VIDEO MONITORING FOR FALL PREVENTION

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Abstract

Patient safety is a vital aspect of healthcare. Falls and fall-related injuries continue to occur in hospitals worldwide and fall prevention is one of the top priorities in providing quality care. Fall assessment tools, bed alarms, patient rounding, patient education, physical restraints, environmental modification, bedside sitters, and remote video monitoring are some of the methods implemented to reduce falls. This project was a quasi-experimental study informed by Kotter and Cohen Model of Change. The initial purpose of this process improvement project was to educate staff on the significance of video monitoring in fall prevention and determine whether the education regarding the importance of video monitoring in fall prevention was effectively integrated into practice and resulted in a reduction in falls. Ultimately, the project was only able to assess the effectiveness of an educational intervention on staff knowledge of the uses of video monitoring. A cross sectional pre- and post-test design was utilized to assess any gap staff may have regarding video monitoring, and education about video monitoring was tailored to address any needs. Data were collected through a survey of 11 questions, and the mean scores of four selected responses compared before and after intervention. Findings revealed an increase in knowledge post-intervention, as evidenced by increased mean scores. Despite the increase in mean scores, post-intervention fall rates did not decrease. For this project, the final PICOT question was: In nurses working in a healthcare setting (P), does education on the importance of video monitoring in fall prevention(I), compared to pre-education self-report (C) increase staff self-report of understanding the uses of video monitoring (O)?

Keywords: video monitoring, fall prevention, safety, human sitters, hospitals

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Table of Contents

VIDEO MONITORING FOR FALL PREVENTION

Chapter One

Introduction

Safety in healthcare is a priority. The World Health Organization defines patient safety as "the absence of preventable harm to a patient and reduction of unnecessary harm associated with healthcare to an acceptable minimum." Preventable medical errors cost the healthcare system $17 billion annually (Dykes et al., 2023). Medical errors, unsafe surgical procedures, hospital acquired infections, and falls are some of the top safety issues in healthcare (WHO, 2023). Among all this, patient falls are the most frequent adverse events in hospitals. Patient falls affect the patient, caregiver, healthcare team, and the patient's family. Between 700,000 and one million hospitalized people in the United States fall annually (Lelaurin & Shorr, 2019). These falls result in approximately 250,000 injuries and as many as 11,000 deaths (Lelaurin & Shorr,2019). One in four falls results in some type of injury, and about 10% result in serious injuries (Lelaurin & Shorr, 2019). In 2008, the Center for Medicare and Medicaid Services (CMS) can no longer reimburse hospitals for injury incurred from falls during patient hospitalization (Fehlberg et al., 2017). Hospitals have since implemented various fall assessment guidelines to help prevent falls. Alarms, education, intentional rounding, video monitoring, and live bedside sitters have all been used to prevent falls.

This process improvement project was carried out on a neurological unit at a community hospital in Southwestern United States. Patients at risk for falls on this unit included older adults, as well as those affected by and/or diagnosed with seizures, cognitive impairment, altered mental status, and/or delirium. AvaSure brand video monitoring cameras (see Appendix A) were

introduced during the COVID-19 pandemic to assist unit personnel in monitoring patients at risk for falls virtually.

Video monitoring is a continuous, live stream of patient activity monitored from a remote location. It consists of a fixed or mobile camera with a two-way communication system and alarm (Bradley, 2016). The AvaSure camera's infrared properties also make monitoring at night possible. With the two-way communication function, a video monitoring technician can also redirect the patient while notifying the staff. When a patient attempts to get out of bed, either the monitoring technician directs the patient to stay in bed or plays a pre-recorded message saying the same thing while the technicians notify the nursing staff. If the patient does not follow the directions, the technician activates a stat alarm which notifies staff that the patient is getting out of bed. During this time, the monitor technician may call the nurse or nursing assistant directly if no one responds to the stat alarm. The two-way system also allows the patient to respond to the technician, which may allow the technician to distract the patient from getting up until staff can assist them.

Problem Statement

The Joint Commission database lists fall as one of the 10 sentinel events that must be reported annually. The Joint Commission defines a sentinel event as a patient safety event that may result in death, severe harm, permanent harm, or severe, temporary harm (*Sentinel Event*, 2017). During the COVID-19 pandemic, inpatient falls increased among many facilities, even as other types of sentinel events decreased (Liang, et al., 2021). Reasons for this increase include staffing challenges, use of personal protective equipment and restricted visitation policies.

Further, because of staffing shortages during the pandemic, fewer nursing and other staff were available to observe and assist patients (Spetz, Chu & Blash, 2021). As a result, video monitoring of patients was often implemented.

A video monitoring camera with two-way communication function allows a monitoring technician to observe the patient as well as communicate with them, and allows the technician to redirect the patient from actions that could lead to a fall while notifying staff. The AvaSure camera is one brand of device with these capabilities, and its use was implemented at the facility where this project took place. However, institution administration reported that the devices were underutilized by unit staff. Additional education, applying Kotter and Cohen's Model of Change Theory, on the efficacy of video monitoring and its implementation were suggested as a means of improving use of the AvaSure devices.

Purpose Statement

The original purpose of this project was to explore the effects of a staff-directed educational intervention on video monitoring and its use as a way to prevent falls for hospitalized patients on a neurological unit. Ultimately, the project focused only on the efficacy of the educational intervention.

Relevant Definitions

Fall

According to the World Health Organization (WHO, 2018), a "fall is an event which results in a person coming to rest inadvertently on the ground or floor or other lower level." The National Database of Nursing Quality Indicators (NDNQI, 2020) defines a fall as a sudden unintentional descent to the floor or another surface by a patient, with or without injury. Types of falls include assisted falls, observed falls, and intentional and physiologic falls. An assisted fall is

one where a staff member assists the patient to ease the impact of the fall. An observed fall is when someone witnesses the patient fall. The witness may be staff, either nursing or non-nursing, or other personnel. An intentional fall is when the patient purposefully falls to the ground. Lastly, a physiological fall is attributed to physiological factors such a seizure, syncope, visual disturbances, delirium, medications, and gait instability.

Bedside Sitter

The commonly used term for a companion or other person at the bedside who provides one to one surveillance for patients with a high fall risk is bedside sitter (Lelaurin et al., 2019). The bedside sitter may be licensed or unlicensed–the latter are often called unlicensed assistive personnel (UAP). A licensed bedside sitter is usually a certified nursing assistant (CNA) who can directly assist the patient because they have specific education and training in direct patient care. An UAP is not trained on direct patient care, and must notify the nursing staff if the patient needs help (Wood, et al., 2018).

Video Monitoring Technician

This is a medical or non-medical individual who has been trained to monitor patients using the video monitor from a location other than the patient's room (Bradley, 2016). The number of patients being monitored by one technician varies by hospital system and staff availability. All monitoring technicians for the facility where this project took place are certified nursing assistants and receive additional, specific training on use of the AvaSure video cameras. Topics include camera initialization, camera utilization, troubleshooting, downtime use and communication with staff.

Redirection of Patients

Patient redirection is the act of communicating with a patient who is at risk for falls, when or if they are about to act in a way that will increase the risk that they will fall. The monitoring technician talks to the patient via the monitoring device's two-way communication tool and coaches them to either stay in bed or to stop what they are doing. Staff notification is made mostly when the patient tries to get out of bed but may also be made in situations such as patients pulling out lines or catheters. Sometimes redirection from the technician is all that is necessary to avert a fall, but some patients do not respond to redirection, prompting the technician to initiate the stat alarm on the unit.

Chapter Two

Review Of Literature

There are a variety of reasons why hospitalized patients may fall. Medications may play a significant role in falls, especially in the older adult population. According to Cai and Calhoun (2017), two-thirds of older adults (65 and above) in the United States have hypertension and most are on antihypertensive medications. Antihypertensive medications have been shown to make patients more prone to falls (Cai & Calhoun, 2017). This is linked to the fact that the medication during initiation and titration may cause dizziness or lightheadedness related to the changes in blood pressure. However, the benefits of antihypertensive may outweigh the risk because hypertension has been linked to other cardiovascular problems. According to the data from nationally representative Medicare and Current Beneficiary Cohort, 28% of older adults on antihypertensive medications were at risk for falls with severe injuries compared to those not taking medications (Cai & Calhoun, 2017). There was also a difference between those on higher and lower doses of antihypertensives. The former were more susceptible to falls, while the latter had reduced risk (Callisaya et al., 2014). Most of these medication-related falls were linked to beta blockers and diuretics. Beta-blockers lead to postural hypotension, and older adult patients already have blunt sympathetic reflexes, thus increasing the risk for falls. Diuretics were also linked to a risk for falls up to 21 days after initiation of the therapy (Cai & Calhoun, 2017). Diuretics can induce volume depletion and a decrease in calcium. Decreased calcium may result in decreased bone density; thus, a fall with a fracture may be more likely to occur.

