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Reducing Patient Falls and Decreasing Patient Safety Attendant Utilization With CareView Communication Technology

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This is to certify that the doctoral study by

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MBA, University of Phoenix, 2011

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Project Submitted in Partial Fulfillment

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Doctor of Nursing Practice

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Abstract

Attention to quality outcomes, cost reduction, value-based purchasing, and improved initiatives for hospital-acquired conditions (HACs), as well as labor utilization savings, provide a foundation for hospitals to achieve safety and quality outcomes. Falls resulting in fractures, joint dislocation, or other physical injuries are considered HACs and can produce unexpected consequences such as an increase in costs related to an increased length of stay. The CareView Communications system, a fall prevention management program that uses video surveillance technology, offers a strategy to prevent patient falls by customizing patient rounding, conducting fall risk assessments, and generating reports. Guided by Donabedian's framework, this project evaluated the effectiveness of implementation of CareView video monitoring to decrease falls, avoid falls with injury, and reduce use of the patient safety technician on the hospital's telemetry and neurological unit. One year of preimplementation fall data were compared to 1 year of postimplementation data to measure the video monitoring (VM) system effectiveness in fall reduction. Although there was a reduction in the number of falls on the neurological (4.08 to 3.24/1,000 patient days) and the telemetry (2.92 to 1.96.1,000 patient days) units, the results were not statistically significant. The results of this project could contribute to positive social change by helping to determine the effectiveness of the CareView system in reducing falls and identifying strategies for implementing the use of the VM system to reduce patient falls and enhance patient safety.

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Dedication

This project is dedicated to my 13-year-old daughter, Heaven, for her continual support and dedication. There are many times we missed bonding and activities for her Mom to meet deadlines and achieve this degree. Heaven, I hope this will remind you "whatever you put your heart to, you can accomplish" and "whatsoever ye do, do it heartily, as to the Lord and not unto men" (Colossians 3:23). I love you always!

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Section 1: Overview of the Evidence-Based Project

Fall prevention is a ubiquitous challenge for healthcare organizations across the country. In October 2008, the Centers for Medicare and Medicaid Services (CMS) introduced the prospective payment system, *value-based purchasing,* where quality and cost are connected to outcomes. This payment system rewards hospitals for making ethical decisions with regards to patients quality outcomes. Third-party payers are adhering to these guidelines by lowering reimbursement when a hospital-acquired condition (HAC) occurs. Falls that result in fractures, joint dislocation, head injuries or other physical injuries are considered HAC and are subject to lower rates of reimbursement (Burtson & Vento, 2015). In addition to altering a patient's physical outcomes, there are secondary effects due to a fall in the hospital. These include increased length of stay, higher costs of care, increased fear of falling for patients and caregivers alike, as well as emotional distress (Burtson, & Vento, 2015).

Healthcare organizations need to change the care delivery system to meet the demands of quality patient care. Private and government agencies are requiring that hospitals improve their performance year-by-year. The Joint Commission (TJC) hospital accrediting agency pursues opportunities to improve health care for the community. TJC does this in collaboration with other stakeholders by surveying health care organizations and inspiring them to provide safe and effective care of the highest quality and value (TJC, 2015).

Problem statement

Patient falls create a substantial financial burden for hospitals and increased suffering for patients who develop an injury after a fall. Injuries after a fall in an acute care setting can cause additional morbidities such as psychosocial trauma and an increased risk of mortality,

particularly in the elderly population (Votruba, 2016). Video monitoring (VM) is as an alternative to the direct observation of patients at risk for falling among hospitalized adult patients. The use of VM intervention has the potential to reduce falls and improve patient outcomes while simultaneously lowering cost by eliminating the use of patient care attendants who monitor the patient directly at the bedside (Klymko, 2016). About 1 million falls occur in an acute care setting in hospitals in the United States annually. Not including litigation cost, fall-related costs with or without an injury in hospitals range from $3,500 to $27,500. In 2008, CMS challenged hospital reimbursement for preventable HAC falls that resulted in injury (Klymko, 2016).

Project questions

The following questions guided this project:

1. Does CareView technology contribute to the reduction in the number of falls and falls with injury on neurological and telemetry units?
2. Does CareView technology decrease the utilization of a patient safety attendant for patients qualified for the use of the technology?
3. Does CareView technology contribute to achieving a fall rate below 2.5/1000 patient's days?

Purpose Statement

The purpose of this project was to evaluate the implementation of CareView's VM technology on the Neurological and Telemetry Units at the project site. The overall goal of this project was to decrease falls with injury and patient safety attendant utilization through the use of

VM technology (CareView) at a hospital located in Florida on the neurological and telemetry units.

Proposed outcomes for CareView VM are a reduction in patient safety attendant utilization and to decrease the number of falls and injury below the division goal of less than 2.5 falls per 1,000 patient days. Hospitals across the country are using Patient Safety Attendants, often called sitters, despite limited evidence for their use. The cost for Patient Safety Attendants use has increased over the past decade, creating cost-related issues that are not reimbursed by third-party payers and cause a severe financial burden to hospitals (Rochefort et al., 2012).

Several researchers have not supported the use of a patient safety attendant as an effective intervention to reduce falls and harm to patients. Additionally, some researchers validated the high cost of this intervention to monitor patients closely. One researchers estimated the cost of utilizing a patient safety attendant ranges from $1,000 to $240,000 annually per hospital with an average of $51,800 per patient (Adams & Kaplow, 2013). Another researcher examined results from three hospitals using patient safety attendants that ranged from $233,000 to $565,370 annually (Adams & Kaplow, 2013). Insurance companies do not compensate for the cost of a patient safety attendant, although 59% of hospitals utilize them for safety and reduction of harm, despite a lack of evidence on its effectiveness (Adams & Kaplow, 2013).

The hospital's corporate quality branch established the fall rate benchmark for all acute care settings during the past decade at 3.0/1000 patient days. The data analytics system for all corporation hospitals was able to capture data as it relates to the range in fall rates among all acute care settings at 2.5/1000 patient days, which was set in 2016 for all hospitals across the company. The correlation between patient safety and quality outcomes is essential for a

healthcare leader to understand, as these directly impact patient wellness and the financial situation of an organization. The rate of change for healthcare organizations is rapid, meaning, it is crucial to develop a process to ensure the workforce can meet the stringent expectations required to keep patients safe.

Nature of the Doctoral Project

Falls are a serious problem for patients because they can generate multiple complications and have an enormous impact on their well-being. Common risk factors associated with patient falls are related to impaired mental state, visual and sensory deficiency, certain drugs, history of falls, and impaired mobility. Healthcare professionals must implement measures to provide a safe environment for patients by minimizing contributing risk factors (Trepanier & Hilsenbeck, 2014).

Reducing falls and injuries for a hospitalized patient is vital in improving their quality of life, as well as reducing morbidity and mortality. Hospitals must develop a process to minimize falls and injuries to reduce the financial expenses related to malpractice lawsuits and the loss of revenue due to lack of reimbursement and prolonged patient hospital stay (Votruba, 2016). Ultimately, reducing falls and injuries makes a difference in a hospital's bottom line.

There is growing evidence that supports the use of VM as a suitable alternative for utilizing patient safety attendants and actively reducing patient falls in the hospital. VM has been effective in cost reduction as it contributes to a decreased need for sitter utilization that can cost $240/day to $960/day for four patients (Votruba, 2016). VM is a cost-effective alternative to the direct observation of patients at risk for falling among hospitalized adult patients (Klymko,

2016). The use of VM intervention has the potential to reduce falls and improve patient outcomes (Klymko, 2016).

The CareView VM system was implemented in the following units: medical/surgical telemetry, orthopedics, and progressive care unit (PCU). These units were chosen due to high volumes and higher fall incidence. In this project, the neurological and telemetry units were selected because of the higher number of falls over a 12-month period (October 2015 through September 2016). This doctoral project evaluated the effectiveness of the CareView VM system on the fall rates for neurological and telemetry units by comparing fall rates and PSA use for a period of 12 months before and 12 months after implementation of the CareView VM system.

