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Reducing Fall Among Acute Rehabilitation Patients Through Implementation of a Video Monitoring System

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**Reducing Falls Among Acute Rehabilitation Patients Through
Implementation of a Video Monitoring System: An Evidence-
Based Project**

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Abstract

Practice Problem: Falls are a significant healthcare issue that leads to substantial patient suffering and exorbitant health care expense. The Centers for Medicare and Medicaid Services (CMS) identify falls as preventable and not eligible for reimbursement.

PICOT: The PICOT question that guided this project was: for acute rehabilitation inpatients (P), will the continuous use of video monitoring (VM) (I) compared to using bed alarms (C), decrease the fall rate by 10% (O) within six weeks of implementation (T)?

Evidence: The practice recommendation for using a VM system as a primary intervention or part of a multifactorial comprehensive fall prevention strategy was recommended in the literature to improve patient safety and outcomes.

Intervention: VM surveillance was used to decrease the prevalence of falls in moderate to high fall risk traumatic brain injury (TBI) patients on a rehabilitation unit. VM technicians verbally refocused patients and quickly alerted staff to potential falls.

Outcome: The intervention achieved a 49% reduction in the hospital fall rate per 1,000 patient days, 65% in the rehabilitation fall rate per 1,000 patient days, 100% reduction in the TBI fall rate per 1,000 patient days, and a 30% reduction in cost for 1:1 sitter.

Conclusion: This clinical project demonstrated support for the use of live VM surveillance to decrease fall rates on a TBI unit. As a result, this evidence-based project (EBP) project was recognized as improving the organization's clinical care.

Reducing Falls Among Acute Rehabilitation Patients Through the Implementation of Video Monitoring System: An Evidence-based Project

Hospital-acquired falls are a serious health problem that can diminish the quality of life and cause deaths (Soncrant, Neily, Bulat, & Mills, 2019). Falls in hospitals lead to anxiety, discomfort, reduced healing, lengthier inpatient stays, and additional health-related problems. Falls may also cause patient distress and affect the quality of life. Falls have a high prevalence in the hospital setting, causing a severe patient safety risk, particularly to the elderly population (Ronald et al., 2012). Regardless of the efforts in healthcare organizations to identify patients in danger for falls and employ fall preventive measures, the prevalence of falls among hospitalized patients in the United States remains a significant health care concern; with falls occurring in approximately 700,000–1,000,000 hospitalized patients per year (Cox et al., 2015).

Approximately twenty percent of hospitalized patients experience a fall event, which may result in physical harm, suboptimal quality of life, emotional and mental pain, and suffering (Hodo, Munsterman, & Newomb, 2018). Falls and related injuries are a global public health problem anticipated to worsen with the increasing aging population (Vanderberg et al., 2017).

This evidence-based practice (EBP) project was aimed to determine the impact of implementing a video monitoring (VM) system in the traumatic brain injury (TBI) unit as an intervention to reduce the prevalence of falls within six weeks. This paper will describe an EBP project that will include the significance of the practice problem, the PICOT question, EBP model and change framework, literature search strategy and themes, the setting, implementation considerations and a plan, an evaluation plan, results, dissemination, conclusions, and practice recommendations.

Significance of the Practice Problem

Prevention and reduction of falls is an important goal of hospitals throughout the world. According to the World Health Organization ([WHO], 2018), an estimated 646,000 individuals die from falls globally each year. Over 80% are in low-and middle-income countries, and 37.3 million are severe enough to require medical attention each year (WHO, 2018). In 2017, the Centers for Disease Control (CDC) reported injuries related to falls lead to prolonged hospitalization, surgery, and death. The Centers for Medicare and Medicaid Services (CMS) noted that injurious falls were an identified hospital-acquired condition (HAC), which was considered preventable when EBP guidelines are used (CMS, 2011). In 2008, CMS discontinued reimbursement for any HAC treatments, such as injuries due to falls in acute care. Studies have shown increased hospital costs and increased inpatient stay lengths by 6.3 to 12 days because of serious falls (Dykes, et al., 2018). Fatal falls resulted in an approximate treatment cost of \$34 billion, with a projected increase to approximately \$67.7 billion by 2020 (Dykes et al., 2018). California reported about 74,945 fall cases and 1,733 deaths in 2013 (CDPH.ca.gov). In 2007, almost 30,000 people were injured in falls in Los Angeles County, and approximately 400 died because of their fall; those numbers are expected to rise with an aging population. (publichealth.lacounty.gov, 2008). Since the Institute of Medicine's hospital safety report was published, patient safety became the primary focus for regulatory accreditation agencies, as well as numerous government and private agencies, such as the Agency for Healthcare Research and Quality, the Joint Commission (TJC), healthcare organizations, and providers, including the nursing discipline (Donaldson, 2018). These regulatory and accreditation agencies have established best practices and preventive safety measures (Donaldson, 2008).

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Within the hospital organization for this EBP project, the 2019 data showed approximately 123 fall events or a mean fall rate of 4.57 per 1,000 inpatient days. There were 15 falls in the TBI unit for 2019 (Rancho, 2019). This rate was higher compared to benchmarks set by the National Database of Nursing Quality Indicators (NDNQI) of 2.22 per 1,000 inpatient days (NDNQI, 2019). The high prevalence, long-standing effects, and costs of falls will affect the healthcare system progressively as time goes on (Ronald et al., 2012). The proposed EBP project was implemented at a local 150-bed inpatient rehabilitation center, part of the Los Angeles County Department of Health System (LACDHS). There are 75 acute inpatient rehabilitation beds, including 25 TBI beds (Rancho, 2019). Fall events in the TBI rehabilitation unit pose a complex patient safety issue because they may result in higher injury severity, prolonged post-traumatic amnesia, and decreased Functional Independence Measure scores (Hodo, Munsterman, & Newcomb 2018). Reasons for falls may be attributed to a patient's diagnosis, such as TBI, lack of compliance with regulatory requirements on staffing ratio or care companions, or the use of bed alarms (Hodo, Munsterman, & Newcomb 2018). Though falls in hospitals may not always be averted, using the most appropriate actions to reduce falls was essential. This EBP project implemented an intervention using VM for fall prevention among hospitalized TBI patients. Ethical considerations to protect the patients' rights and mitigate new types of risks, such as disruption of care, workload increase related to data management, and technology maintenance introduced to implement monitoring technologies were reviewed (Grigorovich & Kontos, 2020).

PICOT Question

The PICOT question that guided the development of the EBP project was: For acute rehabilitation inpatients (P), will the continuous use of VM (I) compared to using bed alarms (C),

decrease the fall rate by 10% (O) within six weeks of implementation (T)? The population selected for the implementation of the VM intervention were adult inpatients diagnosed with TBI; many of these patients with a history of falls have a significantly longer rehabilitation length of stay; falls are a significant cause of morbidity and mortality for children and older adults (Maas & Manley, 2013). The intervention used 12 “Telesitters” video monitors in the adult TBI unit as part of a fall prevention program. Studies showed that patients in rehabilitation hospitals such as those with TBI, stroke, spinal cord injury, and other neurological problems are at higher risk for falls and can benefit from EBP to reduce the incidence of falls (Forrest et al., 2012). The impact of using VM on preventing falls was assessed among patients with TBI in the rehabilitation unit and compared to the incidence of falls with other rehabilitation patients on bed alarms. Designated VM technicians performed continuous live monitoring of TBI patients in a surveillance area located in the Nursing Resource Center.

Evidence-Based Practice Model & Change Theory

The EBP model identified for this change project was the Iowa Model of EBP to promote quality care. The Iowa Model helped nurses and other healthcare providers adopt the best evidence into clinical practice while improving patients' outcomes. The Iowa Model steps include: 1) identify a problem-focused trigger, such as the identification of a clinical problem like patient falls, 2) determine if the clinical problem is a priority for the organization, 3) form a team, 4) compile and evaluate relevant studies related to the practice change by the team, 5) critiques of presented studies by the team to ascertain whether the project with the established intervention is scientifically appropriate, 6) implement the intervention into a pilot practice change, and 7) evaluate the practice change (Brown, 2014).

The change model identified as most consistent with the author's organizational structure and professional experience was Kurt Lewin's Model of Change. “Changes to organizational patterns (new workflow, policies & procedures) will surely occur within the organization as it adapts to sustained practices. Relationships between practices and their systems exist using Kurt Lewin's 3-step change model of Unfreezing, Movement, and Refreezing” (Manchester et al., 2014, p.82).