Patients with neurological conditions that affect gait or memory were also more prone to falls than those with intact neurological function (Cattaneo et al., 2019) Physical inactivity due to prolonged immobility and even fear due to a previous fall may make the patient more prone to

falls (Morris & O'Riordan, 2017). Lastly, environmental hazards, or extrinsic factors, have been linked to falls. Such hazards include poor lighting, bed cords, and other medical equipment in the patient's environment (Saccomano & Ferrara, 2015).

Search Strategies

Before starting this project, a literature search was performed utilizing databases including CINAHL, PubMed, Cochrane, and Web of Science. Search terms included acute care hospitals, acute rehabilitation, high safety risk, at risk for falls, tele sitter, visual monitoring, video monitoring, virtual monitoring, technology monitoring, remote visual monitoring, human sitter, one to one sitter, bedside sitter, patient sitter, sentinel events, and fall prevention. Exact phrases were used during the search to help eliminate some articles. Results were pulled from searching synonyms and combining keywords. The search date range limit was 01/2012 to 12/2023. However, with CINAHL, smart text entries were used when the synonym yielded no results. Subject MeSH headings were used to narrow some searches. For instance, a search of sitters in the database CINAHL yielded 84 results. When Mesh heading specific for a heading was used, it yielded results for patient safety (6), caregivers (6), and accidental falls (17). With Cochrane, most of the searches found were either reviews or trials. PubMed yielded most of the literature on this topic. Abstracts were read to eliminate duplicate articles found in more than one database During the initial search from all databases, there were a total of 95,609 findings. When the exact phrase filtering was applied, this was narrowed down to 7176 articles. The combination of key words further narrowed results to 155 articles. Reading through abstracts and eliminating other articles, a total of 17 articles were highlighted for use in this process improvement project (See Prisma chart in Appendix B).

Critical Appraisal of Articles

Critical appraisal of articles is valuable in distinguishing best evidence from unreliable evidence (Melnyk & Fineout-Overholt, 2019). It identifies the strengths and weaknesses of these articles and aids the DNP student in deciding if this is a suitable article for inclusion in the project. Despite no standardized approach to evaluate evidence, the Agency for Healthcare and Research Quality (AHRQ)in 2002 lists domains such as study limitations, directness, consistency, precision, and reporting bias to determine level of evidence (Melnyk & Fineout-Overholt, 2019).

Articles appraised for this project included systematic reviews, randomized controlled studies, cohort studies and quality improvement articles. The levels of evidence included 16 articles from level one to level six. Level one evidence, the strongest level, consists of systematic reviews and meta-analysis. Level two evidence is typically evidence from randomized controlled trials. There is a need for more randomized controlled trials in relation to video monitoring. Level four evidence involves cohort studies and level six is evidence from a descriptive study (Melnyk & Fineout-Overholt, 2019). There were 2 randomized controlled trials identified from the database searches (Daley et al., 2020; Hardin et al., 2013). Most of the results the review of literature included were quality improvement studies and systematic review (Appendix C)

Synthesis of Literature (Appendix D)

There are several topics in the existing literature that are relevant to this project. These include the processes of video monitoring, education on specific devices, monitoring location, procedures for staff notification, cost savings, staff handoff reporting when using video monitoring, and patient consent. These will be addressed in the subsequent paragraphs.

Video Monitoring

Across studies, there was a decrease in falls with the use of video monitoring (Woltsche et al., 2022; Daley et al., 2021; Hogan Quigley et al., 2021; Oh-Park et al, 2020; Purvis et al 2018; Cournan et al., 2018; Votruba et al 2016; Jeffers et al., 2013; Hardin et al., 2013; Spiva et al., 2012) According to Vortuba et al. (2013), fall decrease with video monitoring was statistically significant. Also, several articles showed no increase in fall rates with the introduction of video monitoring (Greely et al 2020; Cournan et al., 2020; Wood et al 2018). Two studies also found that a combination of video monitoring and other fall prevention interventions led to a decrease in fall rates (Lang 2014; Oh-Park et al, 2020).

Education

Educating the staff in the use of video monitoring was considered vital in implementing this strategy (Woltsche et al., 2022; Spano-Szekely et al., 2019; Vortuba et al., 2016). Assessing staff knowledge and educating nurses and monitor technicians on the importance of fall prevention and the use of video monitoring is very important (Spano-Szekely et al., 2019; Jong et al 2019; Votruba et al, 2016; Spiva et al., 2012).

Monitoring Location

Monitoring of patients in these studies was done in a quiet location to prevent distraction from staff. In most studies, the location was remote and done by monitoring technicians (Daley et al, 2021; Oh-Park et al, 2020; Cournan et al., 2020; Sand-Jecklin et al 2019). Being in a remote location, the technicians only communicated with nurses by phone. This helped minimize the distraction that is often associated with other events happening on the unit. Thus, the only focus of the monitor technicians was to watch the cameras. However, the study by Woltsche et al., (2022) did reveal that patients were also monitored by the nurses who were assigned to the patient for a particular shift.

Staff Notification

Prior to notifying staff, patients were redirected by the technician as described above if they attempted to get out of bed without assistance or engaged in other actions likely to increase fall risk (Woltsche et al., 2022; Daley et al., 2021; Hogan Quigley et al., 2021; Greeley et al., 2020; Oh Park et al., 2020; Spano et al., 2019; Sand-Jecklen et al., 2019; Cournan et al., 2018; Wood et al., 2018; Purvis et al., 2018; Quigley et al., 2017; Vortuba et al., 2016; Lang, 2014; Jeffers et al., 2013; Hardin et al., 2013; Spiva et al., 2012). If technician redirection was unsuccessful, the nursing assistant or nurse is notified by an alarm. Sand-Jecklin, K., et al (2019) was the only study that used the overhead pager to notify staff when unable to redirect the patient. This was deemed helpful because sometimes the nurse may be engaged with another patient and not respond to the alarm in time.

Cost Savings

There was significant cost savings in all studies when video monitoring was used as compared to bedside sitters (Woltsche et al., 2022; Daley et al., 2021; Hogan Quigley et al., 2021; Greeley et al., 2020; Oh Park et al., 2020; Spano et al., 2019; Sand-Jecklen et al., 2019; Cournan et al., 2018; Wood et al., 2018; Purvis et al., 2018; Quigley et al., 2017; Vortuba et al., 2016; Lang, 2014; Jeffers et al., 2013; Hardin et al., 2013; Spiva et al., 2012). Savings varied per setting based on method of education, type of camera used, full time equivalent payment versus per diem payment for staff sitter, training and sitter need per year. Despite the differences, all articles did conclude there was significant cost savings when using video monitoring. However, none of the studies reported if the cost incurred when a patient fell while using video monitoring was equivalent to that of using bedside sitters.

The cost of bedside sitters likely varies from institution to institution as well as by geography, however, according to a study by Hogan Quigley et al., (2021), a comparison in cost between bedside sitters and virtual sitters showed significant cost savings when using virtual sitters. More than $97000 was saved while using virtual sitters in that study (Hogan Quigley et al., 2021). Greeley et al (2020) also found a 63% decrease in fall rates with video monitoring which led to $321,822 in cost savings. Bedside sitter costs are also not categorized as nursing care, and as such these costs are not billable to insurance (LeLaurin et al., 2019). The use of video monitoring instead of bedside sitters therefore may represent a significant cost reduction, both in wages and in fall reduction.

Staff Handoff Report

In combination with video monitoring, change of shift report in two of the studies showed a positive impact on fall reduction (Jeffers et al 2013; Purvis et al 2018). At the beginning of each shift, there was a report on patients who were being monitored. The outgoing monitor technician gave both a written and verbal report to the incoming technician about the patient being monitored. This report included notifying the video monitoring technician of any patient limitations and specifying situations in which they should contact the staff. Clinical nursing supervisors in charge of the video monitoring unit contacted the technicians to ensure the right number of patients were being monitored. During surveys, the video technicians noted that this was very helpful when calling for help (Jeffers et al., 2013).