Significance to Practice

Hospital operating expenses have continued to increase year after year, resulting in poor financial margins. Value-based purchasing (VBP) places hospitals at financial risk due to reduced payments for which hospitals are pressured to aggressively manage costs and productivity, while simultaneously improving patient quality outcomes (Betka, 2012).

Falls are the most harmful events in hospitals, with about 3-20% of patients falling at least once during their hospital stay. Of these falls, about 30-51% result in injuries that include fractures, brain trauma or hemorrhage that leads to death at a rate estimated at 6-44% (Quigley & White, 2013). Falls are also the most expensive adverse events in hospitals and continue to be a major patient safety concern.

Patient safety concerns and HAC continue to lead medical malpractice as a topic of enormous interest among providers, healthcare institutions, policymakers and the general public (Bixenstine et al., 2014). Patient falls are considered a *never event*, which is defined as a severe

preventable condition that is very costly and associated with long-term disability and even death (Trepanier & Hilsenbeck, 2014). Hospitals across the country are experiencing malpractice lawsuits every day. Many cases are related to poor safety practices, leading to disability and death. A hospitalized patient that falls can experience a range of outcomes from no injury to minor, moderate and severe injuries, including death. The cost related to a serious injury can have an average cost of $22,368 per occurrence (Zecevic et al., 2012).

For example, a patient experiencing a preventable fall during their hospital stay can result in a hip fracture and a lawsuit settlement of up to 1.5 million dollars (CMS, 2008). The patient cost for any surgical intervention and treatment for hip fracture repair is not reimbursed to the hospital. Thus, legal settlements stemming from preventable falls are an additional expense to an organization's operating margins (CMS, 2008).

According to Jeffers et al. (2013), "The Centralized Video Monitoring (CVM) program goals include two primary 'target state' metrics: (a) decrease 1:1 sitter observation by a minimum of 50% per day or six patients with 1:1 sitters per day; and (b) decrease hospital fall rates under the National Database of Nursing Quality Indicators (NDNQI) benchmarks" (p. 304).

Notably, Denver Health demonstrated a first-quarter cumulative operation savings post implementation of the video monitoring of $392,000, which exceeded the original technology investment of $305,000. After a year and a half of operation, the CVM program has produced more than $2.02 million in deferred cost savings (Jeffers et al., 2013). Thus, the use of CVM as an alternative to the use of sitters for continuous observation of hospitalized adult patients can be beneficial to reducing costs associated with falls with injury (Klymko, 2016).

Implications for Social Change in Practice

This project aligns with Walden University's Positive Social Change Goal 1: "Leveraging Our Research and Networks" by using research to improve patients' quality of life by reducing falls and injuries. The results of this project could lead to positive social change by determining the CareView system as an effective patient health outcome strategy in reducing patient fall incidence. The increasing complexity of healthcare requires the professional nurse to investigate alternatives for providing safe, quality care with deliberate efforts to be effective and cost-efficient. Clinicians must know best practices can improve and optimize patient outcomes and satisfaction as they progress through the continuum of care (White & Dudley-Brown, 2012). The development of technology has been continuously expanding. VM technology provides an opportunity to reduce patient falls, decrease costs and can serve as a useful tool for nursing in monitoring patients at risk for falls.

Definitions of Terms

Centralized video monitoring: Innovative technology to perform remote video observation of patients to improve safety and decrease expense by reducing the use of patient safety attendant (Jeffers et al., 2013).

Fall: According to Agency for Healthcare Research and Quality (AHRQ) (2013, para. 1) is "A patient fall is defined as an unplanned descent to the floor with or without injury to the patient."

Hospital acquired conditions: Are adverse events considered to be preventable. The increasing number of HAC's augment mortality rates and Medicare cost every year (Sung-Heui, 2017).

Fall with injury: AHRQ (2013, para. 1) states "A fall may result in fractures, lacerations, or internal bleeding, leading to increased health care utilization."

Never event: Canterell (2016, p. 16) notes that these are "serious, preventable medical mistakes that should NEVER happen".

Patient safety attendant or sitters: are personnel used to observe one or more patients closely in direct line of sight. They are to intervene to prevent self-injury and promote safety. They are variable staffing based on the needs of the hospital making it difficult to accurately construct a hospital budget (Burtson & Vento, 2015).

Value-based purchasing: Is a Medicare program with strategies to align the national healthcare expense with lower cost and higher quality care. This program intends to improve the quality of care outcomes beginning with the fiscal year 2013 (Aroh, Colella, Douglas, & Eddings, 2015).

Summary

Patient safety is a priority for healthcare organizations, practitioners, and payers in hospitals across the world. Cunningham and Geller (2012, p. 195) stated "Patient safety is the prevention of healthcare errors and the elimination or mitigation of patient injury caused by healthcare errors." Hospital reimbursement is affected every time a fall-related injury occurs. The CMS initiative to alter reimbursement patterns is focused on reducing falls with injury by mobilizing organizations into putting their efforts on fall prevention strategies and abolishing injuries related to falls (Ambutas, 2017). The use of the VM technology is to aid in reducing falls and decreasing the utilization of PSA was considered an important step to an alternative to study further and research the utilization of the VM system in a process improvement initiative.

The next section addresses the background, context, and theoretical framework for this evidence-based project (EBP).

Section 2: Background and Context

The purpose of this project was to evaluate the implementation of CareView's VM technology on Neurological and Telemetry Units at the project site with the overall goal of decreasing the number of falls with injury and utilization of Patient Safety Attendants. The healthcare system in the United States is dynamic and demands healthcare professionals to improve quality outcomes for the patients served. CMS and other agencies have implemented performance improvement outcome measures to evaluate the quality of care provided by hospitals across the United States and identify specific standards related to nursing care.

A patient fall resulting in trauma is considered a HAC, and the hospital does not receive any payment for treatment related to the injury and cannot bill the patient. The most meaningful aspect of a fall with trauma or injury prevention, however, is the pursuit of safety for improved outcomes and patient quality of life (McEwen & Wills, 2014). Despite being preventable, one-third of the geriatric population across the country will experience a fall every year (Day Ramos & Hendrix, 2012). The likelihood of an older adult falling one or more times within the next year is 27-29 %, and these older adults will incur higher healthcare costs (Day Ramos & Hendrix, 2012).

Evaluating the effectiveness of early identification of patients at risk for injury poses the questions: (a) Does the CareView technology contribute to the reduction of falls and falls with injury on Neurological and Telemetry Units?; (b)Does CareView decrease the utilization of Patient Safety Attendant for patients qualified for the use of the technology?; (c) Does CareView technology contribute to achieving fall rate below 2.5/1000 patients' days? This section

expounds on the theoretical framework used to guide this EBP project, relevance to nursing practice, local background and context, and the role of the DNP student.

Approximately 10% of falls that occur within the elderly population in the United States happens during a hospital inpatient stay (McCarter-Bayer, Bayer, & Hall, 2005). Elderly patients experiencing a fall during hospitalization undergo significant changes in their health status because of the fall, and in some cases death. Regardless of efforts to decrease falls and falls with injury, older adults continue to fall due to debilitation related to their acute illness, polypharmacy, and medication side effects.

Hospitalized patients incurring a fall during their stay may experience anxiety and injury leading to loss of revenue from resulting necessary treatment and an increased length of stay, sometimes resulting in litigation. Patient falls in the acute care setting occur at a rate of 3 to 14 for every 1,000 patient days. Data from the National Patient Safety Agency (NPSA) reported over 200,000 falls from September 2005 to August 2006. This data is derived from 98% of inpatient services across the United States (Vass et al., 2009).

The cost of fall-related injuries can range from $5,808 to $29,450 based on data from a study on 57 patients at a mid-west hospital in the US from 2004 to 2006 (Weil, 2015). The injuries patients had included fractures, subdural hematomas, any injury resulting in a surgical intervention or death. Falls and falls with injury increase cost because of additional testing and treatment; they also increase the length of hospital stay for an extra 6.9 days (Weil, 2015).

