table 4

Frequencies and Percentages of Fall Incident By Race

	Caucasian		Non-Caucasian				
Race	<i>n</i>	%	<i>n</i>	%	X2	<i>p</i>	Cramer's V
Fallers	33a	45.8%	14a	63.6%	2.136a	.144	0.151
Non-fall	39a	54.2%	8a	36.4%			
$p < .144$							

Due to the resulting small sample size of participants with acute myelogenous leukemia (AML; 26), chronic lymphocytic leukemia (CLL; 4), chronic myelogenous leukemia (CML; 3) and acute lymphocytic leukemia (ALL; 3), these diagnoses were combined and categorized as leukemias. As shown in Table 5 the relationship between fall incident and diagnoses was not significant, $X^2 (2) = 1.016$, $p = .602$, Cramer's $V = .104$. There was an equal distribution of fallers (50%) and non-fallers (50%) in

participants with non-Hodgkin's lymphoma. A greater proportion of participants who fell were those diagnosed with leukemia (55.6%) than those diagnosed with multiple myeloma (42.9%).

Table 5

Frequencies and Percentages of Fall Incident by Diagnosis

Diagnoses	Non-Hodgkin's Lymphoma		Multiple Myeloma		Leukemias				
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	X ²	<i>p</i>	Cramer's V
Fallers	15a	50%	12a	42.9%	20a	55.6%	1.016	.602	0.104
Non-fall	15a	50%	16a	57.1%	16a	44.4%			
<i>p</i> < .602									

As shown in Table 6, the relationship between fall incident and gender was not significant, $X^2(1) = 2.147$, $p = .143$, Cramer's $V = .151$. More than half of participants who fell were female (51.1%) than males (48.9%).

Table 6

Frequencies and Percentages of Fall Incident By Gender

	Male		Female				
Gender	<i>n</i>	%	<i>n</i>	%	X ²	<i>p</i>	Cramer's V
Fallers	23a	48.9%	24a	51.1%	2.147	.143	0.151
Non-fall	16a	34%	31a	66%			
$p < .143$							

Continuous predictors were individually analyzed but were reported together, as shown in Table 7. There was no statistical significance between the fall incident and the identified continuous variables.

Table 7

Frequencies and Percentages of Fall Incident for Continuous Variables

Variable	X^2	p	Cramer's V
Age	26.200a	.955	0.528
Length of Stay	35.467a	.674	0.614
WBC	62.143a	.542	0.813
Hgb	42.652a	.473	0.676
Hct	31.867a	.275	0.811
Plts	94.000a	.172	1.000

Findings

A simple logistic regression of the fall incident (dependent variable) initially confirmed that 50% of the participants fell, but the predictive model demonstrated 36 fallers and 34 non-fallers resulting in a 74.5% prediction classification accuracy, which was 24.5% increase from the initial 50% classification accuracy. The research question sought to identify the unique predictors of falls in hospitalized adult hematology patients. Table 3 demonstrates a relationship that existed between the fall assessment risk score on admission with the fall incident. The stepwise logistic regression model demonstrated that there was a statistically significant correlation of high fall risk assessment scores with the number of patients that experienced a fall (63.6%, odds ratio $X^2 (1) = 6.153$, $p = 0.013$, Cramer's V = .256).

Fall Prevention Measures

Fall risk prevention measures for patients assessed to have a high risk of falling include the utilization of bed alarm, bedside commode, and non-slip footwear. Eighty-one percent of the falls during the parent study were unassisted and unwitnessed. Among the 47 patients who fell, 35 (74.5%) did not have the bed alarm activated, more than 50% did not have non-slip footwear, and 57% did not have a bedside commode readily available in the room before the fall.

Time and Location of Fall Incident

The time of fall was evenly distributed between dayshift work hours (7 am-7 pm) and night shift hours (7 pm – 7 am). More than half of the falls (55%) occurred between the hours of 8 am through 6.30 pm. Nine (19%) of the falls were assisted falls where the patient was helped to the floor by a healthcare provider. These falls occurred between midnight and 2.30 am. It was noted that none of these patients had a bedside commode within reach before the fall incident.

The majority (63.8%) of the falls occurred inside the patient's hospital room, 29.8% occurred in the bathroom, and 6.4% occurred in the hallway while the patient was ambulating. 43% of the patients who experienced a fall in the hospital room had a bedside commode readily available. Participants had verbalized as reported in the nursing post-fall documentation that they thought they were strong enough to make it to the bedside commode on their own and either experienced lightheadedness or reported that "their knees gave out" while trying to return to bed. Thirty-five percent of these patients

were noted not to be wearing non-slip footwear. Thirty percent of fall incidents occurred in the patient's bathroom. Sixty-four percent of these falls were assisted and occurred between midnight, and 2.30 am. The nursing staff reported that they had assisted the patient in the bathroom and had stepped out of the bathroom to provide the patient with privacy. Patients reported lightheadedness or weakness while getting up to clean themselves and had called the nursing staff who assisted them to the bathroom floor. Three percent of the falls that occurred in the hallway were due to inappropriate footwear where the patient's "flip flops" were reported to stick on the hardwood hospital floors resulting in the patient falling while ambulating independently.