Consent

Consent for monitoring was generally considered implied. Nurses did not need to call a doctor for an order for video monitoring. The video monitoring cameras did not record, and since human sitters do not need consent, this is similarly considered distant monitoring. However,

written consent was used in two studies (Woltsche et al., 2022; Jeffers et al 2013 and Hardin et al., 2013). In these cases, patients were asked to sign consent before using video monitoring. If the patient was not competent to provide consent, then a family member could sign. If the patient /family refused and the patient was deemed a safety risk, then a human sitter was brought in.

Needs Assessment

This medical facility where this project occurred is an accredited stroke center and patients are transferred from surrounding states for treatment. It serves the Southwestern United States. The 53-bed unit is a neuro-stroke medical-surgical unit. Depending on the severity, ischemic or hemorrhagic stroke may significantly affect a patient's mobility. 83% of stroke survivors suffer from balance impairment (Li et al., 2019). Patients with seizures, mobility problems, delirium, and cognitive impairment are all at risk for falls. When a patient is identified as a fall risk by the nurse, a bedside sitter is usually required (Lang, 2014). However, there is not enough evidence from various studies that these sitters prevent falls. The hospital is not reimbursed for care when a patient falls but no consideration is taken about extra hospital costs when trying to keep patients safe. Education rather than reprimand may be an effective way of communicating how to improve conditions with staff when an incident occurs. An original, pre-implementation survey was conducted to assess staff knowledge of video monitoring. The survey consisted of 11 questions which included seven questions on a Likert scale and four open-ended questions (Appendix E). Since the unit protocol for fall risk assessment included completing the Morse Fall Scale (MFS) (Appendix F), a question was also included in the survey about this scale and whether staff understood its use. The educational intervention was then tailored to address gaps in staff knowledge.

Population Identification

The population of interest for this project was the full-time nursing staff (*N*=71) on a 53-bed unit where the patient population consists of adult patients 18 years of age and older. The unit houses patients recovering from a stroke, seizures, and general health issues. The unit currently utilizes the MORSE Fall Scale (see Appendix E), AvaSure cameras (Appendix A), tab alarms, and lap belts for fall prevention. The Morse Fall Scale (MFS) is a numeric scale that determines a patient's risk for falls (Jewell et al., 2020). The Morse Fall Scale focuses on six items: history of recent fall, presence of secondary diagnosis, receiving continuous intravenous therapy, use of ambulatory aid, gait, and mental status. The unit also has a specific intake form (Appendix G) that is used to assess if a patient is eligible for video monitoring. The primary nurse must fill out this form which consists of 4 sections examining possible adverse events, patient condition, patient risk factors, and any additional considerations. Patients are considered eligible for video monitoring if they meet at least one criterion from each section.

Key Stakeholders

A stakeholder is a group or individual who is affected by health or healthcare related decisions (Concannon et al., 2018). The key stakeholders in this project included patients, caregivers, hospital administration, payers, and policymakers. Caregivers include the interdisciplinary team: (medical providers, nurses, physical therapists, occupational therapists, nurse assistant, and monitor technicians). Caregivers play a crucial role in assessing patients at risk for falls, implement appropriate fall prevention measures, and respond to fall incidents. If an alarm goes off, everyone on the unit is responsible for responding to the alarm and keeping the patient safe. Hospital administrators provide leadership and support for fall prevention initiatives. Resources, policies, and protocol should be appropriately allocated to promote patient safety and quality of care. Policymakers play a critical role in ensuring patient safety, particularly

concerning nurse-patient ratios, which remain unregulated in many states. Research by Lasater et al. (2021) underscores the significance of this issue, highlighting how inadequate ratios can lead to adverse patient outcomes. It is imperative for policymakers to understand the impact of nurse-patient ratios on patient well-being, including their potential to mitigate falls.

Organizational Assessment

Falls can have a significant impact on patient health outcomes, wellbeing, and duration of hospitalization. In this institution, a multifaceted approach is used as a fall prevention strategy. Falls and fall-related injuries are a specific quality indicator for the hospital where this project occurred, and are continually monitored. During every morning huddle on the medical surgical unit, the clinical nursing supervisor reminds the staff that, "It has been ……. days since our last fall." Fall prevention assessment and education is done with patients on admission to the unit. Assessment is also done during every 12-hour shift and/or as needed if there is a change in the patient's condition. The initial assessment provides a baseline risk score, via the Morse Fall Scale (MFS; see Appendix F) and appropriate fall prevention interventions are recommended.

For a score between 0-25, the patient is considered independent with little or no risk for falls. For a patient with this fall score, staff ensures standard safety interventions which include; adequate room lighting, bed in low position, call device within reach, familiarization with environment, locking wheeled equipment, hourly rounding with cued toileting, personal items within reach and safety lighting at night. In addition to these precautions, patient specific interventions such as keeping any sensory aids or sensory support items within reach, and encouraging the use of personal mobility items are employed. For patients with an MFS of 26-45, moderate fall risk is assessed. In addition to the standard precautions explained above, these patients must be accompanied during ambulation and use gait belts for physical support while

ambulating. For patients with a MFS greater than 45, the staff can ambulate with the patient every 2 hours to minimize distractions, assist patient to the bathroom and remain within arm's reach, set a bed, chair or exit alarm, collaborate with physical therapy, consider gait belt for physical support while ambulating, place an external notice at the door to alert others that patient is a fall risk, keep room door open, move patient closer to nurses station when possible, use a yellow armband, non- skid socks and gown and implement standard precautions. A bed alarm comes in two forms. The first is a tabs alarm placed on the bed's center that senses the patient's motion. Once the patient tries to get out of bed, the device alarms and alerts the staff. The other alarms are built into the bed. The nurse programs these alarms as needed. For example, the alarm can be set to alert when a patient goes from lying to sitting.

A physical therapist assesses patients on admission to establish a baseline of the patient's mobility status. Findings are communicated to nurses who will help ensure the patient has a fall care plan congruent with their risk. The physical therapist also recommends ambulatory aids based on the assessment. Together the nurse and physical therapist ensure that patients are educated on the appropriate use of call lights to request assistance and on what medication side effects may occur that can increase fall risk.

If a fall occurs, a code yellow is broadcasted over the entire hospital. The code yellow indicates that a patient has fallen. A code lift is broadcasted if assistance is needed with lifting the patient. If no lift is needed, the nurse manager, nursing house supervisor, or chief nursing officer comes to the unit where the fall occurred. A post-fall huddle explores the reason for the fall and what can be done to prevent future falls. When a patient falls, reassessment is completed as the incidence of a fall may predict future falls, and appropriate safety measures are revised

and implemented. A root cause analysis is also done by risk management to identify the cause for every fall.

A staff member must come in hourly to check on patients. During this hourly rounding, the 5Ps must be addressed. These include:

1. Pain
2. Potty
3. Position
4. Pump
5. Possession

The 5P's is part of the unit protocol for fall prevention. With the 5Ps, the nurse must assess the patient for pain. If they are in pain, a pain assessment is done, and interventions provided based on pain level. If assessment is done by the nursing assistant, they must report the patient's pain to the nurse so appropriate interventions are provided. The next step is asking the patient if they want to use the bathroom and helping them accordingly. For incontinent patients, the assessment includes checking to make sure they are clean and dry. This is because if a patient is incontinent, they can become uncomfortable and try to get out of bed. For patients sitting at the bedside, the nurse can ask if they are ready to go back to bed, or for those in bed, ask if they would like to sit at the bedside. This prevents patients from trying to reposition themselves, which may also lead to a fall.

In regards to pumps, staff members have to ensure that there are no ongoing beeping sounds from any pumps or other equipment connected to the patient. They must check and ensure that no beeping occurs, as it may lead to alarm fatigue among staff. Additionally, cords

should be appropriately placed to prevent tripping hazards. Lastly, when possible, keep personal possessions as close as the patient desires and the call button is within reach.

Assessment of Available Resources

The DNP student was granted hospital privileges to conduct this quality improvement project on one of the units at the local facility. The student met with hospital risk management and unit staff to look at fall data 10 months pre-educational interventional.

Team Selection and Formation

The team for this project included unit nurses, monitor technicians, nurse assistants, charge nurses, unit nurse managers, and the risk management team for the facility. A nurse champion was also identified from the unit to help facilitate this project.

Project Economic Analysis

Falls are one of the most frequent adverse events encountered in hospitals, and this results in an increase in cost and injury to patients (Jong et al., 2019). Cost from falls is because of increased hospital stay, additional treatment and litigation. Increasing staff understanding of video monitoring may improve use of this technology and ultimately decrease fall rates and associated costs.