The processes and outcomes of the project were influenced by multiple stakeholders' (fall prevention team) perspectives at the planning, implementation, and evaluation phases of the change process. Lewin's first phase is changing the traditional approach (Unfreezing), highlighting the emergent team behaviors (Movement), and strengthening the behaviors through changes in organizational structure (Refreezing). Kurt Lewin's change model has previously been applied to understanding how health professionals' behaviors become accepted and sustained in clinical settings (Manchester et al., 2014). This change model guided the EBP project.

Evidence Search Strategy

The evidence search strategy process started with conducting a focused search using the clinical problem to direct the search. The other search strategy steps used included the identification of keywords, the selection of relevant library databases to identify primary sources, the review of titles for relevance to the clinical problem, which ensured that the articles met inclusion criteria, the review of abstracts, retrieval of full-text articles, critical appraisal, and the development of summary and the syntheses of strengths and recommendations for each of the articles (Adorno, Garbee, & Marix, 2016). An essential step in the search process was gathering recent evidence that was scholarly and peer-reviewed to accumulate information to answer the clinical question. The search was conducted through collaboration with a health science librarian

of the University of St. Augustine for Health Sciences (USAHS). The USAHS electronic resource databases was accessed to search for scholarly literature pertinent to the project.

The electronic search resulted in 10 relevant articles to support the PICOT question. The Cumulative Index to Nursing and Allied Health (CINAHL) Complete, Joanna Briggs Institute of EBP Database, PubMed, and Eric databases were searched through the USA Search engine. The specific keywords used in the literature searches were fall prevention intervention, acute admission, and brain injury patients. To avoid duplication, the inclusion criteria used for all the databases and articles contained the keywords, full text, date of publication years 2010-2019, English as the language, and peer-reviewed. The exclusion criteria included pediatric and ICU patients with additional diagnoses, such as psychiatric and suicidal tendencies. The search produced 952 records, but only 51 were eligible based on title and abstract review.

Evidence Search Results and Evaluation

With the four carefully chosen databases mentioned above, the search had initially produced a total of 51 research articles. The total search citations include 31 CINAHL citations, 15 PubMed citations, and five Eric citations, and these were reviewed and screened for the inclusion criteria. Additionally, a comprehensive search and synthesis of the literature was performed to understand the PICOT question's components better. To assist with the organization of the retrieved literature and relevant articles, an evidence table was created to include information such as Reference, Keywords, Research Method Design, Level, Quality Grade, Main Findings, Usefulness, and Level of Evidence. The literature review synthesis matrix aided in establishing and ensuring that the publication and articles were comprised of quality evidence and the most current information needed to create a patient safety intervention that supported the organization's EBP program (see Appendix A). To assist in evaluating the quality and critically

appraise the evidence, step three of Melnyk and Fine-out Overholt's (2015) seven evidence-practice steps were used. The Strength of Recommendation Taxonomy (SORT) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) were used to assess the quality of evidence and the level of findings (Bonnell & Smith, 2018). The search result is included in the PRISMA table.

Figure 1 PRISMA TABLE

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement*. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

Themes from the Evidence

The evidence evaluation table and synthesis consisted of 10 research studies relevant to the clinical question on fall prevention of patients seeking treatment at acute hospitals, which consisted of three qualitative and seven quantitative research articles (see Appendix A). All ten research articles explored falls and addressed interventions to improve patient safety. These articles explored the healthcare team, patients, and family members' perceptions regarding falls, causes, costs, and prevention efforts to determine any knowledge gaps in the implementation and sustenance of EBP fall prevention programs. The main themes identified in these articles included fall prevention intervention, population, patient outcomes, the role of a registered nurse (RN) in fall preventions, and communication.

Fall Prevention Intervention

Seven of the articles identified bed alarm use and VM as a primary intervention or as a component of a multifactorial fall prevention program. Baris and Seren Intepeler (2019) noted that falls are a complex event affected by multiple factors. The primary and the utmost noteworthy step in preventing patient falls was determining the causes of falls and the associated fall-prevention interventions. Successful implementation of a comprehensive fall prevention program stressed that bed alarms and fall risk signs were effective fall prevention interventions. Radecki, Reynolds, and Kara (2018) explored patients' perspectives in using bed alarms and gait belts as fall prevention interventions, and Wong et al. (2011) discussed the cost of serious fall-related injuries for cognitively impaired patients.

Population

Three articles identified the inter-professional healthcare providers as having distinct and integral roles in the planning and implementing of a comprehensive and sustainable fall prevention program (Baris & Seren Intepeler, 2019, & Porter et al., 2018). All ten articles included patients 18 years of age and older, with one article focusing on older patients with cognitive impairment (Baris & Seren Intepeler, 2019, Radecki, Reynolds, and Kara, 2018, & Wong et al. 2011). Older adult patients with cognitive impairments have the highest risk for falls and related injuries. The selected population for this EBP project was essential in determining the impact of the proposed intervention as part of a fall prevention program.

Patient Outcomes

The use of bed alarms and fall risk signs could reduce fall events (Baris et al., 2019). The other six (60%) articles noted the decline of falls and injuries related to falls using bed alarms and VM as prevention interventions. One can conclude that the appropriate use of bed alarms and VM positively impacted patient outcomes.

Role of RN

All ten articles identified various RN and Telesitter (VM technicians) roles in the comprehensive fall prevention program. These included completing the Morse Fall Scale (MFS) risk assessments promptly, ensuring the appropriate use of bed alarms, being a patient advocate, and developing a close RN-patient relationship to promote better patient understanding regarding the program fall evaluators leading the coordination of fall prevention strategies. One can conclude that RNs played a critical role in the fall prevention program. Two out of ten studies used unlicensed personnel in VM use (Sand-Jecklin et al., 2016; Votruba et al., 2016). Unlicensed personnel can reduce labor costs and allow more people to apply for a Telesitter or VM tech position. A wide variety of healthcare knowledge and skills is required to monitor many

patients at once effectively. Organizations must develop practical training to introduce the VM tech to wide-ranging healthcare knowledge.

Communication

Six of the articles noted the importance of communication, including dissemination and sharing of essential healthcare providers' opinions and patient input as critical components of a comprehensive fall prevention program. Porter et al. (2018) noted that focused communication was vital to the thorough day-to-day preparation to improve patient safety and outcomes.

Fall events in the inpatient population are prevalent and a grave risk to patient safety. There has been an increase in demand to assess the most effective fall prevention interventions, such as increasing VM use to decrease hospital falls and related events. After reviewing the available EBP research studies, the most critical finding was that the VM method impacted fall prevention. All these studies have identified the reduction of fall-related events and injurious falls. Considering the evidence presented in this synthesis, one can conclude that the use of bed alarms and a VM system can improve patient safety and outcomes, either as primary interventions or part of a multifactorial part of a comprehensive fall prevention strategy. Four of ten studies had SORT 3, three had SORT 2, and three had SORT 1. VM supported consistent findings as a fall prevention strategy, and the recommendation at level A on the Strength of Recommendation Taxonomy was considered (Ebell, et al., 2004). See Appendix A for a Summary of Primary Research Evidence.

Practice Recommendations

A continuous effort is geared toward finding solutions to decrease the prevalence of inpatient falls. There has been an increased demand to assess the most effective interventions for a comprehensive EBP fall prevention program. The findings from the synthesis of the ten articles

highlighted several factors that may impact the success and sustainability of an EBP fall prevention program, which follow.

Fall as Team Responsibility for Staff and Patient and Family

Fall prevention is team accountability, and it is vital to ensure patient and family engagement as full partners on the care team. Patient and family engagement enables patient decision-making and fosters family involvement in fall prevention. The evidence suggested a need for hospitals to have collaborative inter-professional training, explain role responsibilities, and develop consistent communication practices about patient-specific and standardized fall prevention approaches (Porter, 2018).

Inter-professional Communication and Collaboration and Ensuring Stakeholder Buy-in

Having an inter-professional collaborative approach has been deemed essential to the appropriate communication and development of timely actions related to falls. Organizations need to develop standardized protocols to support inter-professional team collaboration and corresponding planning related to an EBP fall prevention program (Porter, 2018). There was a correlation between the opinions of the stakeholder in successful fall prevention. Seeking these opinions will improve the effectiveness of fall prevention programs. It was recommended that the staff gather more comprehensive information from key stakeholders, including all healthcare professionals, patients, and patient family members (Baris et al., 2019).