Summary of Findings

The purpose of this retrospective case-control study was to answer the following question "what unique predictors of falls exist in hospitalized adult hematology patients?" The stepwise regression model revealed that fall risk assessment scores using the Hester Davis Fall Risk Scale were significant predictors of falls in this patient population. The nurse reported data on fall prevention procedures demonstrated a lack of consistency in the implementation of required prevention measures on patients who were identified to be at a higher risk of falling.

CHAPTER V

SUMMARY OF THE STUDY

A fall is defined as an unplanned descent to the floor with or without injury to the patient (Staggs, Davidson, Dunton, & Crosser, 2015). In cancer patients with hematologic malignancies, falls may contribute to and or result in higher complication rates compared to the general population of medical-surgical patients (Walle et al., 2014). Falls with injury are of greater concern because this population has an increased risk of developing fall-related complications such as excessive bleeding that may result in death (Capone et al., 2010). In older patients with cancer, prior falls may result in increased risk due to treatment-related side effects up to death (Wildes et al., 2015). Data on falls in hospitalized adult patients with cancer is scarce and is generally included in the limited reported fall data of hospitalized adult patients without cancer (Spoelstra et al., 2013). Falls are costly and are usually under-reported by patients to their care providers due to their perception that their fall is a minor incident (Sattar et al., 2018). CMS no longer reimburses hospitals for patient care resulting from hospital-acquired falls (Fehlberg et al., 2017).

Fall prevention is a concept associated with hindering a fall from happening through advance care planning, or action (Montalvo, 2007). The body of knowledge on falls, risk factors, consequences, and prevention originate from studies of older persons who have experienced a fall. The medical community has made several efforts toward fall risk assessment with an emphasis on prevention of the reoccurrence of falls, but this

approach could potentially skew attention away from initial fall prevention efforts (Haslam & Stubbs, 2005). Few studies have explicitly investigated fall prevention in patients with cancer (Allan-Gibbs, 2010).

Summary of the Study

A convenience sample of 94 participants was drawn from a larger parent study sample of 2,472 individuals who were hospitalized for care associated with leukemia, lymphoma, multiple myeloma, or stem cell transplantation. The parent study examined the impact of a video-based educational intervention on the occurrence of falls among hematology patients hospitalized for the management of cancer treatment and its complications.

A retrospective review of 94 medical records was conducted to answer the following research question: “What unique predictors of falls exist in hospitalized adult hematology patients?” There was no statistical demographic and clinical significance in age, race, gender, underlying diagnoses, and complete blood count (CBC) values; white blood cells (WBC), hemoglobin (Hgb), hematocrit (Hct), and platelet count (plt). However, there was a statistically significant relationship between fall incident and fall risk assessment score on admission ($p = .013$). More than half of participants who fell were identified to be at a higher risk for falling (63.6%) than medium fall risk (38%). The three themes of care processes, technology-related interventions, and physical environment modifications provided insight into the proportion of patients who fell with the fall risk assessment score that they received upon admission utilizing the Hester Davis Scale for fall risk assessment.

Discussion of Findings

The findings from the quantitative portion of this retrospective case-control study provided data needed to successfully address the aims of this study. Quantitative data supported the ongoing utilization of the Hester Davis Scale for fall risk assessment on the hospitalized adult hematology patient population because their fall risk status drastically changes throughout their hospitalization (Filler et al., 2011). Previous research of patients with cancer found that patients who fell were more likely to have a hematologic cancer diagnosis (Capone et al., 2012). The prevalence of falls in hospitalized cancer patients is unique from other populations in acute care settings because their fall risk status drastically changes throughout their hospitalization (Filler et al., 2011).

Donabedian's quality care model (Donabedian, 1988) was used as the conceptual framework to support this study. The structure process and outcome framework was demonstrated through the utilization of the Hester Davis Scale for fall risk assessment during initial admission into the hospital. The process included the implementation of fall prevention measures such as bed alarm activation, non-slip footwear, and the availability of a bedside commode inside patient hospital rooms. The number of fallers and non-fallers was the outcome measurement.

Implications for Practice

The study demonstrated that fall risk scores were the primary predictor of falls in the hospitalized adult patient population with hematologic malignancy. A clinical and

educational implication is relevant to this research. First, the study demonstrated the need for in-hospital continuous fall risk assessment utilizing the Hester Davis Scale. Fall risk assessment scores should guide comprehensive fall prevention measures that will yield positive patient outcomes. Fall risk assessment and fall prevention are significant in nursing practice due to their impact on patient experience and outcomes. Patient falls, and patient falls with injury are healthcare measures that have historically been utilized to evaluate the quality of hospital nursing care, and are an integral part of the NDNQI reporting structure (Montalvo, 2007).