Mission, Quadruple Aim and Values

Mission

The original mission for this project was to provide education to at least 50% of the full-time nursing staff and video monitoring technicians regarding AvaSure cameras and video monitoring and then to investigate if education increased camera use and helped to prevent falls. Due to difficulties in data gathering, however, the ultimate mission of the project was to provide

education on video monitoring to unit staff, and assess for gains in knowledge about the use of video monitoring.

Quadruple Aim

The quadruple aim was developed from the triple aim. According to Bachynsky (2019), the triple aim is "framework for optimizing health system performance by simultaneously focusing on the health of a population, the experience of care for individuals within that population, and the per capita cost of providing that care". The addition of the fourth aim was to optimize provider performance in healthcare.

The quadruple aim examines cost, population health, patient experience, and provider experience regarding patient falls. Falls are one of the most frequent adverse events encountered in hospitals, resulting in an increase in cost (Jong et al., 2019). Fall costs result from an increased hospital stay, additional treatment, and litigation. For employed patients, this may also result in time off work and loss of income. When patients fall, the hospital system loses reimbursement from Medicare and Medicaid services and private insurance. According to the Centers for Medicare and Medicaid Services (CMS), the cost of falls was more than $31 billion overall and $30, 000 per direct cost per patient (Hogan Quigley et al., 2021).

Value

Strategic Agenda Related to The Problem: STEADI, WHO

More than one out of four older adult patients fall each year (CDC, 2023). The CDC, using STEADI (Stop Elderly Accidents and Deadly Injuries), recommends screening all patients at risk for falls, assessing modifiable risk factors, and implementing strategies to reduce the risk of falls (CDC, 2023).

The World Health Organization (WHO, 2018) assessed falls globally, according to gender, age, job, and education. The WHO considered low- and middle-income countries as the places with the most falls and specified that the death rate was higher for people aged 60 and above. Though some falls do not require medical attention, others have led to permanent disabilities. In the United States, older adults are more likely to fall than young adults (WHO, 2018). The reason for these falls is often linked to physiological aging processes, such as decreased muscle tone, decreased physical functioning, loss of sensory, and some cognitive deficits.

Functional: Clinical Guideline Related to Falls

A systematic review by Montero-Odasso et al (2021) found 15 clinical guidelines grouped into different fall-related topics. The guidelines were similar in addressing risk stratification, assessment tools, fractures and osteoporosis management, exercise interventions and the use of multifactorial interventions. According to Montero-Odasso et al., (2021), there was a gap in literature as most studies about falls were about the elderly and not all patients at risk for falls.

The Clinical Practice Guideline developed by the American Medical Director Association (AMDA) is one of the many guidelines related to fall prevention. This guideline aims to assist the staff in evaluating, managing, and preventing falls (Vance, 2011). It is tailored for long-term care facilities but provides different fall assessment tools that providers can tailor to suit their setting. The guideline addresses recognizing, assessing, treating, and monitoring patient falls. The recognition phase assesses patients who are at risk for falls. The assessment phase looks at the reason a fall may happen. The treatment phase is the plan of care after a fall, and it is not a

generalized treatment. It is tailored to meet the needs of the patient. The monitoring phase investigates the success of the intervention implemented.

Emotional and Life Changing: Impact on Patient and Family

Regarding population health and patient experience, injurious falls have led to broken hips, intracranial injuries, and in extreme cases, even death. A fall can also affect the patient psychologically. Once a patient falls, they may experience anxiety getting out of bed, and prolonged immobility may lead to other health problems such as pressure injuries or permanent immobility (Saccomano & Ferrara, 2015). Falls also reduce patient satisfaction significantly.

Whether a fall is a result of a physiologic or environmental cause, it significantly affects the patient and the healthcare system. Once a person falls, they are at a higher risk of falling again. This is because a first fall leads to immobility and fear of getting out of bed to prevent further falls (Lelaurin & Shorr, 2019).

Social: Impact on Healthcare System

Falls are among the top preventable outcomes under CMS reimbursement policy (Bae, 2016). Preventable outcomes are hospital conditions which CMS believes can be prevented when quality care is provided. The hospital system loses reimbursement from CMS and private insurance when patients fall. According to the Center for Disease Control (CDC, 2020) the total cost for falls was more than $50 billion for non-fatal falls and $754 million in fatal falls nationwide. A review of the CDC (2020) statistics for states showed that in Nevada, 25.5% of falls included older adults. Fall deaths per 100,000 in Nevada were similar the national rate of 68 (CDC, 2020). The total cost of falls in Nevada was $295 million of which $216 million was from Medicare, $40 million from Medicaid and $39 million from private insurance (CDC, 2020). The state cost to Nevada was a direct cost which included nursing homes, hospitals, doctors and other

professional services, rehabilitation, prescription drugs, insurance processing and community-based services (CDC, 2020). Direct care cost does not include disability, dependence on others, lost time from work and household duties, and reduced quality of life. Decreasing the number of falls could significantly decrease the financial burden for the patient, medical facility, and the state.

Goals and Objectives

Goals

Goal 1: Assess staff needs for video-monitoring education.

Goal 2: Educate staff on the efficacy of video monitoring in reducing falls.

Goal 3: Decrease overall fall rate via use of video monitoring.

Objectives

1. By September 14th 2023, deploy a survey to staff to determine knowledge regarding patient falls and video monitoring.

2. Provide an educational intervention on fall prevention and the effectiveness of video monitoring in reducing falls by November 26th, 2023.

3. Conduct a post-education implementation survey by January 30th, 2024 and calculate the rate of falls post education. (Note: the second part of this objective, comparing rate of falls after the education, was eliminated from the project due to fall rate data being inaccessible to the student.

Chapter Three

Theoretical Underpinnings of the Project

This chapter addresses the use of Kotter and Cohen's model of change to inform this project. This theory underpins the educational intervention and process intended for the staff on this unit (Appendix H). This theoretical framework has 8 steps and maintains that the vision for change must be communicated effectively to employees for organizational change to occur. Any change in the workplace may be met with uncertainty and resistance. Resistance may result from a lack of education or training about the change to be implemented. This framework offers steps to overcome such barriers. For this project, an initial meeting with the staff introducing the topic of improving patient quality by preventing falls was planned. An anonymous survey was also conducted during the pre-implementation educational sessions. The survey included questions on the incidence of falls and using video monitoring, AvaSure cameras, and/or bedside sitters. A team of monitor technicians, nurses, and certified nursing assistants was surveyed.

Change Theory

The first step in the model is creating a sense of urgency. Urgency in this context refers to educating and engaging staff in ownership of the change process. Engagement, which refers to individuals having the autonomy to make changes, can prompt staff to work towards achieving the desired outcome (Moore, 2021). Managers and employees should recognize the need for change and realize it is essential for quality improvement. Project Goal 1, Assess staff needs for video-monitoring education, helped ensure staff engagement in the process and contributed to creating a sense of urgency. Objective 1, deployment of the pre-education survey, was the mechanism for this assessment.

An educational session about the effects of falls, ranging from disability, non-reimbursement, and even death, was then the starting point for initiating the intended change. Once the need for change is discussed with staff, the next step in this model is building a team or coalition to advocate for the change. Goal 2, Educate staff on the efficacy of video monitoring in reducing falls, required establishing the project team. A strong team with members who have the knowledge and skills necessary to make the change can influence their coworkers to accept this change. A nurse champion was identified for this project. The nurse champion for this project was a staff nurse from the unit. A nurse champion is a staff member who has a positive influence on other staff members and could encourage their participation in the survey. The manager for the video monitoring technicians was also helpful. She encouraged her staff to participate in the survey.

The next step is getting the vision right. Meetings between the team champion and the project lead were essential to establishing the vision for this project and achieving Goal 2, and completing Objective 3: Provide an educational intervention on fall prevention and the effectiveness of video monitoring in reducing falls by November 26th, 2023. The nurse champion suggested favorable times and methods to increase staff participation. A step-by-step approach on assessing staff knowledge about the use of video monitoring for fall prevention was outlined, so everyone understood the plan clearly. Next is communicating the vision to enlist the support of employees. Visions should be communicated effectively, and employees input considered. Sharing studies that show the effectiveness of video monitoring in decreasing falls and promoting other safety aspects compared to the use of a one-to-one sitter is important.

Encouraging feedback from employees at this stage is also critical. One-on-one discussions with the hospital staff were conducted to get their perspectives on fall prevention and

understand challenges faced in practice. Barriers to the implementation of the change were also identified. Some of these were inadequate staffing and lack of education. Without enough staff, the monitoring technician might be monitoring an unsafe number of patients at a time. The nurse-patient ratio should also be reasonable, so the nurse can respond promptly if the monitoring technician calls. A reliable internet connection and hospital information technology staff can help to handle any technological problems during the implementation phase.