Use of Comprehensive Evidence-based Fall Prevention Program Interventions: Valid Fall Risk Assessment, Bed Alarms, and Video Monitoring Technology

Using valid risk assessments, such as a comprehensive fall risk assessment tool MFS and fall prevention procedures and guidelines for high-risk patients, improves nurse satisfaction. The use of bed alarms and patient sitters were effective fall prevention interventions. VM was one

technology that may contribute to the observation and permit nurses to respond more quickly to prevent falls (Hardin, et al., 2013). Using the MFS Risk Assessment tool, the continuous use of bed alarms, and VM designed to recognize the patients who are at the higher risk of falling and signal nurses when the patients are about to get out of bed, can be essential components of the hospitals' comprehensive fall prevention programs (Ronald et al., 2012).

Based on the evidence outlined in this synthesis, it was recommended that fall prevention programs should include a VM system either as a primary intervention or part of a multifactorial comprehensive fall prevention strategy to improve patient safety and outcomes.

Project Setting

Agency Description

The project setting was a 150-bed inpatient rehabilitation center and part of the LACDHS. It is the second-largest municipal health department in the nation, caring for approximately 600,000 patients. The project agency cares for about 4,000 inpatients and conducts 85,000 outpatient visits annually with an average daily census of 140 patients. Rehabilitation services in stroke, spinal cord injury, brain injury, pediatrics, orthopedics, and diabetes management are provided. There are 75 acute Medical-Surgical beds and 75 acute inpatient rehabilitation beds, including 25 TBI beds. This facility is a renowned organization with state-of-the-art EBP treatments and accredited by TJC and the Commission on Accreditation of Rehabilitation Facilities (Rancho, 2019).

Organization Mission and Vision

The mission of the project's agency is to restore health, rebuild a life, and revitalize hope for persons with a life-changing illness, injury, or disability. Their vision statement is to be the

recognized leader and valued partner in world-class neuroscience and rehabilitation (Rancho, 2019).

Stakeholders

The identified stakeholders for this project included patients, the Chief Nursing Officer (CNO), Chief Operations Officer, Chief Medical Officer, and Chief Information Officer (CIO), nursing team, including Nurse Managers, Information technology (IT) staff, Therapy staff, Physician-Patient Safety Officer, Safety Officer, Preceptor, and Housekeeping Supervisor. There were other representatives from the stakeholder group, such as Nursing Informatics and the Director of Nursing Education, identified as essential project team members. An organizational assessment was performed using organizational assessment tools to evaluate the organization's readiness, level of engagement, and support for the EBP project.

Organization Assessment and SWOT Analysis

Organizational assessment was vital to measure the readiness and level of stakeholder engagement of the change project and identify potential gaps before implementation. Regulatory assessment tools were used to determine the organizational preparedness for the planned practice change of implementing the continuous use of VM to decrease the prevalence of falls. The following three tools were used: Checklist to assess organizational readiness (CARI) for evidence-informed practice (Barwicz, 2011), Institute for Healthcare Improvement (IHI) Capability Self-assessment tool (IHI, n.d.), and Organization's Cultural Profile Scale (Groysberg, Lee, Price, & Cheng, 2018b). CARI was developed to review the stakeholders' readiness for EBP implementation (Barwicz, 2011). In using the CARI tool, the senior leadership and organizational capacity relative to financial resources showed the highest readiness and strengths. These results were consistent with the values and vision of Executive Leadership.

However, staff training and staff capacity rated "some way to go" to the change practice implementation readiness and need additional attention.

Similarly, the IHI Improvement Capability self-assessment tool was used, and the leadership appraised as exemplary for active engagement and set goals and priorities for its improvement activities. The capability of the organization to demonstrate measurable improvement across all departments and areas was still developing. Synthesis of the findings from using these three tools showed exemplary organizational senior leadership and readiness to support implementing the continuous use of VM for fall prevention. These tools were consistent in recognizing gaps and areas that need the most focus: staff training and the capability to sustain improvement for the EBP projects. Additionally, a SWOT analysis was performed to identify the organization's strengths, weaknesses, opportunities, and threats, noted in Figure 2.

Figure 2 SWOT ANALYSIS

Some of the strengths identified included strong leadership support and commitment to reducing falls, the organization having a comprehensive fall prevention program, the

organization's strong culture of safety, the appropriate use of the MFS Risk assessment tool, and engaged staff who acknowledge that falls were a problem. The weaknesses identified included staffing issues, alarm fatigue, equipment malfunction, bed alarms, inconsistencies in fall risk assessment and documentation, and the new technology (VM) not available. The opportunities identified included the potential for a fall rate reduction, improved patient outcomes, improved patient, and staff satisfaction, improved financial reimbursement, and the ability to leverage new technology within the organization. The threats and the impetus for the EBP change project proposal included increased economic costs for the organization, increased length of stay, decreased reimbursement, poor patient outcomes, and decreased patient satisfaction. A review of the SWOT analysis findings showed the evidence of the structural and process measures that support this EBP project's implementation.

Project Overview

Project Short-term and Long-term Goals

The short-term objective of the project was focused on the immediate improvement in patient safety, focusing on decreasing fall events in the adult TBI unit within six weeks of implementing the proposed VM intervention. The long-term objective was focused on the sustainability of reducing fall rates after the initial project implementation and spreading the EBP project throughout the organization. These goals and objectives were in congruence with the agency's mission, vision, and strategic priorities.

Project Risk and Unintended Consequences

A risk assessment was performed for the project to address some of the potential risks and consequences. All identified risks included technological, privacy and security, staffing, and patient-related issues. The organization hired four full-time equivalent staff to function as VM

technicians. Several nursing attendants were also cross-trained to serve as VM technicians when there was a need and when the dedicated team was not available. One of the potential unintended consequences was the possible refusal of patients. The issue related to patient refusal and non-compliance were mitigated by ensuring patients and families received training about the VM intervention. The patient educational handouts (see Appendix B) were provided to the appropriate patient and family before initiation of intervention. One of the potential unintended benefits of this project was the cost savings associated with the costs for private sitters and savings related to the avoidance of increasing length of stay resulting from falls. The increase in patient and staff satisfaction was another potential unexpected benefit.

Project Plan (Method)

The EBP project aimed to decrease the prevalence of falls among acute rehabilitation patients by 10% by implementing a VM system for surveillance of TBI patients who were at risk for falls and alert staff to provide early intervention to prevent the fall. All patients were assessed upon admission and every shift for fall risk using a comprehensive and valid fall risk assessment tool MFS (see Appendix C). The MFS was a fast and simple process of evaluating a patient's probability of falling. The MFS assessment tool consisted of six variables that are quick and easy to score and has been shown to have predictive validity and interrater reliability. The MFS is used widely in acute care settings, both in the hospital and long-term care inpatient settings (MFS, n.d.). Patients with a score of 25 or more were classified as high risk for falls. The permission to adapt the MFS was received on 09/22/2020 (MFS, n.d). Before the project implementation, the facility only used bed alarms. The project manager (PM) worked with the facility leadership on the procurement of a VM system implemented during this EBP project. The adult TBI patients who met inclusion criteria were placed on the VM (AVASURE

TeleSitter). During the implementation process, a VM system's use allowed the monitoring of up to 12 patients who were at risk for falls by a VM tech. The VM system had the capability that allowed the monitor technicians to communicate directly with the patient to refocus the patient and notify the patient's nurse of the patient's activity for immediate intervention, which may have prevented the fall event. The intervention entailed the deployment and use of VMs for use with brain injury patients in the TBI with the VM tech observing patient's activities in real-time. Feasibility, cost, and impact of the intervention on the project were evaluated. The planned project of implementing a VM system to reduce the prevalence of falls was an EBP project aimed to improve the current fall prevention program process. A step-by-step process used to implement this project was presented using a project timeline describing four phases taken: (1) project planning, (2) logistical planning, (3) project implementation, and (4) data collection and analysis.

Activities under project planning included meeting with the preceptor, identifying issues, gaps, and staffing needs, review and synthesizing literature, preparing a project proposal, discussing with leadership regarding the proposal, identification of key stakeholders, identification of nursing resources and provider support, development of policy and procedures, identification of equipment requests, identification go-live date, and the acquisition of facility Evidence-Based Practice Committee support. The team initiated this process in January of 2020.