The nurse reported data on fall prevention procedures demonstrated a lack of consistency in the implementation of required prevention measures on patients who were identified to be at a higher risk of falling. Eighty-one percent of the falls during the parent study were unassisted and unwitnessed. Among the 47 patients who fell, 35 (74.5%) did not have their bed alarm activated, more than 50% did not have non-slip footwear, and 57% did not have a bedside commode readily available in the room before the fall. More than half of the falls (55%) occurred between the hours of 8 am through 6.30 pm, and the majority (63.8%) of the falls occurred inside the patient's hospital room, 29.8% occurred in the bathroom, and 6.4% occurred in the hallway while the patient was ambulating. These findings have an educational implication to hold nursing staff accountable for the consistent implementation of fall prevention measures for all high-risk fall patients. Upon review of the qualitative nurse reported data, identified barriers included patient refusal of bed alarm activation because it disrupted their sleep with minor body adjustments

while on the bed. Some patients who had care providers staying with them in the hospital room had refused bedside commodes inside the room because it was a barrier to privacy during toileting. One patient who fell in the hallway while ambulating had refused to wear the non-slip footwear provided by the nursing staff and opted to wear her “flip flops” which got stuck on the hardwood hospital floor resulting in a fall.

Limitations

The overarching limitation of this research was the dependence on nursing accuracy of fall incident documentation. The nurse reported data of fall incident depended on the recollection of events before and during the fall. Eighty-one percent of the falls during the parent study were unassisted and unwitnessed, and therefore the patient was the primary historian of the events before the fall. A second limitation is a dependence on the incident reporting system as the main tool for identifying patients who fell. Although all staff at the cancer center are expected to report patient falls in the incident reporting system, under-reporting fall events are probable due to staff time constraints and perception of blame (Haines et al., 2008). This limits the generalizability to the target population of hospitalized adult patients with hematologic malignancy. Finally, the higher risk for falls among this population is a limitation to the generalizability of this study to other oncology patients (Vela et al., 2018). Patients with hematologic malignancy undergo multiple chemotherapy treatments leading to a prolonged duration of severe cytopenias. The severity of their underlying disease coupled

with the common use of corticosteroids places them at a higher risk for falls than the general population of patients due to steroid-induced muscular weakness or myopathy.

Conclusion and Recommendations for Further Study

In this study, fall risk scores were the primary predictor of falls in the hospitalized adult patient population with hematologic malignancy. Ongoing utilization of the Hester Davis Scale for fall risk assessment and consistent evaluation and modification of fall prevention measures is imperative for sustainable fall prevention efforts. Literature has also demonstrated that a correlation exists between cancer diagnosis and fall rates in older adults compared to a like group without cancer. More research is needed to demonstrate the relationship between falls and cancer types (Spoelstra et al., 2013). To date, literature about fall prevention and reduction continues to focus primarily on older populations, medical-surgical patients, or individuals in tertiary care settings (Capone et al., 2010). There is not a descriptive analysis of falls of hospitalized adult patients with hematologic malignancy.

There are several recommendations for nurse leaders on fall prevention in hospitalized adult patients with hematologic malignancies. 1) Replicate the current study with a larger sample of hospitalized adult patients with hematologic malignancies. The findings from this retrospective case-control study could be used as the first step in continuing research on continuous fall risk assessment in this population. 2) Consistent implementation and monitoring of fall prevention measures have the potential to impact patient safety and improve outcomes. 3) Consider further studies of fall prevention that

include patient engagement and interdisciplinary collaboration in fall prevention efforts, which were not a focus of this study.

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APPENDIX A

A. IAA Between The University of Texas MD Anderson Cancer Center and TWU

Texas Woman's University Institutional Review Board
Application for Dual Review Studies

TWU Principal Investigator (PI) Information:

Name of PI: Catherine Mbango Phone: (281) 853-6602
Status: ☐ faculty ☒ student ☐ staff ☐ other: _____ E-mail: cmbango@twu.edu
Department: Nursing
Colleague ID# (this is the 7-digit # on your ID): 0779541
If the PI is a student, provide the following information for the faculty advisor:
Name of Advisor: Dr. Robin Toms E-mail: rtoms@twu.edu
TWU Department: Nursing

Project Information:

Title of Study: Retrospective Case Control Analysis To Identify Unique Contributors to Falls in Hospitalized Adult Hematology Patients
Estimated beginning date of study: 9/1/2018 Estimated duration of study: 9/1/2019
Campus (Denton, Dallas, or Houston): Houston Level of review: ☐ exempt ☒ expedited ☐ full
Type of Project: ☐ thesis ☐ professional paper ☒ dissertation ☐ class project
(check all that apply) ☐ faculty research ☒ pilot ☐ other _____

Other IRB Information:

Name of Other IRB: MD Anderson Cancer Center Institutional Review Board
Contact information for IRB (i.e. website, email, phone #): (713) 792-2933
Name & title of PI on other IRB application: Patty Johnston, Executive Director, Projects & Operations, Cancer Network
Title of Study (if different from above): Examining the Impact of a Video-Based Educational Intervention on the Occurrence of Falls in a Hematology Population
Status of Other IRB Review: ☐ pending ☐ not yet submitted ☒ approved (date: 7/10/2018)

Dual Review Information:

Provide reason for dual review.