Preceding the project implementation, a spreadsheet was designed for use by the PSA. The PSA were instructed on how to collect data for every shift (See Appendix 1). Information that was collected included a test of the alert system, risk score based on the MORSE fall risk

scale, phone number of nursing staff assigned to the patient, and information related to any falls experienced by the patient.

Theoretical Framework

The framework guiding this project was Donabedian's framework for quality improvement and is based on the relationships among the three concepts of structure, process, and outcome of the quality of care (McDonald et al., 2007). The Donabedian framework provides the staff with a defined process in the implementation of the VM system to reduce falls and patient safety attendants.

Figure 1 represents the Donabedian framework, whereby the structures of the hospital and staff care must follow the designed process to achieve a fall free unit, which is the expected outcome (Kettner, Moroney, & Martin, 2013). Achieving quality outcomes requires the implementation of certain processes which are to be followed to completion. The Donabedian framework provides a path where outcomes indicate the combined effects of structure and process.

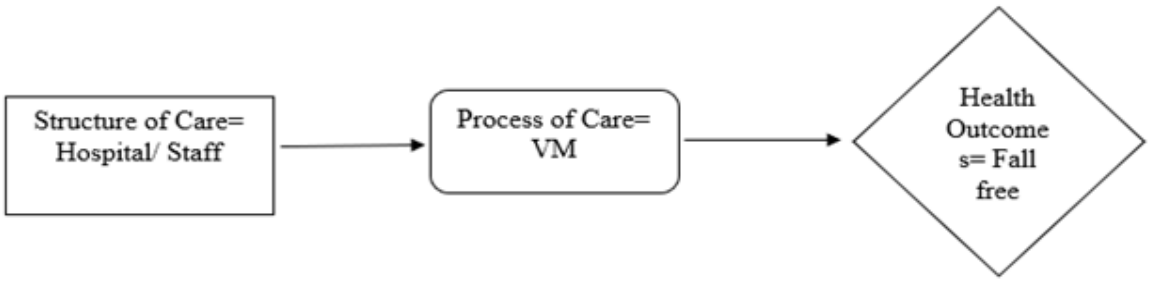

Figure 1. VM Adaptation to Donabedian framework.

According to Grove, Burns, and Gray (2013), quality of care is the "degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" (p. 294). The goal of outcomes research is assessing the results of a process. It is imperative to understand the process thoroughly by reflecting, explaining and observing the continuum of the expected result, as well as assessing if the implementation is executed as planned (Grove, Burns, & Gray, 2013).

According to Donabedian (1988), "Donabedian proposed using the triad of structure, process, and outcome to evaluate the quality of health care. Donabedian defined "structure" as the settings, qualifications of providers, and administrative systems through which care takes place; "process" as the components of care delivered; and "outcome" as recovery, restoration of function, and survival" (p. 1743).

For this project, the Donabedian framework structure is the facility, in this case, the hospital; the process link to the outcome is the VM system; and finally desired outcome is the reduction of falls in this organization. Donabedian's model provides a structure to focus on the outcome desired. This framework guided the health care administrators in identifying the location of the problem, which is the neurological and telemetry units, and the use of a process, the VM system, to achieve the desired outcome, which is a fall free organization. The outcome should be achieved by following the process of care; any alteration in the process of care can lead to differences in outcome (Liu, Singer, Sun, & Camargo, 2011).

Relevance to Nursing Practice

According to Stevens, Corso, Finkelstein, and Miller (2006):

> In 2000, there were almost 10,300 fatal and 2.6 million medically treated non-fatal fall-related injuries. Direct medical costs totaled 20 billion dollars for patient's death and 19 billion dollars for non-fatal injuries. Of the non-fatal injury costs, 63% (12 billion dollars) were for hospitalizations, 21% (4 billion dollars) were for emergency department visits, and 16% (3 billion dollars) were for treatment in outpatient settings. (para. 3)

Hospitals are engaging in performance improvement initiatives to ensure quality care and cost management (Betka, 2012). The improvement plans include quality outcome measures to decrease HAC because it has a direct correlation to the exorbitant cost of health care for patients experiencing falls. Cost of healthcare increase exponentially in relation to serious fall-related injuries. Fractures and subdural hematomas in the elderly population are associated with prolonged length of stay and increased skilled nursing care admissions. Deterioration in the patient's condition and the ability to perform activities of daily living are complications related to fall and injury. Researchers have suggested 60% of falls in an acute care hospital unit resulted in an injury (Brauer et al., 2012).

Studies found rates of falls doubling despite the significant increase in fall prevention efforts throughout the world. The need for effective injury prevention strategies has required a minimum to prevent morbidity and mortality rate related to fall (Brauer et al., 2012).

Falls contribute directly to increasing healthcare costs related to treatment management and an increased hospital length of stay. Patients continue to fall despite the use of fall risk assessment and prevention plan procedures (Bergman & Papendick, 2014). The strategic goals surrounding patient safety outcomes of a hospital include fall reduction and the elimination of falls with injury. Additionally, financial goals also include cost reduction by minimizing the use

of sitters. Empirical evidence supports that the use of direct observation attendants remains ineffective and costly as an intervention to improve patient safety outcomes. The patient safety attendant data does not reflect a correlation in the reduction in fall rates; research does not support continuous observation as a method to reduce patients' risk for falling and harm (Harding, 2010).

Fall prevention initiatives are essential to promote a safe environment for hospitalized patients. Fear of falling is a result of activity avoidance or restrictions due to the risk of falling, causing muscular dystrophy, an increased the risk for fall, depression, and impediment with regards to a patient the quality of life (Huang, Chung, Chen, Chin, & Wang, 2016).It is the responsibility of the nurse to understand and apply current EBPs with the objective of improving patient outcomes. The application of nursing processes requires an understanding of the desired outcome and the interventions to achieve such results. Providing quality health services to individuals and populations in pursuit of the desired outcome is consistent with present professional knowledge (White & Dudley-Brown, 2012).

Review of Literature

Over the past decade, many research studies have been carried out to identify risk assessments, risk reduction, and fall prevention tactics without consistent improvement. It is evident that many factors influence fall prevention and there is difficulty in attaining sustainable prevention efforts. Patients develop new risk factors for falls due to their disease process, effects of medication, treatment plans, unfamiliar surroundings and weakness due to prolonged decreased activity (Boye-Doe, 2017).

The effectiveness of clinical nursing performance is reflected in the patient's clinical outcomes, specifically in the form of nurse-sensitive indicators. Outcomes can be favorable or adverse and are measured using indicators or metrics to measure patient care outcomes while in a specific setting or hospital. The Institute for Healthcare Improvement (IHI), the AHRQ, CMS and TJC view falls as a HAC and preventable event. Pay for Performance incentives are forcing healthcare organizations to develop and sustain measures to prevent falls, reduce health-related injuries, and increase the quality of care in hospitals.

The innovative use of a remote VM system to monitor patients at risk to decrease falls and reduce the use of Patient Safety Attendant has been studied in the past. The use of VM in the inpatient setting provided an understanding of the precursors and interventions in the context of VM observations. The purpose was to explore contributing factors to falls in the acute care setting from the lived experiences of a diverse sample of expert health professionals, patient care assistants (1:1 safety sitters), VM technicians, nurses, and fall prevention experts (Klymko, 2016).

The identification of patients in need of VM was selected based on criteria such as the history of a previous fall, assessments that would indicate impaired judgment such as Clinical Institute Withdrawal Assessment (CIWA), Beers criteria, and the Orientation-Memory-Concentration Test. During the duration of the study, there was a decrease in 1:1 sitter usage with no related increase in falls. In fact, there was a reduction of 35% in falls. Despite specific criteria, 40 patients not meeting the predetermined measures fell during the study period (Votruba, Graham, Wisinski, & Syed, 2016).

The predetermined measures used were developed by a small workgroup involving two staff nurses, a clinical nurse specialist, and a clinical nurse leader. The specific measurements use was Morse Fall Risk scale, prior fall history, patient judgment and impulsivity determined by Clinical Institute Withdrawal Assessment (CIWA) score, and a positive confusion assessment (Votruba et al., 2016).