Activities under logistical planning included the identification of the vendor for VM system, assessment of technical needs after reviewing specification needs, assignment of the IT staff to assess hospital readiness, security and privacy needs, validated documentation platform in electronic health records (EHR) were ready, conducted testing for connectivity and remote access, established downtime procedures, coordinated weekly vendor and project team

communication teleconferences, and coordinated go-live implementation. Other steps included defining the roles and responsibilities of the unit nursing staff, the house supervisors, and the monitor technicians. The development of a patient and family awareness process, establishment of a cleaning process of the VM devices, creation of the admission and discontinuation workflow, creation of policies and procedures which defined the inclusion and exclusion criteria were performed. It was important to develop a nursing staffing plan for the success of the VM system. This included hiring of the monitor technicians, requesting for purchase approval, identifying a storage location for devices when not in use, creating a workflow for the transport of devices from storage, establishing a process for tracking VM devices, and defining change of shift communication for unit nursing staff and monitoring technicians. The procurement of the equipment, vendor training, and the hiring of monitor technicians were completed in September 2020.

Activities under project implementation included confirmation with facility approval, USAHS approval, budget approval, set project meetings weekly to track progress and making the necessary adjustments, identification of training needs of new and existing staff on the TBI unit, supervisor, and newly hired VM technicians, and the development of an educational plan. The project team offered an education plan for the clinical champions and patient care team regarding the project change proposal's background and VM implementation, such as the VM tech. The training information was communicated using educational flyers to train and orient the appropriate staff (see Appendix D). The evidence of training was monitored through sign-in rosters (see Appendix E). Copies of the PowerPoint presentation were provided during training sessions (see Appendix F and G) as handouts to augment the participant's learning. A copy of the

patient education handout was also included to increase the participant's understanding. The project team initiated the proposed implementation for the selected TBI unit in November 2020.

Activities under data collection and analysis included information on the patients who received the VM intervention, such as patients who were admitted to the TBI unit and had a diagnosis of TBI. High risk for falling was determined by but not limited to, such things as Fall risk assessment tool/score of 25 on the MFS, history of falls, previous falls during their stay, medical conditions requiring medical safety restraints, metabolic disorder, central nervous system disorder, hypoxia, lack of muscle control, medication side effects, dementia, neutropenic patients, deconditioned patients with behaviors, such as physically harmful actions, wandering, climbing, pulling at tubes/drains, restlessness, and other behavioral issues, and exacerbated behavioral symptoms. The exclusion criteria include patients having homicide and suicide ideations described in (see Appendix H), and those patients who were on a bed alarm as a fall prevention modality. For this EBP project, quantitative data collection was conducted in a structured environment (hospital). The data compilation tool helped determine the impact of using VM as an intervention for the identified nursing unit and fall events using bed alarms. The implementation process started with collecting data for the number of falls, VM use rates, and bed alarm use rates created for the TBI unit and other rehabilitation units. The data were retrieved using a standardized data compilation tool (see Appendix I), which captured elements such as data from hospital finance (diagnosis), Safety Intelligence (SI) reports, post-fall huddles, as well as the hospital's electronic medical record (fall risk documentation and type of intervention used), the VM system dashboard as the primary data source on VM use, and bed alarm use. The EHR was reviewed to determine patients admitted to the identified rehabilitation unit with a TBI diagnosis, documented fall risk assessments using MFS, and eligibility for VM

system use as an intervention. Fall events were gathered from the SI reports for the TBI unit of patients on the VM system daily. Data related to the number of falls were collected on patients using VM system intervention and compared the number of patient falls on the other rehabilitation units, who only used bed alarms as the fall prevention intervention. VM utilization was collected and assessed electronically by the Avasure TeleSitter system, which also provided several reports about the VM system start and end-use per patient and any fall events. Successful implementation of this EBP project was determined by achieving a 10% reduction among patient falls using the VM versus those using the standard bed alarms.

Iowa Model and Lewin Change Model

The Iowa Model of EBP was selected for this EBP project to guide the practice change and provide a step-by-step process for implementing a change (Brown, 2014). The initial step in the Iowa Model was to identify a problem-focused trigger, such as patient falls. Step two was to evaluate if the problems were a priority for the organization (Brown, 2014). For this EBP project, quality resource management and risk management data revealed an opportunity to reduce the current fall rate and dangerous fall prevalence. Fall prevention was a priority for the organization; therefore, leadership and organizational stakeholders supported seeking additional interventions to augment the agency's comprehensive fall prevention program. The next step was to form a team to help develop, assess, and implement the EBP change. The project team consisted of the PM, project advisor, nurse manager, nurse supervisor, nursing staff, and education department leader. Other members included an inter-professional collaborative team from IT, quality management, and analytic data staff who helped evaluate the implementation of a VM system for fall prevention.

The next step was to compile relevant evidence related to the proposed practice change, which consisted of developing the appropriate PICOT question and performing the proper literature search to determine if enough evidence existed to implement the proposed practice change. The next step was implementing the intervention into a practice change (Brown, 2014). For this proposed change, the organization implemented the new VM system in the TBI unit. After determining the change was suitable for clinical practice implementation, the final step was evaluating the change (Brown, 2014).

In theoretical underpinnings for change, Lewin's theory of change was another conceptual model relevant to this project. Lewin's model is a valuable framework for understanding its change process (Shirey, 2013). Lewin hypothesized a three-stage model of change known as the unfreezing-change-refreeze model. The unfreezing stage necessitates the rejection and replacement of prior learning. For the current fall prevention program, private sitters, bed alarms, and hourly rounding, the staff needed to accept the VM system's inclusion in the project were included. This stage required the organization's collaborative team to change the way they reasoned and behaved related to the new proposed change (Cummings, Bridgman, & Brown, 2016). The Lewin change theoretical framework was appropriate for planned change and ample time and stability to effect a change.

Schedule of Activities

A Gantt chart was developed to foresee the project timeline, steps, and progress (see Appendix J). The step-by-step process used to implement this project used a timeline which included project planning, logistical planning, project implementation, and data collection. Some of the benefits of a Gantt chart included determining all necessary tasks, timeline, when the tasks need to be completed, and progress (Sharon & Dori, 2017). Using a Gantt chart helped define the

parts or implementation stages of the proposed change project, the delineation of related activities to be taken, the projected time needed for each event, and itemized sequential activities carried out and completed (Harris, et al., 2018).

Project Budget

The development of successful projects needed a comprehensive budget that results in an achievable goal. A project budget was created based on an accurate approximation of all costs required from start to completion. According to Harris et al. (2018), project budgets must be flexible using accessible sources to avoid unnecessary costs. A typical project budget includes expenses for staff labor, materials and procurement, ongoing operation costs, other direct costs such as travel and education, and indirect costs that support the project, such as building expenses (Harris et al., 2018). This proposed change project itemized labor, service, and supplies for implementing the VM system (see Appendix K). Additional costs incurred for the project to the facility's operational budget, including ongoing staff education and VM equipment maintenance were added.

Role of the DNP Student

The DNP student assumed the role of the PM in this EBP project. The PM was responsible for compiling and evaluating the literature related to fall prevention within this organization, developing the PICOT question, and developing the project proposal. Additionally, the PM leveraged knowledge and expertise of the preceptor, who also holds the CNO's position in the whole project management process. The PM assessed the facility's current fall management process before implementation and was responsible for evaluating the current fall prevention strategies for effectiveness and identifying improvement opportunities for preventing falls and injurious falls within the proposed organization. Lastly, the DNP student assisted the

facility by implementing the proposed EBP project using new technology and assessing the EBP project's impact in decreasing the number of falls on the TBI unit, improving patient satisfaction, and enhancing patient outcomes, and increasing patient safety. As the PM, the DNP student oversaw this project, coordinated, managed the data collection, coordinated the EBP education program with the education department, collaborated with IT for the data retrieval, and collected and analyzed the findings.

Result

The focus of this project aimed to determine whether real-time VM surveillance would decrease the prevalence of falls in TBI patients on a rehabilitation unit. The premise of the project was that potential fall situations could be prevented or reduced by early intervention in the form of VM technicians verbally refocusing patients and quickly alerting staff. The organization used the MFS, a comprehensive fall risk assessment tool, to identify moderate and high fall risk patients. Sixteen patients met the inclusion criteria to participate in the project. The VM surveillance impact was evaluated by comparing the number of falls and fall rates pre- and post-project implementation (see Figure 3). Results from descriptive statistics and calculation of percent changes were used to evaluate the use of VM in decreasing falls and fall rates in TBI patients on a rehabilitation unit.

Evaluation Design

Frequencies, means, and percentages were calculated using descriptive analysis. Intellectus statistics software was used to calculate descriptive statistics on demographic data and MFS total scores. The VM surveillance effectiveness was determined by comparing the fall rates per 1,000 patient days before and after the project implementation, which described the

percentage in fall difference. Data for the hospital and rehabilitation unit was used for the comparison fall rates.