The study has been approved by M.D. Anderson Cancer Center as a retrospective case control analysis of an existing database. The PI is a TWU Graduate Student who will be conducting her pilot and dissertation research using the existing data at M.D. Anderson. The aim of this dual review is to conduct a retrospective review of a sample of patients who fell during their hospitalization and a sample those who did not fall.

Explain the TWU investigator's role on the project and relationship or affiliation with the other institution.

The TWU investigator is a College of Nursing graduate student. She will be using the data for a pilot study and for her full PhD dissertation.

Explain what part, if any, of the subject recruitment and data collection will be done on the TWU campus.

None

List TWU research team members other than PI and advisor (attach additional pages as needed):

Name TWU 7-digit Colleague ID # (if applicable) Email Address: TWU Department Role on Project	None
Name TWU 7-digit Colleague ID # (if applicable) Email Address: TWU Department Role on Project	None

Attachments (as applicable):

Approval letter from other institution's IRB
Completed application form to other IRB (required)
Consent form

Attached	N/A
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>

Consent documents must meet TWU requirements. The goal is a single consent form that explains the roles of each institution and fairly and completely represents the decisions of each IRB involved.

Generally, the consent form should list TWU as a study site and include the TWU disclaimer statement "The researchers will try to prevent any problem that could happen because of this research. You should let the researchers know at once if there is a problem and they will help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research."

TWU's name may be inserted in the disclaimer statement of the other institution if the two statements are similar. Otherwise, TWU's statement must be added in a separate paragraph.

Training certificates for all TWU team members (including PI and research advisor) if a current training certificate is not already on file

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

Recruitment materials (i.e., scripts, flyers, advertisements, etc)

<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	-------------------------------------

Agency approval letters

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

Surveys, questionnaires, or any other instruments used in the study

<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	-------------------------------------

Other ()

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

Other ()

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

Provide the IRB with any other information necessary for the review of this study.

None

Signatures (Approvals):

Principal Investigator (PI): Signature certifies that the investigator has primary responsibility for all aspects of the research project

Catherine Mbanga, PhD
Principal Investigator

7/20/2018
Date

Faculty Research Advisor (for student research only): Signature certifies that the faculty member has read, reviewed, and approved the content of the application and is responsible for the supervision of this research study

Robyn Tene PhD
Faculty Research Advisor

8/29/2018
Date

Academic Administrator: Signature certifies that the administrator has read, reviewed, and approved the content of the application

Charles M. M. M.
Academic Administrator (Department Chair, Program Director, or Associate Dean)

8/31/18
Date

SUBMISSION INSTRUCTIONS

The application should be submitted to the appropriate campus IRB.

Denton and Dallas

Mail the signed original to the address below. If electronic submission is preferred, combine all parts of application into single .pdf document and email to irb@twu.edu. If the application is submitted electronically as a fully signed .pdf, the original copy is not required.

TWU's Office of Research & Sponsored Programs
Institutional Review Board
PO Box 425619
Denton, TX 76204-5619

Applications may also be hand delivered to the Denton campus ACT 7th floor or the Dallas campus Office of Research IHSD 8th floor.

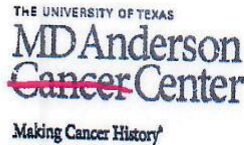
Houston

All parts of the application (including the signed cover page and appendices in order) should be combined into one single .pdf or Word document and emailed to irb-houston@twu.edu. The original copy is not required. If you have any difficulty with preparing a .pdf file, please contact the Houston Office of Research via email for assistance.

APPENDIX B

B. Institutional Review Board (IRB) Approval from The University of Texas MD

Anderson Cancer Center



Department of Nursing
1515 Holcombe Boulevard Unit 456
Houston, Texas 77030

August 30, 2018

Texas Woman's University
School of Nursing
Institutional Review Board

To whom it may concern,

This letter is to confirm that the protocol related to the dissertation work of Cathie Mbango was approved by the IRB on 1/30/2014. The parent student involved both focus groups and pre and post-testing that required consent forms be completed. The third component of the study involved patients being assigned to an intervention or control group relative to falls prevention education, and waiver of consent for this component of the study was granted by the MD Anderson IRB. Cathie has proposed to do a secondary analysis on existing study data from the third component of the study. Therefore no consent forms exist nor will additional consent be required for the review of this data.

The MD Anderson IRB approved the amendments related to the conduct of this secondary analysis on 7/10/2018.

If any additional information is needed please do not hesitate to let me know. We look forward to partnering with you to ensure Cathie is successful in her proposed work.