Kotter and Cohen's next step is about empowerment and enabling action by removing barriers. During this stage, employees should be empowered to change their behaviors. The educational intervention (Goal 2) was designed to empower the staff with knowledge of video monitoring that could increase its use on the unit. Staff was also educated on the importance of their participation in contributing to the improvement of patient care and safety.

At this point, the model's interim success stage calls for identifying short-term wins. At this stage, the framework suggests starting small here, this was done by implementing video monitoring on a single unit and not hospital-wide. This is to ensure everything is working smoothly. For example, in Jeffers et al., (2013), video monitoring was initiated in one unit during the first week of the program and on the day shift only. The video monitoring technician monitored 8-10 patients. Review logs were completed including “good saves” or times when falls were avoided and shared with the staff. By the second week, monitoring was done 24/7, with 8-12 patients and more units. Woltsche et al., (2021) started monitoring at night shift only and included dayshift only when they found that the monitoring decreased fall rates. Such a phased implementation process can convince those still doubting to give the process a chance. In this case, Objective 3: Conduct a post-education implementation survey, allowed the project

team and unit staff to determine the efficacy of the education and see that staff knowledge had increased overall (see Table 2).

The next step in the process of change is ongoing persistence and sustainability. During this stage, staff should be recognized for outstanding work, and every step should be introduced slowly. According to Spano-Szekely, L. et al., (2019), the change process was introduced one step at a time with evaluation to see how the first step worked before the next step was introduced. Also, education was reinforced before a new step was introduced. With this approach, employees are less overwhelmed by the implementation process. In Jeffers et al., (2013), daily status meetings were conducted during the first week to identify any challenges before introducing the next step. The final step in the Kotter and Cohen change model is nourishment. Nourishment refers to providing support and resources that will sustain the change effort over time. During morning huddles and other meetings, it is therefore important that staff and administrators discuss the change and its benefits to the patients and the hospital. Continuing education and skills training for employees necessary for change to continue can be incorporated into practice. Patient, family, and employee feedback can be gathered to make necessary alterations in any processes.

For this project, sustainability and nourishment were expected to occur through reporting of the project findings and comparing overall fall rates before and after the intervention. Data on the fall rates after the intervention were not available, however, and these steps could not be completed. Project Goal 3, Decrease overall fall rate via use of video monitoring, was therefore not achieved.

Chapter Four

Setting

This medical facility where this project occurred is part of a network of 6 acute care hospitals in Southwestern United States with a population of greater than 2 million people. It is a teaching hospital for medical graduate students with a 306-bed capacity. The unit where this project will be conducted is a 53-bed neurological unit.

Implementation Science

This project draws on video monitoring as a fall prevention measure. The project is backed by evidence-based practices that have shown effectiveness in decreasing falls and fall related injuries. Video monitoring technology allows for continuous monitoring and surveillance of patients. By capturing real-time video footage, staff can identify potential fall risks, assess patient mobility and behavior patterns, and intervene proactively to prevent falls before they occur. Also, by providing real time feedback, the hospital system can identify areas for improvement and implement appropriate interventions to prevent falls.

Sample

The population of interest in this unit included registered nurses (RNs), certified nursing assistants, and monitor technicians. These and other staff care for adults above the age of 18 many of whom are at risk for falls based on unit selection protocol. Full-time and part time staff were included in the survey. Float pool and per diem staff were excluded because their shifts often vary and these personnel were less likely to be available to complete the post survey.

Recruitment

Prior to starting the survey, the DNP student talked to the unit manager about plans and method of execution. There was an approval form the CNO of this facility to carry out this

project. The DNP student met with staff during unit huddles. Huddles are done at the start of each shift. Nursing staff and the unit manager are always present for the huddle. The morning huddle is led by the unit nursing supervisor. During huddles, the DNP student told them about plans to carry out a survey which will identify any gaps staff may have about the effectiveness of video monitoring in fall prevention. Staff was also educated on the importance of their participation in contributing to the improvement of patient care and safety. At the end of each huddle, a raffle was drawn for everyone who participated in taking the surveys. Also, a nurse champion was designated for the unit. A nurse champion is a staff member who has a positive influence on other staff members and could encourage their participation in the survey. The manager for the video monitoring technicians was also helpful. She encouraged her staff to participate in the survey.

Comparison

A comparison was initially intended to be made between 1) the participants' knowledge of the AvaSure monitoring protocol before and after the educational intervention, and 2) the rate of fall incidents on the unit before and after the educational intervention. Data for the second measure were not available, however, and only the comparison of participants' knowledge before and after the educational intervention was ultimately completed.

Measures

A pre-test/post-test survey design was used. The survey consisted of 11 questions which included seven questions on a Likert scale and four open-ended questions (see Appendix D). This survey was developed by the DNP student with expert input from the project's Graduate Advisory Committee.

Data Collection

Surveys were carried out during staff huddles for both morning and evening shifts, as well as weekend shifts. This ensured representation across different working hours and days of the week. A QR code was provided during these sessions and staff were encouraged to participate. Scanning the code took participants to the 11-question survey. Some data on fall rates were provided from the unit manager and the director of risk management prior to the educational sessions. The unit manager assisted in providing monthly fall data pre- and post-intervention while risk management provided fall data pre-educational intervention.

Analytic Plan

Survey scores were collected and stored in Google Drive using a QR code, and then imported into excel. The data were reviewed by the DNP student in collaboration with the committee chair and a statistician. At this time, it was determined that mean scores for both samples should be used to analyze data rather than a paired t-test. This was in part because of the small sample size (N =28) and in part because some participants' pre- and post-education data could not be linked, as they had forgotten their passphrases. Therefore, only overall group statistics could be calculated.

Timeline of Tasks Assigned

A GANTT chart of project tasks and completion dates is included in Appendix I.

Monitoring and Evaluation Plan

Originally, the plan was that during the post- educational session, review of any falls recorded would be conducted in conjunction with risk management. This assessment would include:

1. Total number of falls for that month.
2. Causes of any falls recorded for that month if available.

Since the fall data were not made available for the period following the educational intervention, survey data was analyzed using the analytics proposed for this project as recommended by statistical consult described above. The project evaluation then consisted of reviewing any changes in self-reported knowledge from pre- to post-education survey responses, and examining the trends in fall rate on the unit before the educational intervention as a proxy for whether opportunities for video monitoring implementation to reduce falls existed.

Resources and Support

Prior to initiating the project, the DNP student received a letter of approval from the CNO of the facility supporting the quality improvement project (See Appendix J). A UNLV School of Nursing panel, in collaboration with the UNLV Institutional Review Board (IRB) also reviewed the project proposal to determine appropriateness for exemption from full IRB review (See Appendix K). The unit manager where the project was conducted assisted with providing monthly fall data. Scheduled meetings with risk management to discuss fall rates and root cause analysis for falls were during the project. A meeting scheduled with the organization director and manager in charge of video monitoring. Information was provided about the program and a tour of the monitoring location was completed. The chair and committee members also provided frequent feedback and assisted with any roadblocks.

Risks and Threats

One of the anticipated risks to this project is not obtaining at least 50% of staff to engage in the surveys and educational sessions. Staff members on their days off may not choose to come to the hospital for non-mandated educational sessions. Thus, pre- implementation data collection sessions were held during day, evening, and night shifts' work hours. Staff may elect to attend educational sessions. If this happens, surveys and presentations will be conducted at that same

time. Since huddles are completed prior to engaging in patient care, this may increase participation rate.

Another potential risk may be lack of sufficient monitoring devices for implementation of remote monitoring. AvaSure cameras are costly, and the facility may not have enough cameras to monitor every patient who meets criteria for continuous video monitoring. The availability of these devices varies throughout the hospital, depending on census and number of devices in use at any given time. This will be considered in reviewing the fall incidence, especially if patients who fell were eligible for a monitor but did not have one.

A final consideration will be in the case that hospital risk management cannot provide sufficient data for conclusions to be drawn about the fall rates versus use of the video monitoring. In that case, raw numbers of falls for the past year will be reviewed to identify general trends. If these numbers are available post-intervention, the trends will be examined in relation to the education dates. Otherwise, only general trends will be examined.