Data Collection

Demographic data was collected on patients who met the inclusion criteria for the project. Demographic information consisted of age, gender, race/ethnicity, MSF fall risks, and MFS total score. Fall risk assessment information was collected on admission and every shift by the nursing staff using the MFS. Data on the number of falls, VM use rates, and bed alarm use rates were collected prior to the start of the project implementation for the TBI unit and other rehabilitation units. The data were retrieved using a standardized data compilation form, which captured elements such as data from hospital finance (diagnosis), hospital occurrence reports (SI), post-fall huddles, hospital's electronic medical record (fall risk documentation and type of intervention used) and the VM system dashboard as the primary data source on VM use and bed alarm use. Data security was assured by adherence to HIPAA regulations and hospital privacy regulations. VM technicians were trained and competent specific to privacy and security components. Providing secure data storage was essential to the integrity and security of the project and the safeguard of patient health information. The data were stored in a password-protected dedicated shared folder that the PM managed. To address the possible missing data, all the data and workflow processes were reviewed. The inclusion and exclusion criteria were reviewed by staff to include all patients meeting the VM process.

Data Analysis

During the data collection period from November 1, 2020, to December 15, 2020, sixteen patients met the inclusion criteria and were placed on VM on the TBI unit. The majority were male (75%), with most identified as Hispanic (56%), followed by Black (25%) and non-Hispanic

White (19%). The mean age of the 16 patients was 45 years old, with age brackets consisting of 20-30 years (31%), 31-40 years (25%), 41-50 years (0%), 51-60 years (18%), and > 60 (25%).

Only patients who scored high fall risk (87.5%) and moderate fall risk on the MFS (12.5%) were included in the project. Scores on the MFS score ranged from a minimum of 25 to a maximum of 60 ($M=42.19$) with a standard deviation of 11.25.

Data showed that the average fall rate of the hospital from January 2019 to October 2020, before VM implementation, was 2.5 per 1,000 inpatient days. After VM implementation (November 1, 2020, to December 15, 2020), the falls rate decreased to 1.38 per 1,000 inpatient days. This finding was a 49% hospital fall rate reduction. Data showed that the rehabilitation average fall rate during January 2019 to October 2020, before VM implementation, was 3.11 per 1,000 inpatient days. After VM implementation (November 1, 2020, to December 15, 2020), the fall rates decreased to 1.09 per 1,000 inpatient days. This change was a 65% decrease in the fall rate. The average fall rate in the TBI unit before the VM was 0.59 per 1,000 inpatient days. After VM implementation, that there were zero patient falls in the TBI unit or a 100% reduction in TBI fall rate (see Figure 3).

Figure 3 Fall Data for TBI, Hospital and Rehabilitation Units per 1,000 patient days

Project Significance

This clinical project demonstrated the evidence and support for the use of live VM surveillance as an intervention to decrease fall rates on a TBI unit and improve patient safety. The PICOT outcome of the project was to reduce the hospital falls by 10%. The intervention achieved a 49% reduction in the hospital fall rate per 1,000 patient days and 65% in the rehabilitation fall rate per 1,000 patient days after implementing the project. As a result, this EBP project was recognized as improving clinical care provided by the organization. All categories of measures, including outcomes, process, balancing, financial, and sustainability identifying benchmarks for each measurement, are displayed (see Appendix L). Quality measures were used to assess if the data obtained in the EBP was clinically significant in the promotion of fall reduction and based on this data, it was shown that an overall decrease in falls for the hospital system occurred. Prevention of falls can avert additional patients suffering increased length of stay, liability, and lack of reimbursement. In summary, the EBP supported real-time VM surveillance in the rehabilitation and TBI setting. Additionally, the organization will evaluate the application of the EBP throughout other locations in the hospital.

Impact

There is a growing necessity to implement evidence-based approaches that positively impact healthcare outcomes and address the global issue of fall reduction and prevention. Nearly 20% of hospitalized patients have experienced a fall event that affected them physically, emotionally, financially, and mentally; thus, they experienced a suboptimal quality of life experience. The EBP found the development and implementation of a new fall prevention program using VM surveillance to be clinically significant in preventing falls in patients on a TBI unit. The project answered the clinical question and practice problem by demonstrating its

impact on the hospital fall prevalence, fall rate, staff, and patient compliance within the organization. The EBP compared the impact of the VM intervention to prior practice (use of bed alarms) through data collection pre-and post-implementation of the EBP intervention. During the 6-week implementation phase, evidence supported a 49% reduction in the hospital fall rate per 1,000 patient days, a 65% in the rehabilitation fall rate per 1,000 patient days after implementing the project, 100% reduction in TBI fall rate per 1,000 patient days, and a 30% reduction in cost for 1:1 sitter and was considered a clinical improvement.

The future implication of the project will be expanding the use of the VM system for the entire organization. The organization purchased an additional eight VM monitors and another 49-inch TV monitor. The organization plans to start using 16 of the 20 VM monitors in all Rehabilitation and Medical-Surgical areas three months after the EBP implementation.

Additionally, new VM staff were hired and completed the appropriate training. The limitation of the full hospital-wide implementation of the project was related to space. The previous area only allowed the use of one 49-inch monitor and two VM tech seating spaces. After addressing the space issue, the organization plans to use the 20 video monitors hospital-wide with two large monitors and the appropriate VM technicians. The Nursing Informatics Department maintained the project sustainability as the organization charged the nursing informatics staff with ongoing data collection and assessing the effectiveness hospital-wide.

Dissemination

Communication of relevant findings from an EBP project is a professional responsibility and is essential for improving patient outcomes (Oermann, 2018). Findings from this EBP project will focus on communication within the organization, professional groups, and scholarly publications. Results will be presented to the hospital administration at the Executive Council

and to committees with a heavy representation of staff nurses, such the Interdisciplinary Falls Committee, Nursing Executive Council, Nurse Certification Tea, Hospital Management Staff meeting, Hospital Quality, Risk and Patient Safety Committee, Nursing Management and Operations Council, and the Quality Safety Outcome and Magnet Councils. Presentations will occur at regularly scheduled committee meeting times in a hospital conference room using a 20-minute PowerPoint presentation and handouts describing the intervention and results. Flyers with project results will be disseminated to all hospital staff via email and a one-page flyer posted on the hospital intranet. The EBP Council committee of hospital interdisciplinary experts will review the project findings, who use a peer review process to recommend practice changes.

Regional poster presentations will occur at the Los Angeles County Department of Health Services at the Annual Patient Safety Conference and the Patient Safety Conference of the local chapter of the Association of Rehabilitation Nurses. Posters will be submitted to National groups such as Collaborative Alliance for Nursing Outcomes and American Nurses Credentialing Center Magnet Conference. A manuscript will be submitted to the Quality Management in Healthcare Journal, due to its high impact and acceptance of evidence-based projects. The hospital EBP Council committee of interdisciplinary experts will peer review the manuscript and provide publication assistance.

Conclusion

Falls have a high prevalence in the hospital setting, causing a severe risk to patient safety, particularly among the elderly (Ronald et al., 2012). Inpatient falls remain the leading cause of adverse events occurring in hospitals worldwide (Quigley & White, 2013). Studies of falls on rehabilitation units have usually reported a relatively high rate of falls and 12.5% of patients admitted to an inpatient rehabilitation unit fell at least once while on the unit (Forrest et al.,

2012). TBI rehabilitation patients with a severe brain injury categorized by multisystem impairments are at an increased risk of falling. Some common fall risk factors, such as age, sex, medication quantity and type, and prior events, may be associated with falls in this population (McKechnie, 2018). The purpose of this EBP project was to decrease the prevalence of falls among acute rehabilitation patients by 10% through the implementation of a VM system for surveillance of TBI patients who are at risk for falls. The premise of the project was that potential fall situations could be prevented or reduced by early intervention in the form of VM technicians verbally refocusing patients and quickly alerting staff to fall situations.