Sincerely,

Kelly J Brassil, PhD, RN, AOCNS
Director, Nursing Research and Innovation
The University of Texas MD Anderson Cancer Center
kjbrasil@mdanderson.org
713-792-1130

THE UNIVERSITY OF TEXAS
MD Anderson
Cancer Center
Office of Protocol Research

Institutional Review Board (IRB)
Unit 1637
Phone 713-792-2933
Fax 713-794-4589

To: Patty A. Johnston
From: Michelle D. Linares
CC: Kelly J. Faltus, LaTonia R. Okadigwe, Marion B. Olson
MDACC Protocol ID #: 2013-0858
Protocol Title: Examining the Impact of a Video-Based Educational Intervention on the Occurrence of Falls in a Hematology Population
Version: 03
Subject: Contingencies Met - Protocol 2013-0858

01/30/2014

Official IRB Approval Date: 01/16/2014

On 01/30/2014 the Institutional Review Board 4 committee, chair, or designee granted approval to the above named and numbered protocol since the contingencies outlined by the IRB 4 on 01/16/2014 have been met.

It was noted that the protocol, informed consent documents (ICDs) and/or the Waivers of ICD and Authorization are satisfactory and in compliance with federal and institutional guidelines. No participants may be entered on this protocol until it has been officially activated by OPR.

In keeping with the requirements outlined in 45CFR46.109(e) and 21 CFR56.109(f), the IRB shall conduct continuing review of all protocols at intervals appropriate to the degree of risk, but not less than once per year.

You are responsible for promptly reporting to the IRB:

- any severe adverse events;
- any death while patient is on study;
- any unanticipated problems involving risks to subjects or others;
- any proposed changes in the research activity (changes may not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects).

Sponsor Name: The DAISY Foundation
Sponsor Version Number and Date:
ICD Approval Date: 1/30/2014

The IRB approval expiration date is 01/16/2015.

In keeping with the requirements outlined in 45CFR46.109(e) and 21 CFR56.109(f), the IRB shall conduct continuing review of all protocols at intervals appropriate to the degree of risk, but not less than once per year.

To activate this study, please compose and send a "Request for Activation" memo in PDOL.

The existing Informed Consent and/or Waivers of Informed Consent and Authorization cannot be used.

If a Material Transfer Agreement (MTA) is required, it must be obtained prior to Activation.

In the event of any questions or concerns, please contact the sender of this message at (713) 792-2933.

Michelle D. Linares 01/30/2014 10:58:38 AM

This is a representation of an electronic record that was signed and dated electronically and this page is the manifestation of the electronic signature and date:

**Michelle D. Linares
01/30/2014 10:58:29 AM**

IRB 4 Chair Designee

FWA #: 00000363

OHRP IRB Registration Number: IRB 4 IRB00005015

APPENDIX C

Curriculum Vitae

Appendix C

Curriculum Vitae

Catherine Mbango MBA, MSN, RN, NE-BC, OCN

2214 Mateo Park Drive, Houston, TX, 77047

Tel: (832) 804-9527, Cell: (281) 853-6602

mutondo@hotmail.com

RESEARCH INTERESTS

Symptom science and patient reported outcomes.

EDUCATION

Doctor of Philosophy, Nursing Science, 2015 – Current - Texas Woman's University

Post-Master's Certification, Nursing Education, December 2017 - Texas Woman's University

Executive Masters in Business Administration, December 2011 - Texas Woman's University

Master of Science, Health Systems Management–Major; Health Care Administration–Minor, August 2010 - Texas Woman's University

Bachelor's of Science in Nursing, May 2007 - Texas Woman's University

Associate Degree Nursing, May 2003 - Houston Community College

PROFESSIONAL EXPERIENCE:

Associate Director Clinical Nursing, npatient Lymphoma/Myeloma, **MD Anderson Cancer Center**, August 2019 - Current

Patient Care Nurse Manager, Clinical & Translational Research Center, MD Anderson Cancer Center, August 2015 – August 2018.

Project Manager, Nursing Workforce Planning & Development, **MD Anderson Cancer Center**, January 2014 – August 2015.

Nurse Manager – Hematology, Oncology Specialty Clinics & Infusion Center, Smith Clinic, **Harris Health System** – January 2011 – January 2014.

Nurse Clinical Manager – Medical-Surgical/Orthopedic, **Ben Taub General Hospital**, October 2009 – January 2011.

Assistant Nurse Manager – Diagnostic Imaging Mays Clinic, **MD Anderson Cancer Center**, December 2007 – July 2009

Clinical Nurse – Stem Cell Transplantation & Cellular Therapy, MD Anderson Cancer Center, June 2003 – December 2007.

PER DIEM EMPLOYMENT

Adjunct Clinical Faculty, School of Nursing, **Texas Woman's University**, September 2024 – Current.

Clinical Nurse Inpatient (Per Diem) - Stem Cell Transplantation & Cellular Therapy, **MD Anderson Cancer Center**, May 2010 – January 2014

Clinical Nurse (Suppl.), Oncology/Medical Surgical, **Memorial Hermann, The Woodlands**, August 2007 – February 2008.

Nurse Intern – Bone Marrow Transplant, **Texas Children's Hospital**, January 2007 – April 2007.

Clinical Nurse (Per Diem) – Medical Oncology/Renal, **Houston Northwest Medical Center**, September 2005 – March 2006.