In a similar study, the VM program objectives were to decrease 1:1 sitter observation by 50% per day and reduce hospital fall rates to under National Database of Nursing Quality Indicators (NDNQI) falls per 1,000 patient days benchmark. On the first three months, the VM utilization contributed to preventing 57 falls. The estimated return on investment for this program was $381,323 excluding the initial technology investments. The deferred staff labor savings in the first quarter of operation was cumulative $392,000; this exceeded the cost of the original investment for this technology which was $305,000. After 18 months, the program produced more than $2.02 million in deferred cost savings (Jeffers et al., 2013).

A VM program in combination with a nursing-driven sitter protocol resulted in a 23.9% reduction in combined VM technician and sitter staffing in the first year according to a study by Burtson and Vento (2015). Savings were estimated at $771,919. During the second year of the program, there was a 53.6% reduction in combined VM technician and sitter staffing for an estimated savings of $1,718,823. The total cost of the VM initial startup cost, training, and annual service agreement in the first 24 months were $82,482. The return on investment calculated system-wide for over 2 years time frame was 29.2 times the initial investment (Burtson & Vento, 2015).

Local Background and Context

According to Kelsey, Procter-Gray, Hannan, and Wenjun (2012):

> Falls in older people are a significant public health problem. In the United States, about one-third of community-dwelling people aged 65 years or older fall each year, with about 10% of falls resulting in serious injury. These falls and injuries can lead to disability, loss of independence, and fear of falling. (p. 2149)

In 2012, the corporate office introduced a risk reduction plan to decrease falls with injury to every hospital in the organization. The motivation for this initiative was based on data indicating the failure to keep patients safe and reimbursement concerns for HAC. The data gathered for falls with injuries over five years show an increase in falls and the organization's financial revenue losses due to compensation and litigation. The corporate administrators decided to utilize technology to leverage patient safety initiatives on the reduction of falls with injury and the utilization of sitters.

The VM implementation plan arose as a performance improvement plan to improve patient safety and reduce use of PST. The cost for CareView was over $250,000 annually. Sitter utilization costs for 2016 was over $350,000. Moreover, there are funds on hold for three pending litigation cases from 2014 for 1.5 million dollars. The CVM program provides the ability to improve patient outcomes by reducing falls and subsequently reducing costs (Jeffers et al., 2013).

The VM system was installed in January of 2016. After the system installation, wireless connectivity issues were met, delaying the implementation on the units from February to March. During the month of January, nursing staff, leadership team, and ancillary departments were trained on how to use the system and phone alerts. The PSAs endured a more detailed training

for 16 hours in January of 2017. Nursing staff and PSAs were retrained the week prior to implementation in the month of March of 2016.

During the implementation and continuous evaluation of the fall prevention project, the need for additional safety technicians was recognized after the first week of implementation. The safety technicians are high-performing certified nursing assistants (CNAs) from various units. The Med/Surg unit had 50% of the CNAs participate in training with competency validation to be a safety technician for day and night shift coverage. The other nursing departments in the hospital provided 15-25% of CNAs to receive training to be certified as a PST.

Role of the DNP Student

During the master's degree practicum in 2008, a patient on the unit was readmitted post hip replacement due to acquired infection. This patient was not able to ambulate since experiencing a fall leading to a hip fracture. The patient required another surgical procedure to remove the prosthesis and insert a spacer until successful treatment of the infection, which was approximately 14 months from the initial surgery to expiration. The patient suffered depression and did not emotionally recover. This event influenced the decision to focus on EBP to reduce falls and injuries. In 2009, with a new nursing director in a busy Orthopedic unit, the team achieved positive fall prevention results by setting expectations with necessary interventions outlined in hospital policy for the nurses and ancillary staff.

Between 2012 to 2017, the doctoral scholar held executive leadership positions at different three hospitals with high fall rates. Over four months nursing protocol and strategies to reduce falls and injury on the inpatient nursing unit and the emergency department were re-

introduced. The unit directors were held accountable to ensure education, training, expectations, and accountability of each staff member. The doctoral scholar was able to examine organization systems, protocols, and practices to identify opportunities to improve health outcomes, ensure patient safety, strategically assess systems and pursue methods to bridge the gap using empirical evidence (Zaccagnini & White, 2011).

During the implementation of the VM system, the doctoral scholar functioned as the project manager coordinating with the leadership team and education director for pre-implementation, implementation, and monitoring of the CareView system. Meeting with the leadership team regularly provided an opportunity to share with them the rationale and goals for fall prevention initiatives and increased use of VM surveillance cameras. The leaders translate the goals into outcomes by inspiring the team as champions to achieve the vision. Leaders connect the hospital mission to the outcome (White & Dudley-Brown, 2012).

The DNP student's role in this EBP project was to research evidence, share the evidence, provide a defined process, collaborate with training, and assist the nursing leaders in this organization with the implemented falls prevention strategies to increase staff compliance, and decrease inpatient falls through continuous program evaluation. Observing the practice of the staff on duty during project implementation provided insight to the staff's level of understanding of the processes. Inconsistencies in practice were noted at various staff levels such as safety technicians making notes of noncompliance of a process without initiating the chain of command and nurses failing to communicate fall risk to the incoming shift.

These inconsistencies and noncompliance among staff members triggered additional interventions and direct participation of the department leaders. Reducing falls and injury to a

hospitalized patient requires a team effort. Every staff member on the unit must engage in following the intervention protocols and policies to achieve the expected outcome. The lack of consistency in practice was introduced at the Falls Prevention Committee with the participation of department leaders, where strategies were developed to overcome the challenges.

Nursing leaders must hold staff accountable to adhere to the standards of care and maintain a sustainable effort to reduce falls and injury (Ambutas, 2017). Standardization of interventions and consistency in practice generates sustainability beyond the initial implementation efforts. Sustainability ensures the processes become a regular part of the operations of the organization (Hodges & Videto, 2011).

Summary

The purpose of this project was to incorporate technology to improve rates in the reduction of falls in an acute care setting and to reduce costs by minimizing the use of Patient Safety Attendants. The Donabedian framework provides three essential steps to guide this project by introducing the relationship amid three concepts in structure, process, and outcome concerning the quality of care. Even with decades of research on fall reduction interventions and protocols, patients continue to fall in hospitals. The patients at risk in this project were identified using the MORSE scale, requiring various stakeholders' involvement to ensure proper bed placement (Terry, 2012). The introduction of the VM system project utilizes technology to provide direct observation of patients at risk and alerts the nursing staff to rescue a patient before a fall. The next section describes the methodology and proposed data analysis procedures for this project.

Section 3: Collection and Analysis

The purpose of this project was to evaluate the implementation of CareView's VM technology on the Neurological and Telemetry units at the project site. The overall goal of this project was to decrease falls with injury and Patient Safety Attendant utilization through the use of VM technology (CareView) at a hospital located in Florida on the neurological and telemetry units.

Eight percent of patients sustain moderate to severe injury after sustaining a fall in a hospital. The injuries range from a laceration to fracture, subdural hematoma, or death. Patient safety is a priority for patient's quality care delivery. Hospitals are trusted to guard patients against injury and provide a safe environment and simultaneously provide high-quality care (Graham, 2012). Hospital leaders, physicians, and nurses must be very clear on processes to provide quality and efficient patient care due to declining reimbursement, staffing shortage, and transparency on patient outcome (Graham, 2012). Achieving organizational quality and patient safety goal is an important element for organizations adapting to changing the environment. The delivery of safe, effective, and efficient care is hindered by unproductive work processes and outdated physical conditions (Lavoie-Tremblay et al., 2014). This section expands on the practice-focused questions; purpose statement; assumptions and limitations; prevalence and incidence; source of evidence; approach with the setting; project evaluation plan; method; data collection instrument; analysis; and the protection of human subject.

Practice-Focused Questions

This quality improvement evaluation project included the following questions:

1. Does CareView technology contribute to the reduction in the number of falls and falls with injury on a Neuro-Telemetry unit (NTU) and Medical-Telemetry unit (MT)?
2. Does CareView technology decrease the utilization of a Patient Safety Attendant for patients qualified for the use of the technology?
3. Does CareView technology contribute to achieving a fall rate below 2.5/1000 patient days?