Financial Plan

The AvaSure website has a cost calculator which is based on the hospital's daily census and the national statistical averages. Their solution helps lower cost by reducing fall rate of 1.1 per 1000 AvaSure patient days which is an 84% reduction from a typical high fall risk population. According to a review of literature by Dykes et al., (2023), average

Cost of one patient fall- $62,521

a) Injurious- $64,526
b) Non-injurious- $1139- $2033
c) Cost of prolonged hospitalization

Information for video monitoring equipment cost could not be released by the AvaSure organization. However, cost savings was provided from a facility as shown below:

Cost based on 1.8 million hours

Yearly cost of bedside sitters - $27,826,095

Pay rate for 1:1 sitter- $15/hour (Monitors one patient).

Pay rate for VMT- $15/hr (monitors 12 patients)

Yearly cost for VMT – $4,066,786

Cost of VMT- $1.25/hr.

Cost of equipment -95 cents

Total cost savings- $23,759,309

Student Costs

15 Staff educational session pre implementation raffle gift cards- $200

5 Staff educational sessions

QR Code for 1 year for pre and post survey and education- $199

Nurse Champion gift card - $25

Cost of student time - $0

Cost of presentation posters- $50

IRB Approval

Prior to IRB approval, the student was granted permission and access to conduct this quality improvement project by the Chief Nursing Officer (CNO) for the hospital (Appendix J). The student also received an IRB exemption (Appendix K) from the UNLV institutional review board to conduct this project.

Chapter Five

Project Summary

This project was a quasi-experimental study. A quasi-experimental study is a non-randomized study used to explore the benefits of an intervention. It aims to identify a possible relationship between an intervention and an outcome. In this case, there was an increase in mean score post education but no decrease in overall unit fall rates.

Adherence to Plan

During the project, the plan of the DNP student was to assess the knowledge of staff through a survey, provide education and conduct a post survey. The first question of the survey requested that staff members had a passphrase that had to be used for the pre and post survey. This was to help identify staff and compare their response pre and post education. Staff participation during the post survey was lower as compared to the pre-survey because some staff members were unable to remember their pass phrase (see Table 1) and others did not participate in the post survey. A paired t-test was intended to be used for data analysis but due to the small sample size, the statistician recommended the mean scores to be calculated. The student also had to meet with risk management once the project was complete to discuss root cause analysis for falls post education. The student was not successful in scheduling a meeting with risk management. Thus, fall rates were calculated without root cause analysis.

Results

Sample Description

A total of 44 staff participated (n=44) in the pre-intervention survey while during the postsurvey, 39 staff members participated (n=39). These numbers indicate the plan to educate 50% of the full-time staff was completed. Participant demographics including age, position,

gender, educational level, and number of years as a practicing in nursing are shown in Table 1. Using the same set of questions for both the pre-intervention and post-intervention surveys ensured consistency in data collection. It also allowed for direct comparison of responses over time. Additionally, encouraging participants to use a passphrase known only to them was intended to provide security and confidentiality to the survey process. During the post survey, however, some staff members did not participate while others had forgotten their pass phrase. Prior to commencing data analysis, participants with inconsistent passphrases across the pre and post survey were identified and removed from the dataset. The end number comparison was 28 (*N*=28).

Table 1: Demographics

	Pre-Intervention Percentages n=44	Post Intervention Percentages n=39
Age		
20-30	29.5	25.6
31-40	22.7	28.2
41-50	22.7	23.1
50 and above	25	23.1
Gender		
Male	18.2	15.4
Female	81.8	84.6
Position		
Nurse	52.3	64.1
Nurse assistant (CNA)	36.4	34.9
Monitor Technician (CNA)	15.9	0
Education		
GED		
High School	2.2	0
Vocational training	52.3	43.6
College/University	6.8	5.1
Doctorate/PHD	36.4	38..7
	2.3	2.6
Years Practicing in Nursing		
0-5	40.9	43.6
6-10	18.2	20.5
11-15	13.6	10.3
16 and above	27.3	25.5

Results of Analysis

Using the pre and posttest intervention, the DNP student compared staff knowledge pre and post education and compared the mean scores. The pretest and posttest consisted of some Likert scale questions and knowledge-based questions. After completion of the pre and posttest mean scores for 4 out of the 11 questions were analyzed using Excel. A mean score was

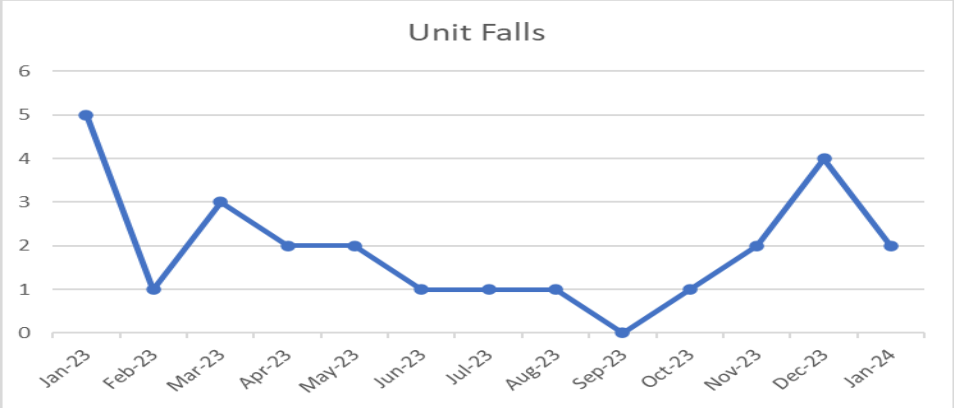
calculated for questions 2,3 4 and 7 from the pre and post intervention questionnaire (Appendix D). The results are shown in table 2.

Table 2: Mean Scores

Questions	Question 2 n=28	Question 3 n=28	Question 4 n=28	Question 7 n=28
Pretest	4.107	3.821	3.821	3.964
Posttest	4.429	4.393	4.214	4.179
Mean Difference	0.322	0.572	0.393	0.215

The mean results from the posttest were all higher than the pretest mean scores on all 4 questions. A look at the fall rates post education did not, however, show any decrease in fall rates for the unit. The increase in mean score indicates a positive shift in respondents' understanding of the role of video monitoring in effective fall prevention, possession of adequate knowledge about the Morse Fall Scale, and sufficient educational training on the implementation of video monitoring to prevent falls and agree with the current selection process for patients to be on video monitoring. However, with no decrease in fall rates post intervention (Figure 1), there may be a need for additional teaching or further exploration to evaluate the post education intervention.

Figure 1:Unit Falls



In addition to assessing staff knowledge on fall prevention strategies and effectiveness of video monitoring, the survey included inquiries about staff confidence in the use of video monitoring, hospital policy, physician orders, staff notification, any additional educational needs and best fall prevention strategies. Table 3 shows these results of the survey.

Table 3: Survey Results

		Pre-Intervention	Post Intervention
Level of confidence	Confident Somewhat confident Unsure Not confident	69.8% 18.6% 9.3% 2.3%	74.4% 25.6%
Hospital Policy	Yes No	93% 7%	94.9% 5.1%
Physician Order	Yes No	83.7% 16.3%	92.3% 7.7%

Also, the survey encompassed knowledge-based questions such as querying the annual incidence of hospital fall-related deaths, identifying educational needs related to video monitoring, and soliciting opinions on effective fall prevention strategies. The retention of knowledge regarding hospital fall-related deaths significantly improved post-intervention, with 71.8% of participants correctly identifying the number of deaths per year, compared to only 1 participant during the pre-intervention survey. Some common themes regarding further educational needs included monitoring criteria, setting up the camera, using the camera and troubleshooting. Some participants requested in-services, quarterly training, and learning modules to assist with camera utilization. Regarding the most effective fall prevention strategies, the common themes identified included the use of video monitoring, lap belts, bed alarms, morse fall scale, hourly rounding, call light, and bedside sitters.

Economic Evaluation

There was no decrease in fall rates, thus no direct cost savings. Though cost savings were not realized for this project, it is important to note that according to the existing literature there is always significant cost savings when video monitoring is used instead of bedside sitters.

Project Evaluation

The mission of the project was partly achieved. There was an increase in mean scores indicating staff comprehension of the material provided in the education but no corresponding decrease in fall rates.

Limitations

This project faced several limitations that impacted its execution and outcomes. Firstly, a significant constraint was challenges in communication with the risk management department, primarily aimed at obtaining root cause analyses for falls. Several attempts through emails and

phone calls proved challenging as risk management remained unresponsive. This affected the student's ability to access crucial data essential for understanding the underlying causes of falls within the facility. In regards to cost, the facility was also not forthcoming with information about its cost of falls and the expenses related to implementing camera monitoring systems. This impacted the student's capacity to conduct a comprehensive cost-benefit analysis and assess the economic implications of fall prevention measures–particularly video monitoring accurately.