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Appendix A

Summary of Primary Research Evidence

Citation	Design, Level Quality Grade	Sample Sample size	Intervention Comparison (Definitions should include any specific research tools used along with reliability & validity)	Outcome Definition	Usefulness Results Key Findings
Baris, V. K., & Seren Intepeler, S. (2019). Views of key stakeholders on the causes of patient falls and prevention interventions: A qualitative study using the international classification of functioning, disability, and health. <i>Journal of Clinical Nursing</i> , (3–4), 615.	Research Design Descriptive qualitative method SORT 3	Sample Size: four MD, four Charge nurses, Twelve Nurses, Four support staff, Eight patients, Eight family members	Research Tools Used: Semi-structured interview	Discern the perceptions and recommendations of the healthcare professionals, patients, and family members regarding falls, including causative factors and prevention practices.	Noted 71 themes related to triggering situations for falls, and 30 of these are related to prevention interventions. These themes were linked with 44 categories under five International Classification of Functioning, Disability and Health domains and organized accordingly. There is a correlation between the patient body function to the causes of falls. There is a correlation between stakeholders' opinions in successful fall prevention. Seeking these opinions will improve the effectiveness of fall prevention programs. It is recommended for the staff to gather more comprehensive information from key stakeholders including all healthcare professionals, patients, and patient family members.
Dykes, P. C., Carroll, D. L., Hurley, A., Lipsitz, S., Benoit, A., Chang, F., Meltzer, S., Tsurikova, R., Zuyov, L., & Middleton, B. (2010). Fall prevention in acute care hospitals: a randomized trial. <i>JAMA</i> ,	Randomized Trial SORT 1	Cluster randomized study conducted January 1, 2009, through June 30, 2009, comparing patient fall rates	Data Analysis Stratified, cluster randomization design, with the randomized intervention	Investigate if a fall prevention tool kit (FPTK) using health information technology (HIT) will reduce patient falls in hospitals.	Patients in the control and intervention units were comparable, but patients in the control units were more likely to be the younger population and of the white race and to have health insurance. Site adjusted fall rates were meaningfully higher in control units (4.18) per 1,000 patient-days) than in intervention units (3.15). The FPTK was found to be particularly

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304(17), 1912–1918. https://doi.org/10.1001/jama.2010.1567		in four urban US hospitals in units that received usual care (four units and 5104 patients) or the intervention (four units and 5160 patients).	at the unit (cluster) level within hospital (strata) and falls assessed at the patient level Statistical analyses were performed using the SAS software		effective with patients aged 65 years or older (adjusted rate difference, 2.08 per 1,000 patient-days; Using a fall prevention tool kit in hospital units compared with usual care significantly decreased the rate of falls.
Hardin, S. R., Dienemann, J., Rudisill, P., & Mills, K. K. (2013). Inpatient fall prevention: use of in-room Webcams. <i>Journal of Patient Safety</i> , 9(1), 29–35. https://doi.org/10.1097/PTS.0b013e3182753e4f	Research Design Quantitative study with a case-control, descriptive design was conducted at ten hospitals. SORT 2	Sample Size: Adult patients admitted to the Medical-Surgical units from ten hospitals chosen from a network of 56 hospitals N=10	Descriptive data were collected on every participating unit. Data were collected on MRA scores, daily patient daily, count of patient eligibility and consent, number of falls, and use of bed alarms or Webcams during the fall and characteristics associated with each fall for all study units and monthly compliance with the system fall protocols.	Compare inpatient falls on medical surgical units with and without Webcams and assessed the Morse Risk Assessment (MRA) for effectiveness in identifying fall risk.	There were 185 total falls, 101 transpired in the control hospitals and, 84 occurred in the intervention hospitals. There were three injurious falls in the control hospital and one in the intervention hospital. The use of the MRA with a 50+ score for high risk is highly recommended. Recommended more research is needed on patient acceptance of Webcam as a form of intervention and usefulness in preventing falls on several inpatient units or with specific age groups. The use of valid risk assessments such as Morse and fall prevention procedures and guidelines for high-risk patients improve nurse satisfaction. Webcams are one technology that may contribute to the observation and will permit nurses to respond more quickly to prevent falls.
Hester, A. L., Tsai, P., Rettiganti, M. & Mitchell, A. (2016). CE. Predicting	Research Design	Sample Size: One thousand three hundred	Research Tools Used: De-identified data for	Ascertain which patient causative factors lead to injurious inpatient falls.	The analysis noted a statistically significant correlation of injurious falls with having a primary diagnosis. The study revealed that

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injurious falls in the hospital setting: implications for practice, <i>American Journal of Nursing</i> , 116(9), 24–31. http://doi.org/10.1097/01.NAJ.0000494688.10004.85	Quantitative retrospective chart review SORT 1	sixty-nine patients who fell between Jan 2006-Oct 013. Patients 18 years and older	electronic medical records (EMR) Data Analysis: Bivariate analysis was used and SPSS		40.6% of patients with ill-defined diagnoses sustained injurious falls. To prevent injurious falls, clinicians should consider the patients' diagnoses in the care management.
Sand-Jecklin, K., Johnson, J., Tringhese, A., Daniels, C., & White, F. (2019). Video monitoring for fall prevention and patient safety: process evaluation and improvement. <i>Journal of Nursing Care Quality</i> , 34(2), 145.	Research Design Quasi-experimental SORT 3	Sample: Adult patients admitted to a neuroscience unit, medical unit, or one of two medical-surgical units within one hospital. N= Four units Setting: Hospital in the Mid-Atlantic Region	Interview with staff and patients, including video monitors. Patients and family members of monitored patients completed 52 surveys. These patients and family are representative of all the monitor-available units.	Appraise the surveillance process at a large teaching hospital to create improvements and standardize monitoring practices. Aims of the study were to identify (1) the nursing staff and monitor technicians' perspectives on the video monitoring (VM) process, including areas for improvement of the process; (2) patient/family perceptions related to patient monitoring, such as the perceptions of communication related to the process, its impact on patient safety, and guarding of privacy; and (3) to revise and standardize the procedure for VM and enhance its value for protecting patient safety.	Pre-implementation had 3.9 falls per 1,000 patient days, and post-implementation had 28 falls per 1,000 patient days. The decrease in the rate was statistically significant. There were six injurious falls on non-monitored patients, and no injurious falls on non-monitored patients, statistical significance could not be determined.
Porter, R. B., Cullen, L., Farrington, M., Matthews, G., & Tucker, S. (2018). CE: Original research: Exploring clinicians'	Research Design: Qualitative design focus	Sample Size: 20 clinicians (18 F & 2 M) (5 Nurses & 5 Non - Nurse)	Research Tools Used: Semi-structured interview guide	Examine the views of the inter-professional health care team to determine the knowledge gap between	There were two themes related to falls identified, namely: The patterns of communication within the health care team and the hospital organizational practices influences. There is an association between these two themes in the

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perceptions about sustaining an evidence-based fall prevention program. <i>American Journal of Nursing</i> , (5), 24. http://doi.org/10.1097/01.NAJ.0000532806.35972.29	groups and interviews SORT 3		to direct conversation. Data Analysis: Inductive approach pragmatic form	implementation and sustenance of evidenced-based practice fall prevention interventions for hospitalized patients.	sustainability of the EBP fall prevention program. Having an inter-professional collaborative approach has been deemed essential to the appropriate communication and development of timely actions related to fall Organizations need to develop standardized protocols to support inter-professional team collaboration and the coordinated planning around the sustained use of an evidence-based fall prevention program.
Radecki, B., Reynolds, S., & Kara, A. (2018). Original article: Inpatient fall prevention from the patient's perspective: A qualitative study. <i>Applied Nursing Research</i> , 43, 114–119. http://doi.org/10.1016/j.apnr.2018.08.001	Research Design: Descriptive qualitative perspective interview SORT 2	Sample Size: 12 hospitalized patients (7 M, 5F) Mean age 65.2	Research Tools Used: Interview guide. Data Analysis: Thematic analysis of patients' responses	Examine the patient's views of fall prevention in an acute care setting. This process will assist in the development and design of patient-centered fall prevention strategies.	Qualitative analysis revealed three significant themes, namely: description of patient's beliefs of their fall risks, intervention such as bed alarms, and usefulness of interventions and the barriers to practice in fall prevention. Patients were aware but believed that their ability to mobilize is a crucial factor. Organization leaders need to develop a shared objective that will allow the intervention to meet the patient's needs and nurses' judgment. The organizations need to deter from clinician-led to patient-centered fall prevention.
Schwenk, M., Lauenroth, A., Stock, C., Moreno, R. R., Oster, P., McHugh, G., Todd, C., & Hauer, K. (2012). Definitions and methods of measuring and reporting on injurious falls in randomized controlled fall prevention trials: a systematic review. <i>BMC Medical Research Methodology</i> , 12, 50. https://doi.org/10.1186/1471-2288-12-50	Research Design Randomized Control Trial SORT 2	Sample Forty-one articles were included. The systematic analysis of the methodology applied in RCTs revealed considerable variations in the definition and approaches employed to measure and document injurious falls.	Data extraction was performed by three independent reviewers using a standardized form. A descriptive statistical analysis was performed.	Thoroughly review the range of case definitions and methods used to measure and report on injurious falls in randomized controlled trials (RCTs) on fall prevention.	Customizing the fall prevention education by addressing validity and motivation positively improved fall threats information. Merging motivational tactics with multimedia education improved the effectiveness of the intervention in encouraging fall prevention behaviors. The authors also recommend using a standardized methodology in future randomized controlled trials, including a comprehensive system for categorizing and defining injurious falls and standardized methods of gathering and reporting detrimental falls data.