Purpose Statement

The use of advanced technology to prevent falls is not entirely understood. VM can provide an understanding of the origin of patient falls through concurrent observation of hospitalized adult patients (Klymko, 2016). The overall goal of this quality improvement evaluation project was to evaluate the implementation of a VM system designed to decrease falls and falls with injury using CareView technology monitored by PSA on the neurological and telemetry units, and ultimately to demonstrate a reduction in the use of PSAs. Although the benchmark of 2.5/1000 patient days was set in 2016 for all hospitals across the company, the goal has not been achieved. Rates are as follows:

Table 1

Fall Rates of Neurological and Telemetry Units (Preintervention, March 2016-March 2017)

Date	Telemetry Unit	Neurologic Unit
Apr-16	2.95	5.68
May-16	1.88	3.10
Jun-16	1.06	5.61
Jul-16	0.96	3.70
Aug-16	2.11	4.31
Sep-16	5.63	6.28
Oct-16	2.96	4.10
Nov-16	2.15	2.11
Dec-16	5.91	6.75
Jan-17	3.62	0.00
Feb-17	0.00	5.42
Mar-17	5.91	5.91

Assumptions

An assumption of this project is that nursing staff is to identify patients at risk for falls based on the Morse Fall Scale (MFS) and initiate transfer of patients to designated VM rooms. Another assumption is that nursing supervisors would be assigned newly admitted patients to a VM room based on a high-risk score on the MFS.

Approach

The Setting

The CareView VM system has been implemented in the following units: telemetry, 0rthopedics, medical/surgical, and progressive care unit (PCU). These units were chosen due to

high volumes and higher fall incidence. For this project, Neurological and Telemetry Units were selected because of the higher number of falls over 12 months (September 2015- September 2016).

The neurological unit is a 40 semiprivate bed unit, specializing in neurological disorders including a diagnosis of stoke, transient ischemic attack, seizures, and various low-risk cardiovascular conditions. This unit remains full during this year except for blocked beds for patients in isolation rooms. The staffing for this unit includes a director, mnager, 4 charge nurses, 28 registered nurses (RN), 6 licensed practical nurses (LPN) and 14 CNAs. The nurse to patient ratio is 6:1 for RNs and 15:1 for CNAs. Fall rate for 4 South unit was historically the highest in the hospital related to various factors such as high turnover rate and high vacancy rate (See Table 1).

The telemetry unit is a 40 semiprivate bed unit, specializing in medical conditions such as chronic obstructive pulmonary disease (COPD), pneumonia, clostridium difficile infections, diabetes, urinary tract infections, altered mental status, and gastrointestinal bleeding, among others. Surgical cases include cholecystectomy, appendectomy, colectomy, wound debridement and others. The unit is at 85-90% capacity with many rooms blocked due to isolation. The unit is comprised of a director, manager, 4 charge nurses, 24 RNs, 4 LPNs and 14 CNAs. The nurse to patient ratio is 6:1 for RNs and 15:1 for CNAs. Fall rate for the MT unit was the 2nd highest in the hospital (See Table 1).

Sources of Evidence

The CareView monitoring system produced a monthly report with the total number of patients in monitor room compared to the total number under surveillance (arm rails) (Appendix

2). During data collection, the project variables such as responsiveness of staff to alerts and proper bed assignments to patients at risk for fall were considered through observation, review of the fall risk assessments, interviews with nursing staff, the function of the CareView and alert systems, staff debriefing, and daily review of the data. The data for falls on the units were gathered via an occurrence reporting system reviewed by the risk manager at the monthly fall prevention meetings. CareView system data and spreadsheet data analysis were also shared with nursing leaders and participating staff at the committee meeting.

Project Evaluation Plan

The project evaluation plan was based on a summative evaluation by comparing the pre-implementation fall rates to the 12-month period post evaluation fall rates to assess the effectiveness of the VM monitoring system utilization in reducing falls and injuries. Prior to the VM system data collection, the use of PSAs before and after the VM implementation was observed to confirm reduction in 1:1 PSA utilization-related cost (Hodges & Videto, 2011).

Process of Implementing of VM

The project evaluation started during the planning phase and the decision to embark on the implementation of a new technology required the input of various stakeholders. The implementation of a process or practice change for the nursing staff needed planning. Part of planning is the consideration of variables and method of evaluating the outcome. An evaluation of patient outcomes was performed throughout the operational plan (Terry, 2012).

Ongoing evaluation of the process is necessary to translate the evidence into practice (White & Dudley-Brown, 2012). An organized system to collect information regarding activities, characteristics, and results of a program is an evaluation. The evaluation process aided

the program lead to make decisions regarding the program's effectiveness and provided a guide for future program development. Program evaluation has to consider the implementation, effectiveness, efficiency, cost, and attributes during the project as a whole (Hodges & Videto, 2011).

A specific project must have a distinct evaluation method. An evaluation should be developed thoughtfully to measure the success or failure of the project. The project manager has to integrate the evaluation method during the planning process. The appropriate method includes various types of data and expected outcomes (Zaccagnini & Waud White, 2011).

Distinctive tools were developed to track daily patients at risk using the MORSE scale, the functionality of the alert system by performing a test every shift, recording time to respond to an alert into a patient room with impending fall risk and an end of shift report with rationale for any patient who were being observed on VM. Also, for any patient falls, a debriefing was performed to identify opportunities related to personnel or systems.

The fall rate for the Neurological and Telemetry Units for the April 2016 to March 2017 period was used as a baseline and compared to the current month over month. The falls data was obtained from the risk management department via a report. The patient safety technician utilization baseline was derived from 2016 data and the hospital supervisor's data spreadsheet to exclude behavioral health patients requiring this close observation.

The education and training of the VM system and processes provided to safety technicians were performed with the collaboration of the VM company (CareView) and the hospital educators. Training and education of the staff occurred through classroom presentations and hands-on use of software and equipment, discussion of standard workflows, and simulation.

Competency evaluation tools were used to validate knowledge and understanding of the system and processes being implemented. Leadership and ancillary staff were educated regarding the surveillance and their role in keeping patients safe and responding to alerts with nursing staff.

Activities that the DNP student performed to ensure the implementation process plans are as below:

- Evaluation of system with vendor and safety technicians.
- Coordination of patient transfers into monitoring rooms.
- Developing reports with Information Technology and Systems (IT&S) for automatization of emails of all patients with MORSE assessment.
- Working with technicians on shift reports and system testing.
- Implementation of audible alert testing to all iPhones at 0900 & 2100 to ensure all staff receives messages for prompt response for patients trying to get out of bed.
- Coordination of weekend supervision training and validation of competency with CareView system and process.
- Validation of data collection process with PSA and trained supervisors to collect reports at the end of the shift.
- Initiation of staff meetings with safety technicians weekly for the first month, then monthly.
- Rounding on staff to observe and identify opportunities for re-education.
- Evaluating the pros and cons of Safety Technicians 6 hours compared to 12 hours shift.

- Identifying education opportunities for nursing staff related to responsivities to alerts (Specific units and staff needs). When staff responded to alerts, they must be visible to the camera to ensure someone is with the patients.
- Monitoring safety techs, reviewing the MORSE Scale Score and validating with charge nurses or supervisors every shift and on admission.
- Developing competency and validation by training super-uses (program manager and supervisors).
- Identifying gaps inconsistency related to safety tech performance and compliance to process.
- Participation in unit specific huddles to ensure awareness and answer questions on the monitoring system.
- Evaluating data collection tools for the reliability of the information gathering.
- Leading monthly fall prevention interdisciplinary team committee.
- Recommending adding additional safety techs to pool and provide education and validation of competency.
- Evaluating the safety technician's performance.
- Monitoring troubleshooting of the alert messages to iPhones every shift and reported discrepancies to the Information Technology team.
- Performing rounds on units to ask questions on the functionality of the monitoring system and notifications.
- Evaluating consistency in practice in process expectation as per initial implementation.
- Debriefing with staff involved with any patients who experienced a fall.
- Investigation of possible CareView system failure related to a patient fall.