PRESENTATION

The Role of Nurses in mHealth Care: A Systematic Literature Review.” Poster presentation at the American Nursing Informatics Association Annual Conference, May 9-12, 2018.

PUBLICATION

Mbango, C. (2017). From clinical to classroom, my experience as a new adjunct faculty member. *Texas Nursing Magazine*, Summer, 20-22.

CERTIFICATIONS

Oncology Certified Nurse; Oncology Nursing Certification Corporation, May 2012 – Current.

Nurse Executive Board Certified; American Nurses Credentialing Center, September 2011 – Current.

Chemotherapy \Biotherapy Certified; Oncology Nursing Society, December 2013.

PROFESSIONAL APPOINTMENTS

Houston Chapter Oncology Nursing Society (HCONS), Secretary, 2016 -2017, & 2018 – Current.

Texas Nurses’ Association District 9 Education Committee Member, 2017 – Current.

Texas Nurses’ Association District 9, Alternate Delegate, 2015 – 2018.

Publicity Chair, Houston Organization of Nurse Executives (HONE), Publicity Chair,

Texas Nurses' Association District 9, North Region Sub-district Representative, Board Member, 2013 – 2015.

MEMBERSHIPS/AFFILIATIONS

Society of Hematologic Oncology (SOHO), 2013.

American Nurses' Association/Texas Nurses' Association, 2010.

American College of Healthcare Executives, 2010.

Houston Organization of Nurse Executives, 2010.

Sigma Theta Tau International, Honor Society of Nursing - Beta Beta Chapter, 2007.

Oncology Nursing Society Member (National & Local Chapters), 2003

APPENDIX D

D. RCR Certificates

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2 COURSEWORK REQUIREMENTS NTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Catherine Mbango (ID: 6233592)
- **Institution Affiliation:** Texas Woman's University (ID: 1959)
- **Institution Email:** cmbango@twu.edu
- **Institution Unit:** Nursing
- **Phone:** 2818536602

- **Curriculum Group:** Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Record ID:** 22625089
- **Completion Date:** 01-Apr-2017
- **Expiration Date:** 31-Mar-2020
- **Minimum Passing:** 80
- **Reported Score*:** 81

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Texas Woman's University Institutional Page (ID: 14186)	15-Mar-2017	No Quiz
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	01-Apr-2017	4/5 (80%)
Belmont Report and CITI Course Introduction (ID: 1127)	01-Apr-2017	3/3 (100%)
Students in Research (ID: 1321)	30-Mar-2017	5/5 (100%)
History and Ethical Principles - SBE (ID: 490)	30-Mar-2017	4/5 (80%)
Defining Research with Human Subjects - SBE (ID: 491)	30-Mar-2017	4/5 (80%)
The Federal Regulations - SBE (ID: 502)	30-Mar-2017	4/5 (80%)
Assessing Risk - SBE (ID: 503)	30-Mar-2017	4/5 (80%)
Informed Consent - SBE (ID: 504)	01-Apr-2017	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	01-Apr-2017	4/5 (80%)
Research with Prisoners - SBE (ID: 506)	01-Apr-2017	4/5 (80%)
Research with Children - SBE (ID: 507)	01-Apr-2017	4/5 (80%)

Research in Public Elementary and Secondary Schools - SBE (ID: 508)	01-Apr-2017	4/5 (80%)
International Research - SBE (ID: 509)	01-Apr-2017	4/5 (80%)
Internet-Based Research - SBE (ID: 510)	01-Apr-2017	4/5 (80%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	01-Apr-2017	4/4 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	01-Apr-2017	1/5 (20%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?kbacb9050-79b0-4a43-a205-c21a93575a9b-22625089

Collaborative Institutional Training Initiative (CITI Program) Email: support@citiprogram.org Phone: 888-529-5929 Web:

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2 COURSEWORK RK TRANSCRIPT T**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Catherine Mbango (ID: 6233592)
- **Institution Affiliation:** Texas Woman's University (ID: 1959)
- **Institution Email:** cmbango@twu.edu
- **Institution Unit:** Nursing
- **Phone:** 2818536602

- **Curriculum Group:** Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Record ID:** 22625089
- **Report Date:** 01-Apr-2017
- **Current Score**:** 81

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Students in Research (ID: 1321)	30-Mar-2017	5/5 (100%)
Texas Woman's University Institutional Page (ID: 14186)	15-Mar-2017	No Quiz
History and Ethical Principles - SBE (ID: 490)	30-Mar-2017	4/5 (80%)
Defining Research with Human Subjects - SBE (ID: 491)	30-Mar-2017	4/5 (80%)
Belmont Report and CITI Course Introduction (ID: 1127)	01-Apr-2017	3/3 (100%)
The Federal Regulations - SBE (ID: 502)	30-Mar-2017	4/5 (80%)
Assessing Risk - SBE (ID: 503)	30-Mar-2017	4/5 (80%)
Informed Consent - SBE (ID: 504)	01-Apr-2017	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	01-Apr-2017	4/5 (80%)
Research with Prisoners - SBE (ID: 506)	01-Apr-2017	4/5 (80%)
Research with Children - SBE (ID: 507)	01-Apr-2017	4/5 (80%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	01-Apr-2017	4/5 (80%)
International Research - SBE (ID: 509)	01-Apr-2017	4/5 (80%)
Internet-Based Research - SBE (ID: 510)	01-Apr-2017	4/5 (80%)

Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	01-Apr-2017	4/4 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	01-Apr-2017	1/5 (20%)
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	01-Apr-2017	4/5 (80%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?kbacb9050-79b0-4a43-a205-c21a93575a9b-22625089

Collaborative Institutional Training Initiative (CITI Program)

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Table 1

Integrative Literature Review

Authors	Publication Year	Sample/Setting	Independent Variable	Dependent Variable	Research Design	Data Collection Process	Summary of Findings	Identified Strengths	Identified Weaknesses	Level of Evidence (Polit & Beck Hierarchy)
Kuhlenschmidt, Reeber, Wallace, Chen, Barnholtz-Sloan, & Mazanec	2016	<i>N</i> = 91 patients Inpatient convenience sample of bone marrow transplant adult patients	Printed patient education and video	Patient's perceived fall risk	Two-group, prospective, randomized controlled design.	Pre & post patient perceived fall risk surveys, 15 patient education sheets, and four videos. Data was collected at admission, at 24 and 72 hours after	Statistical significance was found in patients who perceived themselves to be at high risk for falls despite perceiving themselves as low risk prior to the intervention (<i>p</i> = 0.01). No significant changes were found in confidence or willingness to ask for assistance in both intervention and control groups. Most commonly used education	Patient education based on the patient's perception of their fall risk.	Convenience sample from one site; data may not be generalizable to other cancer centers. Tools were developed by PI and	Level I

						consent, and a discussion with the research nurse	sheet of fall risk factors was diuretic pills and heart, antianxiety, and antidepressant medications. Two patients fell in the control group; rated themselves as low perception of risk, no patients fell in the intervention group.		consisted of a single item, limiting the scope of assessment.	
Huang, L., Ma. W., Li. T., Liang, Y., Tsai, L., & Chang, F.	2014	<i>N</i> = 68 Continence sample of oncology patients admitted in a Medical Center in	Pretest and post-test self-report questionnaire, and 20 min Fall Prevention	Fall incidence with and without the program	Quasi-experimental design	A 45 item questionnaire; pretest and post-test of knowledge and self-efficacy on admission and on day 3. Fall	60 participants completed the FPPP, average score was 3.82 (total possible score was 10 points), (<i>SD</i> = 1.67; range 0-7). Fall risk scores exceeded three points in 75% (<i>N</i> = 45) of participants who were	Small convenience sample in a single hospital, self-reported data, study design	Convenience sample, Fall Prevention Participatory Program (FPPP) for	Level V

		Taiwan	Participatory Program (FPPP).			incidence data was collected from hospital records.	categorized as high-risk. Statistical significance ($p < 0$.001) of scores on fall prevention knowledge at pretest were 70.7% (moderate level), and 88.8% at post-test was noted. Statistical significance difference in fall incidence rate was observed with 0.0% and without 19.3% the program.	compared two different groups at two different periods	oncology patients was developed by PI.	
Hempel, Newberry, Wang, Booth, Sahnman,	2013	59 Studies published over a period of 28 yrs.	Fall prevention interventions (risk	In-hospital incidence Rates Ratio (IRR) falls	Systematic review.	Study data abstraction utilizing a random effects model	Positive changes were reported by the majority of the authors. 17 publication reported a statistical test, 8 indicated	Multiple component approach to fall	Sensitivity and specificity of well-known	Level V

Hohnsen, Shier, Saliba, Spector, & Ganz.		Acute care hospitals; participants ranged from	assessment, post fall evaluation, patient & family education, care, safety, and toileting, clutter-free environment, awareness posters, low beds, call lights, nonskid socks etcetera).			estimating the IRR and 95% CI.	significant improvement. Five out of 11 studies with concurrent controls reported pooled intervention effect (IRR) was 0.92 (95% CI=0.65-1.30; <i>p</i> = .64), while the intervention effect across historic control studies (IRR) was 0.77 (95% CI=0.50-1.18; <i>p</i> = .23).	prevention was noted in the majority of the studies	published validated tools are limited and more than half of the included studies developed their own tools, for which no psychometric data were reported.	
Choi, Lawler,	2011	34 studies that	Patient-related	Fall rate	Quantitative	27-item checklist	This review identified three	The review	Two	Level V