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Votruba, L., Graham, B., Wisinski, J., & Syed, A. (2016). Video monitoring to reduce falls and patient companion costs for adult inpatients. <i>Nursing Economic\$, 34</i> (4), 185–189.	Research Design Prospective Descriptive Study SORT 3	Sample Adult patients admitted to the critical care unit, neuroscience unit, or senior adult unit within one hospital. N= Three units Setting: Magnet-designated hospital. A total of 828 unique adult patients were observed during 992 video monitoring episodes.	Data analysis. Most data were analyzed using simple descriptive statistics, except the change in falls, was also analyzed with paired t-test using a 95% confidence interval.	Assess the effectiveness of remote video monitoring with a dedicated telesitter to reduce falls and decrease patient sitter usage in the inpatient adult population.	Pre-implementation had 17% falls per patient discharge and post-implementation had 1.1% falls per patient discharge (p<0.0001, 95% CI). The result was a significant reduction in the rate of falls, but due to the research design, statistical significance could not be determined. There is an estimated annual savings of somewhere between \$77,200 to \$120,000. The cost of staffing for the video was \$120,000.
Wong, C., A., Recktenwald, A., J., Jones, M., L., Waterman, B., M., Bollini, M., L., & Dunagan, W., Claiborne. (2011). The cost of serious fall-related injuries at three Midwestern hospitals. <i>Joint Commission Journal on Quality & Patient Safety, 37</i> (2), 81-87.	Research Design Retrospective Case-Control Study SORT 1	Sample Cases were randomly coordinated to two controls by hospital, age within five years, year of discharge, and diagnosis-related group (DRG). Three hospitals were used to identify cases.	Data Analysis A parametric testing was used to determine distribution of costs and LOS. Two methods of analysis were used, regression (univariate and multivariate) and OBM to evaluate cost and LOS to be attributed to the serious fall. Analysis by SPSS and SAS.	1) Estimate the current cost and length of stay (LOS) that can be attributed to a fall with serious injury. 2) Evaluate the use of optimal bipartite matching (OBM) analysis	Multivariate analysis showed \$13,316 more costs due to serious injury fall (p<.01; 95% CI, \$1,395-\$35,561) and that these fallers stayed 6.3 days lengthier than non-fallers (p<.001; 95% CI, 2.4-14.9). Univariate analysis showed that fallers with serious injury were more likely to have diabetes with organ damage, moderate to severe renal disease, and a higher mean score on the Charlson Comorbidity Index. OBM analysis indicated Serious injury fallers cost an extra \$13,806 more (p<.001; 95% CI, \$5,808-\$29,450) and stayed 6.9 days longer (p<.001; 95% CI, 2.8-14.9). Patients who fell and sustained a serious injury had higher expenses and longer LOS in these three hospitals.

Legend: (EBP' Evidence-based Practice; EMR, Electronic Medical Record; MRS, Morse Risk Assessment, OBM, Optimal bipartite matching; SORT, Strength of Recommendation Taxonomy; SD, Standard Deviation; SPSS, Statistical Package for Social Sciences, VM, Video monitoring)

Appendix B

Patient Educational Handouts

TELESITTER: PATIENT MONITORING TECHNOLOGY

Protecting patients from falls

Patient safety and privacy are our highest priorities. For this reason, we are using TeleSitter, a patient monitoring device that helps decrease your risk of falls. Falls may cause injuries ranging from scrapes and bruises, to broken bones or serious head injuries. This can lead to a longer hospital stay.

HOW TELESITTER WORKS

The TeleSitter monitoring device is a tool that we use to ensure that you are safe, even if you are alone in your room. It has a video camera and two-way audio, which allows a trained staff member to see and speak to you. When you are trying to get up, the staff member will ask you to stay in bed until a healthcare provider arrives in the room to provide help. Staff members will monitor you from a central room by watching a video feed. They can see you all of the time—except when TeleSitter is set to “privacy mode.” However, the only time they can hear you is when they talk to you over the speaker. TeleSitter does not ever record video or audio. A member of the nursing staff is always available whenever you need anything. Use your nurse call button to ask for help. When the TeleSitter light is on, the staff member who is monitoring you can see you. When the light is off, the privacy cover is on, and they cannot see you. The privacy cover is used when your doctor or nurse is providing care, and when you are dressing, bathing, or using the toilet. When the doctor or nurse is finished, they will ask the staff member to remove the privacy cover and resume monitoring.

Your nurse decides if you no longer need the monitoring device. When your health has improved, and you are safe from falls or injury, TeleSitter monitoring can be stopped.

Questions about TeleSitter? Ask your nurse for more information.

TELESITTER: TECNOLOGÍA PARA EL MONITOREO DE PACIENTES

Protección de pacientes ante caída

La seguridad y privacidad del paciente son nuestras prioridades. Por esta razón, utilizamos el dispositivo de monitoreo de pacientes TeleSitter que ayuda a disminuir su riesgo de caídas. Las caídas pueden causar lesiones que van desde raspones y moretones a fracturas de huesos o lesiones graves en la cabeza. Esto puede generar una estadía prolongada en el hospital.

COMO FUNCIONA EL TELESITTER

El dispositivo de monitoreo TeleSitter es una herramienta que utilizamos para garantizar su seguridad, incluso si usted está solo en su habitación. Tiene una cámara de video y audio bidireccional que permite a un miembro capacitado del personal verlo y hablar con usted. Cuando intente levantarse, el miembro del personal le pedirá que permanezca en su cama hasta que llegue un medico a la habitación para ayudarlo.

Los miembros del personal le monitorearán desde una habitación central al observar la transmisión por video. Pueden verlo todo el tiempo, except cuando el TeleSitter está ajustado en "modo de privacidad". Sin embargo, solo pueden escucharle cuando le hablan a través del altavoz. El TeleSitter nunca graba video ni audio. Siempre habrá un miembro del personal disponible cuando usted necesite algo. Utilice el botón de llamada a la enfermera para pedir ayuda.

Cuando la luz del TeleSitter está encendida, el miembro del personal que está supervisando puede verlo. Cuando la luz está apagada, la cubierta de privacidad está activada, y no puede verlo. La cubierta de privacidad se utiliza cuando el médico o la enfermera lo están atendiendo, y cuando usted se viste, se baña o está usando el inodoro. Cuando el médico o la enfermera terminan, le pedirán al miembro del personal eliminar la cubierta de privacidad y reanudar el monitoreo. Su enfermera es quien decide si ya no necesita el dispositivo de monitoreo. Cuando su salud ha mejorado y está a salvo de caerse o lesionarse, puede detenerse el monitoreo con el TeleSitter.

¿Tiene preguntas sobre el TeleSitter? Solicite más información a su enfermera.

Appendix C

Morse Fall Scale Assessment Tool

Variable	Numeric Value	
1. History of falling	No	0
	Yes	25
2. Secondary diagnosis	No	0
	Yes	15
3. Ambulatory aid		
Non/bed rest/nurse assist		0
Crutches/cane/walker		15
Furniture		30
4. IV or IV access	No	0
	Yes	20
5. Gait		
Normal/bed rest/wheelchair		0
Weak		10
Impaired		20
6. Mental status		
	Orientated to own ability	0
Overestimates or forgets limitations		15
Morse Falls Scale Score	Total	
Interpretation		
No risk < 25		
Moderate risk 26 – 45		
High risk >46		

Appendix D

Educational Flyers

TELESITTER CLINICAL CHAMPION CLASS

Date: To be determined

Times: 0730-0815
&
1530-1615

Target Audience: MANAGEMENT & CHARGE
RNs - Max 8 per Unit

For questions, please contact:

**TELESITTER MONITOR TECH
TRAINING**

Meet Ava.
Your new sitter.