Data Collection Instrument

The Patient Safety Attendant documented on the PST Shift Log (Appendix A), nurse leaders' daily process was to review patient fall/patient safety attendant utilization log (Appendix C), and the PST Shift Morse Scale Log (Appendix B) every shift. The instruments listed were used to collect data every shift and to aggregate the information weekly and monthly for reporting purposes.

Daily, weekly, and monthly data collection and analysis assisted in evaluating the effectiveness of the process in place and the need for prompt changes to attain positive outcomes. Data collection include accurate documentation of the study interventions and any deviation from protocols (Grove, Burns, & Gray, 2013).

Data Analysis

Aggregated data obtained related to the use of the VM system was triggered by the CareView technology system. Spreadsheet use by patient safety technicians was gathered daily and compiled to assess the sustainability of the process. Patient fall data were gathered through risk management and during debriefing. Line charts were used to track patient fall rates every month to analyze and determine trends in the rate of patient falls throughout the program and were presented at the monthly Fall Prevention Committee meetings.

Protection of Human Subjects

The human subject risk is minimal; however, Walden's Internal Review Board (IRB) approved the project (IRB Protocol number 10-25-18-0521054). Since the purpose of this project is to evaluate the reduction of falls and decrease use of sitters in an acute care setting by implementing the VM technology, human subjects were not involved and de-identified

aggregate data was used for the analysis. Data collected consisted of information obtained from the spreadsheet provided by the organization. Spreadsheets used for data collection will be used solely for this intent and discarded appropriately.

Summary

Fall prevention strategies are used to develop initiatives to reduce patients falls in acute care settings. The VM fall reduction project is a technology deployed at this organization specifically on two units to evaluate the use of this equipment to reduce falls and abolish injury. The success of this project is related to the use of EBP to guide clinicians to continue to improve patient outcomes. The principal objective of the implementation of the Falls Reduction Program is to improve nursing practice (Breimaier, Heckemann, Halfens, & Lohrmann, 2015).

A systematic approach to the use of the VM system for fall prevention was provided to employees through improved monitoring by staff and more education (Abraham, 2011). Assessing the performance measure of the project is fundamental in obtaining feedback on the project efficiency, quality, and effectiveness (Kettner, Moroney, & Martin, 2013). Cultivating the input from staff involved in this project is essential to ensure an efficient and effective process is in place to attain project objectives. Adherence to stakeholder suggestions in making modifications to strategies facilitates the achievement of practical measures to secure sustainable outcomes. Data collection planning requires information to provide answers to the practice-focused questions.

Section 4: Findings and Recommendations

The purpose of this quality improvement evaluation project was to determine if CareView technology contributes to the reduction in the fall rate on the neurologic and medical/surgical unit at the target hospital.

The principal reason elderly patients visit the emergency department and are hospitalized is related to a fall which is the leading cause of death related injuries in the United States. Ongoing population survey validates a high risk of falls 25-30% in individuals 65 years, or older and an increase to 40-50% on the elderly group age of 80 years and above (Albert & King, 2017).

Healthcare organizations are investing the enormous amount of resources in fall prevention initiatives to improve patient outcomes because falls with injuries are causing major problems for hospitalized patients related to morbidity and mortality and the organization increased cost (Mitchell, 2018). The pursuit for strategies to decrease fall-related injuries and improve quality outcomes is a quest many organizations are mandated to pursue diligently, not only because of the financial implication but because of the desire to keep patients safe.

The following questions guided the DNP project:

1. Does CareView technology contribute to the reduction in the number of falls and falls with injury on a Neurological and Telemetry Units?
2. Does CareView technology decrease the utilization of a Patient Safety Attendant for patients qualified for the use of the technology?
3. Does CareView technology contribute to achieving a fall rate below 2.5/1000 patient days?

Analysis methods

Data were imported into and analyzed using SPSS version 23 for Windows (IBM Corp., Armonk, NY). Descriptive statistics such as mean and standard deviation were used to summarize the fall rate data for each unit. Normality of the data was examined using the Shapiro-Wilk tests. A p value > 0.05 for the Shapiro-Wilk test indicated that the data were normally distributed. Paired t tests were used to determine if CareView technology contributes to the reduction in the fall rate on the Neurological and Telemetry Units. Line charts of the fall rates were created using Microsoft Excel. For any test, a p value less than 0.05 indicated significance. All p values were 2-sided.

Findings and Implications

Figure 1 shows the month-to-month comparison of fall rates for the telemetry unit before and after the implementation of CareView technology (preintervention period: April 2016 to March 2017; postintervention period: April 2017 to March 2018).

To address the first question, fall data was compared for a 12- month period before and after VM implementation. The fall rate generally decreased on the Medical-Surgical unit (See Table 2.1) and Neurologic Unit (see table 2.2) after VM implementation, however, the fall rate was higher for 3 separate months on the Medical-Surgical Unit (April, August, and February) and Neurologic Unit (August, September, and January) after VM implementation.

Data of the Medical Surgical and Neurological units were provided (See Tables 1 and 2) for this data analysis project.

Table 2

Data for Telemetry Unit

Preintervention				Postintervention			
Date	Number falls	Number injuries	Fall rate	Date	Number falls	Number injuries	Fall rate
Apr-16	3	0	2.95	Apr-17	4	0	4.07
May-16	2	0	1.88	May-17	2	0	1.86
Jun-16	1	0	1.06	Jun-17	0	0	0.00
Jul-16	1	0	0.96	Jul-17	0	0	0.00
Aug-16	2	0	2.11	Aug-17	3	0	3.18
Sep-16	5	0	5.63	Sep-17	4	0	3.83
Oct-16	3	0	2.96	Oct-17	1	0	0.95
Nov-16	2	0	2.15	Nov-17	1	0	0.95
Dec-16	6	0	5.91	Dec-17	0	0	0.00
Jan-17	4	0	3.62	Jan-18	3	0	2.8
Feb-17	0	0	0.00	Feb-18	4	0	4.8
Mar-17	6	0	5.91	Mar-18	1	0	1.1

Table 3

Data for Neurologic Unit

Preintervention				Postintervention			
Date	Number falls	Number injuries	Fall rate	Date	Number falls	Number injuries	Fall rate
Apr-16	6	0	5.68	Apr-17	4	0	4.05
May-16	3	0	3.1	May-17	3	0	2.78
Jun-16	5	0	5.61	Jun-17	4	0	3.92
Jul-16	2	0	3.7	Jul-17	2	0	2.02
Aug-16	4	0	4.31	Aug-17	7	0	6.78
Sep-16	6	0	6.28	Sep-17	7	0	6.71
Oct-16	4	0	4.1	Oct-17	2	0	1.97
Nov-16	2	0	2.11	Nov-17	0	0	0.00
Dec-16	7	0	6.75	Dec-17	0	0	0.00
Jan-17	0	0	0.00	Jan-18	6	0	5.6
Feb-17	5	0	5.42	Feb-18	1	0	1.1
Mar-17	6	0	5.91	Mar-18	1	0	1.1

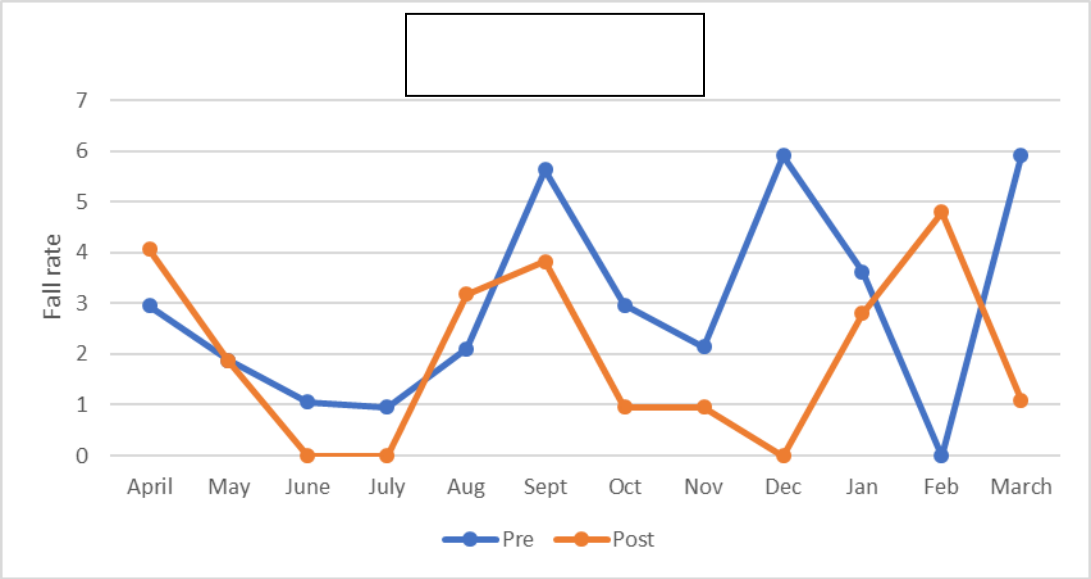

Figure 2. Line chart of pre-and-post intervention fall rates for telemetry unit.