Boenecke, Ponatoski, & Zimring.		tested multifaceted fall prevention interventions in U.S. acute care hospitals.	and environmental risk factors		systematic review without meta- analysis	developed by Downs and Black (1998)	domains; physical environment, care processes and culture, and technology as factors associated with falls. Only a few hospitals were identified to have introduced environment related interventions, and most implemented a number of care process-related interventions.	assessed multifaceted fall prevention interventions, single environment- related, single care process and culture- related, and single technology- related interventions.	independent reviewers were not involved in the study selection process, multifaceted interventions made it difficult to isolate the effect of an individual intervention; which intervention	
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									resulted in reduction or no reduction in falls.	
Stone, Lawlor, & Kenny.	2011	Seven studies examined risk factors for falls and 1 study examined the diagnostic accuracy of a screening tool in the United Kingdom:	Risk factors for falls in patients with cancer	Fall incidence	Cross-sectional study design; systematic literature review of published studies in 2002-2009.	A standardized table was used for data extraction on risk factors. The Australian National Health and Medical Research Council (NHMRC) was used to determine the study design and level of evidence.	A literature review of seven studies aimed to investigate the risk for falls in patients with cancer. Descriptive data analysis findings suggest that patients with cancer have a high risk of falling but further research is required to determine the principle fall risk factors. Identification of risk factors will lead to the development of strategies to reduce risk and informed	Study quality was individually assessed by two authors. Inpatient setting variables were found to be associated with falls in univariate analysis; age,	Incomplete search of gray literature, limited hand search for articles, and inadequate definition of cohorts in individual studies.	Level V

							decision-making regarding use of any medications shown to increase falls risk.	low blood pressure etcetera.		
Allan-Gibbs	2010	Eleven studies. Participants ranged from $N =$ 51to 1,082.	Characteristic s of patients with cancer that may contribute to fall risk.	Fall incidence	A review of literature; Quantitative exploratory quantitative retrospective, observational , prospective, descriptive case- controlled	Electronic literature search and a review of the literature table with the following headings; study, purpose, design and sample, findings, and strengths, and	Eleven studies examined falls in hospitalized patients with cancer from 1985-2009. Descriptive findings demonstrated that a better understanding of specific oncology risk factors that contribute to falls in this population is needed. Further research is needed to understand diagnosis-specific	Review of literature examined patients with cancer and hospital fall- prevention studies as well as the characteristics that may	Studies were inconclusive on how patients with cancer differ from other hospitalized patient populations in fall rates and	Level III

						weaknesses.	groups that may have different risk factors for falls.	contribute to fall risk in this population.	outcomes.	
Capone, L. J., Albert, N.M., Bena. J. F., & Morrison, S. M.	2010	<i>N</i> = 1,000 plus Tertiary care medical center.	Patient characteristic that could be predictors of a fall event.	Fall incidence	Descriptive prospective and retrospective medical record review.	Descriptive prospective data was collected by clinical staff soon after fall. Retrospective data were collected from the medical record after discharge. PI trained data collectors and quality	Data was collected from February 2006 through January 2007. 158 falls were actualized during the study period. 20 patients (13%) had more than 1 fall, of which 17 had 2 falls, 2 patients had 3 falls, and 1 patient had 4 falls. Injury rats	Study reviewed various characteristics of patients with cancer who fell. Characteristic included age, gender, comorbid conditions, cancer	Potential error in data collection and reporting results due to the variation in the definition for patient fall or fall characteristic s. Unequal sample size	Level VI

						assessment were conducted intermittently to ensure accuracy.		diagnosis, clinical characteristic, length of hospital stay, fall characteristics .	of 2 populations.	
O’Connell, Baker, Gaskin, & Hawkins.	2007	Retrospective = 97; prospective = 5 oncology participants	Fall-Risk Assessment Tool (FRAT); items include demographics , prior history of falls, continence issues,	Fall incidence	Retrospectiv e and prospective design.	Medical record extraction of demographic data, prior fall history was measured using a single item question, continence issues	Prior fall within the past 12 months was reported in participants with mean age (M =7 5, $SD=13$) than those who had not fallen ($M = 70$, $SD=15$; $P < .00185$, $d=0.37$). Number of days from admission of patients who fell during current admission ($M = 12$ days,	Study assessed prior fall history, physical functioning status, orientation status, muscle strength, and	Small sample size of prospective study	Level VII

			physical functioning, confusion, orientation (person, time, and place), muscle strength, and fatigue.			were assessed using two-items; urgency and overnight need to use the bathroom. Physical function was measured through participant self-reported answers on ECOG scale. Bedside confusion and orientation in person, year, month, and place	<i>SD</i> = 7). Almost one third (<i>n</i> = 10) of participants reported urgency to go to the toilet, and FRAT measures of fallers had a lower state of functioning than nonfallers. Fallers were more confused and slightly less oriented than nonfallers.	continence issues of participants		
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						were extracted from a modified mini-mental state examination.				
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Table 2

18-Item Data Collection Instrument Shell Table

Incident Ref	Age	Gender	Diagnosis	Admission Date	Discharge Date	Date of Fall	Hospital Days prior to fall	Time of fall

Exact location of fall	Number of days after fall to discharge	Hester Davis Fall Risk Score before on Admission	Bed Alarm On	Non-slip footwear	Bedside Commode	Contributing factors	Activity prior to fall	Description of event