Ava doesn't sleep.
Ava never goes home.
Ava respects privacy.

Date: To be determined
Times: 0730-0815 & 1530-1615

Target Audience: Video Monitor Tech

The image shows a hospital room with a bed, a white table, and a video monitor on a stand. The monitor is labeled 'Ava'. The text 'Meet Ava. Your new sitter.' is overlaid on the image. Below the image, the date and times are listed, followed by the target audience.

Appendix E

Training Rosters

TelaSitter Clinical Champion Training

NAME	SIGNATURE	EMP #	TITLE	DATE	UNIT

1

TelaSitter Video Monitor Tech Training

NAME	SIGNATURE	EMP #	TITLE	DATE	UNIT

2

Appendix F

Clinical Champion Video Monitoring Training

1

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TeleSitter Monitor Tech Roles & Responsibilities

- Monitor patients in real time using TeleSitter. Verbally inform patient when signal drops or when there are low patient counts. Simultaneously inform the nursing staff of the patient's current location.
- Communicate directly with clinical care staff to provide timely information. Just in time communication with the patient when there is a fall incident.
- Participate in reports with nursing/medical staff when working the shift, and report completion of shift. Review patient information and locations.

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Nursing Practice Implications

The use of Video Monitoring

- Evidence based intervention using technology
- Less Model of Evidence Based Practice
- Lower Change Model

8

Patient Inclusion Criteria

Acute Rehabilitation Population

9

Protocol Patient Selection Guidelines

10

Documentation

11

Analysis

- Falls rate per 1000 inpatient days
- Falls rate per 1000 outpatient days
- The video monitoring data will be collected by calculating the number of video monitoring use of patients per 1,000 patient days as well as TSM utilization report generated through the system
- Monthly data to four times per year

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Next Steps

1. Continue targeted meetings with vendors, related disciplines, IT, finance, education to address all actionable items and determine an approach for go live scheduled for October 1, 2020 including testing needs, IT monitoring, educational plan, etc.

COMING SOON!!!

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Questions

Thank You

Contact Information:
Project Manager
pallard@seattleu.edu

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Appendix G

TeleSitter Video Monitoring Training

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Appendix H

VIDEO MONITORING PATIENT SELECTION CRITERIA

Appendix I

Data Compilation Tool

[illegible]

L- Low risk for fall
M- Moderate to high risk for falls (Bed alarms or TeleSitter)
H- Hight risk for falls requiring 1:1 Sitter

Appendix J

GANTT Chart

Implementation of Video Monitoring System to Reduce Prevalence of Falls

Pre-Planning				
Collaborative meeting to review current fall data	Project Manager (PM)	Fall team/PM	Wed 1/15/20	Thu 1/30/20
Clarified process and cause of process variations (flowchart and Fishbone diagram)	PM	Fall team/PM	Wed 1/15/20	Fri 1/31/20
Develop project plan	PM	PM	Mon 2/17/20	Mon 2/17/20
Define PICOT question	PM	PM	Mon 2/17/20	Mon 2/17/20
Perform literature review and review of evidence	PM	PM	Thu 2/20/20	Sun 2/23/20
Identify theoretical framework and change model	PM	PM	Mon 2/24/20	Tue 2/25/20
Identify external and internal stakeholders	PM	PM	Wed 02/26/20	Wed 2/26/20
Planning				
Complete policies and procedures including defining inclusion and exclusion criteria	CNO	Nursing Leadership	Wed 04/01/20	Wed 7/01/20
Identify gaps and staffing needs	CNO	Nursing Leadership	Wed 04/01/20	Wed 7/01/20
Develop Nursing staffing plan for the Video monitoring (VM) for unit staff and the monitors including hiring process	CNO		Wed 04/01/20	Wed 7/01/20
Coordinate equipment request approval and purchase	CNO	CNO and CFO	Wed 04/01/20	Wed 7/01/20
Logistical Assessment and Readiness				
Identify vendor for VM	CIO	CIO	Mon 7/6/20	Mon 9/07/20
Assess technical needs after review of specification	CIO	IT staff	Mon 7/6/20	Mon 9/07/20
Assign IT staff to assess hospital readiness, security, and privacy needs	CIO	CIO	Mon 7/6/20	Mon 9/07/20

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Ensure documentation platform and EHR is ready	CIO	IT staff	Mon 7/6/20	Mon 9/07/20
Conduct testing for connectivity and remote access	CIO	IT staff	Mon 7/6/20	Mon 9/07/20
Establish down time procedures	CIO	IT staff	Mon 7/6/20	Mon 9/07/20
Coordinate vendor and project team communication weekly teleconference	CIO	IT staff	Mon 7/6/20	Mon 9/07/20
Coordinate Go-live and implementation	CIO	IT staff	Mon 7/6/20	Mon 9/07/20
Workflow process Pre-Go Live Tasks			-	
Define inclusion and exclusion criteria	CNO		Wed 7/15/20	Fri 09/18/20
Define floor staff and house supervisor responsibilities	CNO	HR staff	Wed 7/15/20	Fri 09/18/20
Define monitor tech responsibilities	CNO	HR staff	Wed 7/15/20	Fri 09/18/20
Define patient and family awareness process	Director Education	Education staff	Wed 7/15/20	Fri 09/18/20
Define cleaning process	CNO	Nursing Leadership	Wed 7/15/20	Fri 09/18/20
Develop admission and discontinuation process	CNO	Nursing Leadership	Wed 7/15/20	Fri 09/18/20
Logistical Process				
Determine storage location for devices not in use	CNO	Nursing Leadership	Mon 07/20/20	Mon 09/21/20
Determine process for transport of device from storage	CNO	Nursing Leadership	Mon 07/20/20	Mon 09/21/20
Determine for tracking VM devices	CNO	Nursing Leadership	Mon 07/20/20	Mon 09/21/20
Define change of shift communication for RN and monitoring techs including escalation process and STAT abort protocol	CNO	Nursing Leadership	Mon 07/20/20	Mon 09/21/20
Education and training				
Identify training needs of new and existing staff-floor, supervisor, and monitor techs	Education Director	Nursing Education staff	Mon 7/6/20	Mon 9/28/20

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Develop educational plan	Education Director	Nursing Education staff	Mon 7/6/20	Mon 9/28/20
Complete education of staff and patients	Education Director	Nursing Education staff	Mon 7/6/20	Mon 9/28/20

Communication Plan

Coordinate project meetings with staff and stakeholders	PM	Hospital leadership and PM	Mon 11/02/20	Sun 1/31/21
Communicate with the leadership, stakeholders, and process owners (frontline staff) weekly to report the progress of the project.	PM	Hospital leadership and PM	Mon 11/02/20	Sun 1/31/21
Report the progress to the Hospital-wide Falls Committee and the Quality Safety and Risk Management Committee on monthly basis.	PM	Hospital leadership and PM	Mon 11/02/20	Fri 1/29/21

Proposal Approval

Submit proposal to USAHS EPRC	PM	PM	Tue 10/13/20	Fri 10/16/20
Submit proposal to Rancho EBPC	PM	PM/CNO	Mon 10/19/20	Wed 10/21/20

Go Live Implementation

Implement the VM process in pilot unit TBI 1 North	CIO	Nursing and IT	Mon 11/01/20	Tue 12/15/20
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Data Collection/ Analysis

Establish data collection process	PM	CNO/QRM Director	Mon 11/02/20	Tue 12/15/20
Establish data analysis and reporting process	PM	CNO/QRM Director	Wed 12/16/20	Fri 01/15/21
Evaluate project effectiveness	PM	Hospital leadership and PM	Fri 1/29/21	Fri 1/29/21
Celebrate success	PM	Hospital leadership and PM	Mon 2/01/21	Mon 2/01/21

Appendix K**Budget**

EXPENSES	insure	REVENUE	
Direct		Billing	
Salary and benefits (4.2 FTE for Video Monitor Technicians)	\$ 168,000		
Supplies		Institutional budget support	
12 Avasure Telesitter (video monitors)	\$ 137,239		
2 Chairs	\$ 999.02		
TV Desk Mount	\$ 65.09		
48- inch monitor	\$ 667.00		
Height adjustable desk	\$ 3781.75		
16 Headphones	\$ 1326.88		
2 Adapters	\$ 46.92		
Services			
Avasure Implementation Service	\$ 40,730		
AvaNet	\$ 17,703		
ORNA SLA	\$12,000		
Total Expenses	\$ 312,126.01	Total Revenue	
Net Balance			

Appendix L

Measures

[illegible]