Moreover, the monitoring company responsible for supplying monitoring units was unable to disclose the cost of a single monitoring unit despite multiple inquiries. The student was told cost was different for every medical institution and cost per unit could not be revealed. The student was provided with information of cost savings analysis and not the actual cost of a monitoring unit. This lack of transparency regarding equipment costs impeded the project's ability to accurately assess the feasibility and affordability of implementing monitoring solutions and comparing cost savings to bedside sitters for this facility.

Lessons Learned

A review of literature showed video monitoring was effective in fall prevention. Despite the participation of staff, there were shortcomings. The mission of the project was to provide education to 50% of the staff. Participation was lower than the anticipated number. For future studies, a survey should be carried out for a longer time to increase staff participation. With this method, several assessments and adjustments can be made during the project. Also, the survey did show that the staff wanted additional education and quarterly in-service about AvaSure. Video monitoring education can be incorporated in new hire and new graduate orientation sessions while other staff receive continuing education. Patients and their families should also be

educated about fall prevention and the different fall prevention methods used by the facility, so that they are aware of video monitoring and how it works.

Discussion of Project

In 1996, the joint commission created a sentinel event policy. This was to help healthcare organizations that experience serious adverse events improve safety. Falls are a major safety concern in healthcare. Since 2019, falls have steadily increased as the most reported sentinel event. When a patient falls, it affects both the patient and the organization. According to a review of literature, video monitoring has been effective in preventing falls and decreasing hospital cost for 1:1 bedside sitter. During the project, a survey was conducted to assess staff knowledge on the use of video monitoring. An educational intervention was delivered to fill the knowledge gap. With appropriate education, the goal was to achieve a corresponding decrease in fall rates.

Summary

Falls comprise the largest category of preventable events in the hospital (Dykes et al., 2023). Falls and fall related injuries continue to be a very important issue in healthcare and has been on the rise for the past four years (*Sentinel Event*, 2017). Using video monitoring to prevent falls provides continuous visualization of patients at risk for falls. There was an increase in mean scores post education. Increase in mean scores shows staff retained knowledge on the importance of video monitoring in fall prevention. By employing the pre- and post-test design, the project ensures a direct comparison of staff knowledge before and after the intervention. This method allows for the measurement of knowledge retention over time. This design feature enhances the reliability and trustworthiness of the project's findings as evidenced by the increase in mean scores. Thus, the project provides valuable insights into the effectiveness of an educational

intervention in enhancing staff understanding of the importance of video monitoring in fall prevention. This strengthens its utility for informing future healthcare practices.

Interpretation and integration with literature

Falls and fall related problems continue to be a significant safety issue in healthcare. During this project, one of the missions was to increase staff awareness on the efficacy of video monitoring. Most findings from the survey were consistent with a study by Votruba et al., (2013) which stated that video monitoring was an effective tool in fall prevention. Also, one of the goals determine staff educational needs on the use of video monitoring. A study by Spano-Szekely et al., (2019) did reveal that assessing staff knowledge and educating them on video monitoring had a positive outcome in preventing falls. Cost savings when using video monitoring as compared to one-to-sitters was significant in many studies. These studies were consistent with my finding that healthcare organizations save more money when virtual sitters are utilized. A study by Hogan Quigley et al., revealed more than $97000 was saved while using virtual sitters.

Implications for Nursing Practice

Patient falls have a significant effect on the organization and healthcare system in general. Nursing staff play a crucial role in fall prevention in the acute care setting. The project's findings suggest that there is a need for ongoing education and training focused on the use of video monitoring as a strategy for fall prevention. Accessing data related to root cause analysis post intervention during this project was a challenge due to facility policies. The target goal of staff education was to assess educational needs. The pre survey showed nurses require more education about video monitoring. The presence of video monitoring on the unit does not mean it is utilized to its full potential. Thus, continuous education on the efficacy of video monitoring in fall prevention should be a priority.

Dissemination and Utilization of Results

Once this project is completed, the results of the project will be discussed with hospital administration in the form of a poster presentation and an executive summary. Permission will be requested to share results on the unit where the project was conducted. Given the sensitive nature of patient fall data, any publication or presentation derived from this project's data will first be discussed with the facility CNO and risk management personnel. This may mean that the data are not shared publicly in the short -term.

Appendix A

AvaSure Video Monitoring Camera

Retrieved from

https://medcom.uiowa.edu/theloop/wp-content/uploads/2018/01/video-monitoring-unit-721x1024.jpg

Appendix B

Prisma Chart

Appendix C

Evidence Table

Citation	Setting/ Sampling	Research Design	Data Analysis	Results	Level of Evidence	Comments
Woltsche, R., Mullan, L., Wynter, K., & Rasmussen, B. (2022). Preventing patient falls overnight using video monitoring: A clinical evaluation. International Journal of Environmental Research and Public Health, 19(21), 13735. https://doi.org/10.3390/ijerph192113735	Acute care hospital	Cohort Design Study	Descriptive Statistics	Decrease in falls and cost	Six	Started on night shift and later extended on day shift due it's success.
Daley, B., Fetherman, B., & Turner, J. (2020). Staffing utilization and fall prevention with an electronic surveillance video system. Journal of Nursing Care Quality, 36(1), 57–61. https://doi.org/10.1097/ncq.0000000000000472	Acute care hospital with 1032 participants	Randomized Control Trial	Descriptive Statistics	There was a decrease on the need for bedside sitters	Two	Decrease in number of falls per thousand patient days and decrease in cost
Hogan Quigley, B., Renz, S. M., & Bradway, C. (2021). Fall prevention and injury reduction utilizing virtual sitters in hospitalized patients. CIN: Computers, Informatics, Nursing, 39(12), 929–934. https://doi.org/10.1097/cin.0000000000000773	11 Acute care Hospital and 1 acute rehabilitation.12 articles reviewed	Literature Review		Though a variative in sample sizes, all shows no increase in fall.	Six	The number of patients being monitored virtually varied from 8-12. There was no

				However, some shows a decrease in falls while others show no significant change		increase in the number of falls.
Greeley, A. M., Tanner, E. P., Mak, S., Begashaw, M. M., Miake-Lye, I. M., & Shekelle, P. G. (2020). Sitters as a patient safety strategy to reduce hospital falls. Annals of Internal Medicine, 172(5), 317. https://doi.org/10.7326/m19-2628	Acute care	Systematic Review		Adding sitters to patient care does not reduce falls	One	Nursing interventions coupled with video monitoring for fall prevention was unchanged or lower
Oh-Park, M., Doan, T., Dohle, C., Vermiglio-Kohn, V., & Abdou, A. (2020). Technology utilization in fall prevention. American Journal of Physical Medicine & Rehabilitation, 100(1), 92–99. https://doi.org/10.1097/phm.0000000000001554	Reviewed articles about patients in the hospital and the elderly at home	Literature review	t-test	Combining other fall prevention precautions and video monitoring will help decre	six	Virtual sitters with customization of alarm per patient need led to a decrease in falls. Multicomponen

				ase falls.		t programs worked best despite no evidence about which evidence is superior
Spano-Szekely, L., Winkler, A., Waters, C., Dealmeida, S., Brandt, K., Williamson, M., Blum, C., Gasper, L., & Wright, F. (2019). Individualized fall prevention program in an acute care setting. Journal of Nursing Care Quality, 34(2), 127–132. https://doi.org/10.1097/ncq.0000000000000344	Acute care	Evidence bases project		54% decrease in fall rate. However, patient with impulsive behaviors still fell.	Six	Sitters in clusters (1:4) is also ineffective
Sand-Jecklin, K., Johnson, J., Tringhese, A., Daniels, C., & White, F. (2019). Video monitoring for fall prevention and patient safety. Journal of Nursing Care Quality, 34(2), 145–150. https://doi.org/10.1097/ncq.0000000000000355	Acute care hospital	Descriptive Study		There was a decrease in sitter use and a decrease in falls.	Six	The use of an overhead paging system to alert staff when unable to redirect a patient using voice comma