Table 3 shows the descriptive statistics of fall rates for the telemetry unit. According to the results of the Shapiro-Wilk tests, the data were normally distributed ($p > 0.05$). The mean fall rates were 2.93 ($SD = 2.00$) and 1.96 ($SD = 1.72$) for before and after the intervention of CareView technology, respectively. Based on the results of the paired t-test (Table 4), although the mean pre-implementation fall rate ($M = 2.93$, $SD = 2.00$) was lower than the mean postintervention fall rate ($M = 1.96$, $SD = 1.72$), the difference was not statistically significant ($t(11) = 1.214$, $p = 0.250$).

Table 4

Descriptive Statistics of Fall Rates for Telemetry Unit

					Shapiro-Wilk		
	M	*SD*	*Min*	*Max*	Statistic	*df*	*p*
Pre	2.93	2.00	0	5.91	0.914	12	0.240
Post	1.96	1.72	0	4.80	0.906	12	0.189

Table 5

Results of Paired t-test for Telemetry Unit

Paired Differences							
Mean (pre-post)	*SD*	*SE*	95% *CI* of the Difference		*t*	*df*	*p*
			Lower	Upper			
0.97	2.76	0.80	-0.79	2.72	1.214	11	0.250

Figure 2 shows the month-to-month comparison of fall rates for the Neurological unit before and after the implementation of CareView technology (pre-intervention period: April 2016 to March 2017; post-intervention period: April 2017 to March 2018).

Table 3 shows the descriptive statistics of fall rates for the Neurological unit. According to the results of the Shapiro-Wilk tests, the data were normally distributed ($p > 0.05$). The mean fall rates were 4.08 ($SD = 2.03$) and 3.24 ($SD = 2.35$) for before and after the intervention of CareView technology, respectively. Based on the results of the paired t-test (Table 4), although the mean pre-implementation fall rate ($M = 4.08$, $SD = 2.03$) was lower than the mean post-intervention fall rate ($M = 3.24$, $SD = 2.35$), the difference was not statistically significant ($t(11) = 0.901$, $p = 0.387$).

Neurological Unit

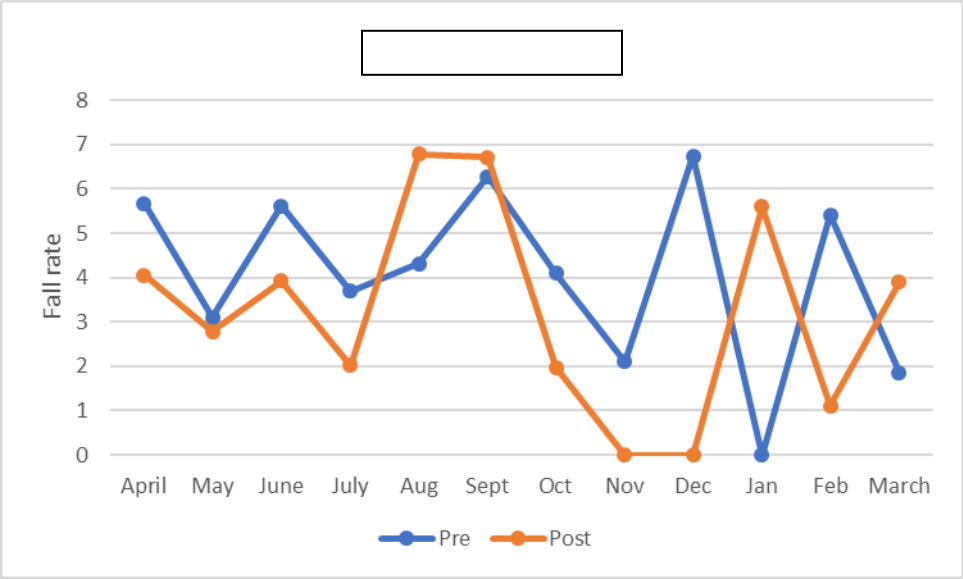

Figure 3. Line chart of pre-and-post intervention fall rates for Neurological unit

Table 6

Descriptive Statistics of Fall Rates for Neurological Unit

					Shapiro-Wilk		
	M	*SD*	*Min*	*Max*	*Statistic*	*df*	*p*
Pre	4.08	2.03	0	6.75	0.952	12	0.671
Post	3.24	2.35	0	6.78	0.938	12	0.473

Table 7

Results of Paired t-test for Neurological Unit

Paired Differences							
Mean (pre-post)	*SD*	*SE*	95% *CI* of the Difference		*t*	*df*	*p*
			Lower	Upper			
0.84	3.23	0.93	-1.21	2.89	0.901	11	0.387

Recommendations

The project scope included the pursuit of comparing results on the reduction of PSA use over the same period of the pre and post implementation of the VM. Also, assessing the use of VM to achieve fall rates below 2.5/1000 patient days. Post-implementation data for the PSA use were unavailable, therefore, the comparison was not performed. Attaining a fall rate of 2.5 per 1000 patient days was accomplished on the Neurological unit in July, October, November, and December of 2017 and for the Telemetry unit a fall rate below 2.5 per 1000 patient days was achieved in May, June, July, October, November, December of 2017; and January and March of 2018. For the Neurological unit 4 out of 12 months and for Telemetry unit 8 out of 12 months.

The VM system fall reduction strategies demonstrated benefits in fall reduction, and it is essential to highlight during the post-implementation phase neither unit experienced a fall with injury. Another advantage is the ability to have CNAs at the bedside assisting patients' needs contrary to stripping the units of this vital resource for a 1:1 PSA in patient rooms. The PSA cost reduction data was not attainable, but daily observation of having more staff available on the units for patient care was tangible among all health care team.

Recommendation strategies to improve the effectiveness and consistency in the sustainability of efforts on the deployment of the VM surveillance is related to consistency with unit leader expectations and accountability. A nurse leader prepares the nursing team to participate as engage partners by integrating nursing science, business and financial principles, current EBP, and balancing workload to achieve organization objectives (Zaccagnini & Waud White, 2011).

The second recommendation is accountability, holding staff accountable for consistency in process expectations. According to Douma (2015),

> "Defining culture, and organizational structure that promotes patient safety and achieves quality outcomes requires shared accountability and teamwork within organizations. The healthcare industry's changing environment requires organization leaders embracing change to align with the industry and developing methodologies to translate the changes to the frontline employees for sustainable effort for ongoing improvement in patients care" (p. 53).

Strength and Limitations of the Project

Project Strengths

A project strength was the ability to have trained PSA to monitor patients at risk and allow the CNAs to stay on the unit patient care assignment. The nursing staff expressed the satisfaction of lower CNA to patient ratio and improved patient satisfaction. A second strength had all nursing staff and leaders to rotate in the VM room to observe the complexity of the process of monitoring and sending message alarms to reduce fall.

Project Limitations

A major limitation was the inability to aggregate data to compare the reduction in the use of PSA over the period of a year. The second limitation was the inconsistency in the responsiveness of the nursing personnel to the alerts to their phone to avoid patients fall. The process was to have everyone respond to the unit specific alert, but the personnel was not responsive assuming someone else will go to the patient room resulting in patients fall.

Summary

Falls and fall-related injuries continue to affect the population in the acute care setting. Organizations are pursuing a method to reduce the risk for patients in the hospital. The results of this study are inconclusive, but because of the quest to achieve quality and patient safety, research must continue. Hospital culture and processes may vary for which everyone must find the key to reduce falls and injuries. Douma (2015, p. 53) said, "A critical first step on the journey to high reliability is leadership commitment and alignment."

Evaluating the VM system using paired t-tests to determine the reduction in the fall rate on the Neurological and Telemetry units before and after the implementation of CareView technology (pre-intervention period: April 2016 to March 2017; post-intervention period: April 2017 to March 2018). The results indicated (a) Telemetry unit, although the mean pre-implementation fall rate (M = 2.93, SD = 2.00) was lower than the mean post-intervention fall rate (M = 1.96, SD = 1.72), the difference was not statistically significant ($t(11) = 1.214$, p = 0.250). (b) Nerological unit, although the mean pre-implementation fall rate (M = 4.08, SD = 2.03) was lower than the mean post-intervention fall rate (M = 3.24, SD = 2.35), the difference was not statistically significant ($t(11) = 0.901$, p = 0.387).

Performing high-quality research affords confidence that the practices implemented will have a high probability of success and will facilitate a positive influence on patient outcome, not at a single hospital level but in the broader context impacting social change by enhancing the ability to contribute to society (Schirmer, Lockman, & Schirmer, 2016).

Section 5: Dissemination Plan

The diligent integration of best evidence research, clinical expertise, and patient preference with deliberate efforts to deliver high quality and cost-effective healthcare define EBP (Grove, Burns, & Gray, 2013). The dissemination of a research project contributes to the growing knowledge and support of other researchers in the quest to find the right interventions to improve quality. The dissemination of the findings of this project will aid other researchers to expand on the interventions and strategies to decrease falls and injury. The plan is to disseminate this project to the clinical manager at the CareView company to help other organizations utilizing this system to address appropriate staff training during the implementation process and develop strategies to ensure appropriate staff response to the CareView alerts.

Distributing the result of this study to the hospital and division leadership to improve compliance and consistency with implementation strategies and sustainability of the results to attain better outcomes and results. The DNP student plans to submit a copy of this scholarly project manuscript to the Academy of Medical-Surgical Nurses, the National Association of Orthopaedic Nurses, and the American Association of Critical Care Nurses to actively engage nursing students, new grad nurses, and experienced nurses in research by stimulating interest in future research possibilities and for them to participate in the progress of the nursing profession. Sharing these finding with the American Organization of Nurse executives will provide insight to nursing leaders as they continue to develop initiatives to keep patients safe. Mostly, the DNP student plans to share the implementation processes and findings from this project to nursing

students as an example to illustrate the process of implementing an EBP and highlight strategies necessary to improve patient outcomes.

Analysis of Self

The self-reflection of this project encompasses the experience to take on the journey to pursue a Doctoral degree. The initial thought of pursuing this degree was for self-gratification and maybe with pride to be the only one in the family to attain this level of education. As time passes by the realization of a greater objective emerged to contribute to the body of knowledge in the nursing profession and to inspire other nurses classified as a minority to pursue their dreams.

The DNP scholarly project allowed to demonstrate the ability to advance nursing practice in the roles of practitioner, scholar, and project manager. As a practitioner being at the forefront during the project, engaging with patients and nursing personnel was important to appreciate the patient experience and the challenges of working in an acute care hospital. As a scholar, the DNP student used research and education to solve a vexing problem and to use most current evidence-based knowledge to change practice and improve outcomes (Zaccagnini & White, 2011). As a project manager, the DNP student assumed the leadership role for interprofessional collaboration to provide a safe environment to the patients admitted to Neurological and Telemetry (Zaccagnini & White, 2011).

The hospital experienced staffing fluctuations and changes in leadership which influenced the inconsistency of the implementation strategies. Challenges noted was lack of responsiveness to alerts, failure to assign the patient into a VM room from admission, the variability of the PSA, and utilizing less engaged personnel to perform this assignment. An important contributing factor is the alerts and alarm fatigue influencing responsiveness of the

staff consistently to the alerts. The alert sound was as an amber alert. The nursing staff may have experienced overload to their senses related to an excessive number of alarms which leads to alarm desensitization (Srinivasa, Mankoo, & Kerr, 2017).

Summary

This quality improvement evaluation project examined the effectiveness of implementing the CareView VM system in preventing patient falls and decreasing the use of PSAs. While there was a decrease in the average number of falls during the 12-month period after implementation of the VM system, the change was not statistically significant; but over the period of 12 months, Telemetry had three months post-implementation with zero falls compared to one month with zero falls during pre-implementation, and a total of 5 months with a decrease of the overall fall rate. Neurological unit experienced two months with zero falls during post-implementation compared to one month with zero falls during pre-implementation and six months with an overall reduction in the fall rate.

Regrettably, the PSA utilization post-implementation data was not available to evaluate the reduction in the number of safety attendant, but the nursing staff was pleased to have the CNAs are on the unit caring for patients' basic needs instead of being utilized as PSAs. Another area of success during the post-implementation of the VM system on Telemetry and Neurological units was zero falls with injury.

Falls and falls with injury continue to be an epidemic for the population admitted to a hospital in the United States causing additional morbidity and, in many instances, increasing the mortality rate. Looking into the impact of social change this research project was aligned to accomplish, is in accord with the 2010 Healthy people goal to improve the quality of health and

longevity and eliminate health disparities (Zaccagnini & White, 2011). Nursing leadership in every acute care setting is needed to achieve this goal by developing inquisitive practice to pursue EBP to keep patients safe. Creating a nursing team with an innovative and inquiry perspective to find best practices that will be suitable to the organizational culture will be a crucial factor to acquire the social change needed to reduce falls and injury.

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Appendix A: Safety Tech Shift Log

Safety Alert		Describe alerts, falls and issues Room # / Patient last name	Time Safety Alert resolved	Actions taken if Safety Alert not resolved immediately	Name of Charge RN Notified of Issue	Comments
Date	Time					

Appendix B: Safety Tech Shift Morse Scale Log

		MORSE SCALE SCORE (Fall Risk => 45)					
DEPT	ROOMS	0800	1200	1600	2000	0000	0400
	[illegible]						

Appendix C: Nurse Leader Daily Process Review

/Patient Fall/Patient Safety Attendant Utilization Log

Nurse Leader Daily Process Review / Patient Fall, Sitter Utilization and CareView™ Log

Date: _____ Shift:_____ Reviewed by:_____

Sitter Utilization					Patient Fall Data					
Patient Requiring Sitter Name and Room #	Reason for Sitter	Sitter Start Time	Plan to eliminate Sitter	Total hours of Sitter use	Patient Name	Age	Location of Fall	Morse Scale Score	Video Monitored Room?	Actions Notifications Debrief

Shift Summary: Careview and Sitter Usage		Shift Summary: Patient Falls	
# Patients high risk for fall (Morse Scale) _____ # Patients of in Careview Beds this shift: _____	Total # of Sitters: _____ Total # of Sitter hours this shift: _____	Total # Falls this shift:_____	# Falls Patient in a Careview room: _____

Appendix D Morse Fall Risk

A. Morse Fall Risk Assessment

Morse Fall Risk Assessment		
Risk Factor	**Scale**	**Score**
History of Falls	Yes	25
	No	0
Secondary Diagnosis	Yes	15
	No	0
Ambulatory Aid	Furniture	30
	Crutches / Cane / Walker	15
	None / Bed Rest / Wheel Chair / Nurse	0
IV / Heparin Lock	Yes	20
	No	0
Gait / Transferring	Impaired	20
	Weak	10
	Normal / Bed Rest / Immobile	0
Mental Status	Forgets Limitations	15
	Oriented to Own Ability	0

To obtain the Morse Fall Score add the score from each category.

Morse Fall Score*	
High Risk	45 and higher
Moderate Risk	25 - 44
Low Risk	0 - 24