						nds on cameras
Cournan, M., Fusco-Gessick, B., & Wright, L. (2018). Improving patient safety through video monitoring. Rehabilitation Nursing, 43(2), 111–115. https://doi.org/10.1002/rnj.308	115 bed inpatient rehabilitation	Sequential cohort design	t-test	There was statistically significant decrease in the number of falls	Six	There was a decrease in in room hallway falls but an increase in in room falls. Video monitor technician monitoring from a remote location with ability to redirect patient
Wood, V. J., Vindrola-Padros, C., Swart, N., McIntosh, M., Crowe, S., Morris, S., & Fulop, N. J. (2018). One to one specialling and sitters in acute care hospitals: A scoping review. International Journal of Nursing Studies, 84, 61–77. https://doi.org/10.1016/j.ijnurstu.2018.04.018	Acute care. 16 studies reviewed	Scoping review	Kappa statistics (K=0.75)	Though there is lack of conceptual clarity, there was both positive and negative	six	Some studies found no difference in measure when compared to the control group. Others found a decrease in

				outcomes.		falls while others said the impact was unclear leading into other alternative such a visual monitoring to be tested.
Purvis, S., Kaun, A., McKenna, A., Weber Viste, J., & Fedorov, E. (2018). Outcomes of clinical nurse specialist practice in the implementation of video monitoring at an academic medical center. Clinical Nurse Specialist, 32(2), 90–96. https://doi.org/10.1097/nur.0000000000000356	Acute care hospital	Quality Improvement		Video monitoring decreased falls and improved patient outcomes	Six	6 months into the program, there was only one fall with virtual monitoring as compared to 8 while utilizing a personal care attendant
Quigley, P. A., Votruba, L., & Kaminski, J. (2019). Outcomes of patient-engaged video surveillance on falls and other adverse events. Clinics in Geriatric Medicine, 35(2), 253–263. https://doi.org/10.1016/j.cger.2019.01.005	Acute care hospital with 15021 participants	Descriptive Study		Staff educated and decrease in falls	Six	One technician monitored 16 patients.

Votruba L, Graham B, Wisinski J, Syed A. Video Monitoring to Reduce Falls and Patient Companion Costs For Adult Inpatients. Nurs Econ. 2016 Jul-Aug;34(4):185-9. PMID: 29975024.	Acute care	Descriptive Study		There was a 35% decrease in falls with video monitoring	six	Monitor technician were trained on behavioral clues. Patient redirected by monitor technician before escalating if unsuccessful
Lang, C. E. (2014). Do sitters prevent falls? A review of the literature. Journal of Gerontological Nursing, 40(5), 24–33. https://doi.org/10.3928/00989134-20140313-01	Acute care	Literature review		Using sitters in combination with other interventions decreased the risk for falls	six	Using sitters alone does not decrease fall rates
Jeffers, S., Searcey, P., Boyle, K., Herring, C., Lester, K., Goetz-Smith, H., & Nelson, P. (2013). Centralized video monitoring for patient safety: a Denver health lean journey. Nursing Economics, 31(6), 298+. https://link.gale.com/apps/doc/A354145691/AONE?u=unlv_main&sid=bookmark-AONE&xid=1e34c64a	Acute care hospital with 525 beds	Quality Improvement		Video monitoring led to a decrease in falls to	six	57 fall prevention in the first 3 months. Consent and docume

				below National Database of Nursing Quality Indicators level.		ntation in real time.
Hardin, S. R., Dienemann, J., Rudisill, P., & Mills, K. K. (2013). Inpatient fall prevention. Journal of Patient Safety, 9(1), 29–35. https://doi.org/10.1097/pts.0b013e3182753e4f	Acute care hospital	Randomized Control Study	Descripted and inferential statistics	There was a decrease in the number of falls	Two	Secured real time video recording. Nurse view and virtual bedrails which creates an alarm once borders are crossed by the patient. Camera at nurses' station and nurse responds to alarm

Spiva, L., Feiner, T., Jones, D., Hunter, D., Petefish, J., & VanBrackle, L. (2012). An evaluation of a sitter reduction program intervention. Journal of Nursing Care Quality, 27(4), 341–345. https://doi.org/10.1097/ncq.0b013e31825f4a5f	Acute care hospital		Descriptive and Inferential statistics	Decrease in fall and cost	six	Educational training provided to staff. Consent not required by patients

Appendix D

Synthesis Table

Study and Author	Year	Number of participants	Sample characteristics	Study design	Intervention	Major finding that addresses an aspect of your picot question
Woltsche, R et al	2022	77	77	CS	Used baby monitors at night only, education and consent	Fall decrease
Daley, B et al	2021	1032	1032	RCT	CVM with R and non-R, education	Fall decrease
Hogan Quigley	2021	12	12	LR	Synthesize review of different studies	Fall decrease
Greely et al	2020	20	20	SR	Adding sitter use and introduction of other alternatives	No increase in falls
Oh Park	2020			LR	Combined traditional fall prevention methods with technology	Fall decrease
Spano et al	2019	254	254	EBP	VM with EBP adoption, education	Fall decrease
Sand-Jecklen et al	2019	137	137	QI	Education	Fall decrease
Cournan et al	2018	15	15	SCD	1VMT:15patients	Fall decrease
Wood et al	2018	44	44	SR	LAP/UAP/VMT	Mixed Reviews
Purvis et al	2018	8	8	QI	VMD	Fall decrease
Quigley et al	2017	15021	15021	DS	Education	Fall decrease

Vortuba	2016	828	828	PDS	Education, 1VMT:12 patients	Fall decrease
Lang	2014	12	12	LR	Decrease the use in sitters	Fall decrease
Jeffers, S et al	2013	525	525	QI	2VMT, SCR, feedback logs	Fall decrease
Hardin et al	2013	51835	10	RCT	Nurse view and virtual bedrail	Fall decrease.
Spiva	2012			DS	Decrease in use of sitters	Fall decrease

RCT; randomized control study, CVM; central video monitoring, CS; cohort study, R; rounder, UAP; unlicensed assistive personnel, LAP; licensed assistive personnel, VMT; video monitor technician, EBP; evidence-based practice, LR; literature review, QI; quality improvement, SR; systematic review, VMD; video monitoring device, DS; descriptive study, CSS; cross sectional survey, PDS; prospective descriptive study.

Appendix E

Pre and Post Survey Intervention Questions

Pre and Post Educational Questionnaire

Demographics

1. Age:

2. Gender:

3. Position:

4. Highest level of education:

5. Number of years practicing:

Survey Questions

1. Passphrase

2. Please indicate your level of agreement with the statement that video monitoring is effective in prevention of patient falls. a) Strongly disagree

b) Disagree

c) Neither agree nor disagree

d) Agree

e) Strongly agree

3. Please indicate your level of agreement with the statement that you possess adequate proficiency in using the Morse Fall Assessment. a) Strongly disagree

b) Disagree

c) Neither agree nor disagree

d) Agree

e) Strongly agree

4. Please indicate your level of agreement with the statement that you are satisfied with the educational training you received on the implementation of video monitoring to prevent patient falls. a) Strongly disagree

b) Disagree

c) Neither agree nor disagree

d) Agree

e) Strongly agree

5. Do you understand hospital policy and procedure for the use of video monitoring? a) Yes

b) No

6. Do you need a physician order for patient to be on video monitoring? a) Yes

b) No

7. Please indicate your level of agreement with the statement that you agree with the current selection process for patients who meet video monitoring criteria. a) Strongly disagree

b) Disagree

c) Neither agree nor disagree

d) Agree

e) Strongly agree

8. What form of notification will be most effective from the video monitor technician to the nursing staff?

9. How would you rate your confidence with using video monitoring. a) Confident

b) Somewhat confident

c) Unsure

d) Not confident

10. How many people die from hospital falls each year?

11. What additional education do you need to help with video monitoring?

12. Which fall prevention strategies do you think are effective?

Test Design

A pretest posttest design will be used.

Pre implementation Survey.

Educational sessions using poster board.

Post implementation survey (same questions as pre-implementation survey).

Analysis of the pre and post test results using excel

Compare the means of both samples using Excel

Appendix F

Morse Fall Scale

Morse Fall Scale

Fall Risk is based upon Fall Risk Factors and it is more than a Total Score. Determine Fall Risk Factors and Target Interventions to Reduce Risks. Complete on admission, at change of condition, transfer to a new unit, and after a fall.

Variables		Score	Admission Date	Review Date	Review Date
History of Falling	No Yes	0 25			
Secondary Diagnosis	No Yes	0 15			
Ambulatory Aid	None/bedrest/nurse assist	0			
	Crutches/cane/walker	15			
	Furniture	30			
IV or IV access	No Yes	0 20			
Gait	Normal/bedrest/wheelchair	0			
	Weak	10			
	Impaired	20			
Mental Status	Knows own limits	0			
	Overestimates or forgets limits	15			
		Total			
		Signature & Status			

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

Note: Complete checklist for resident assessed based on level of risk.

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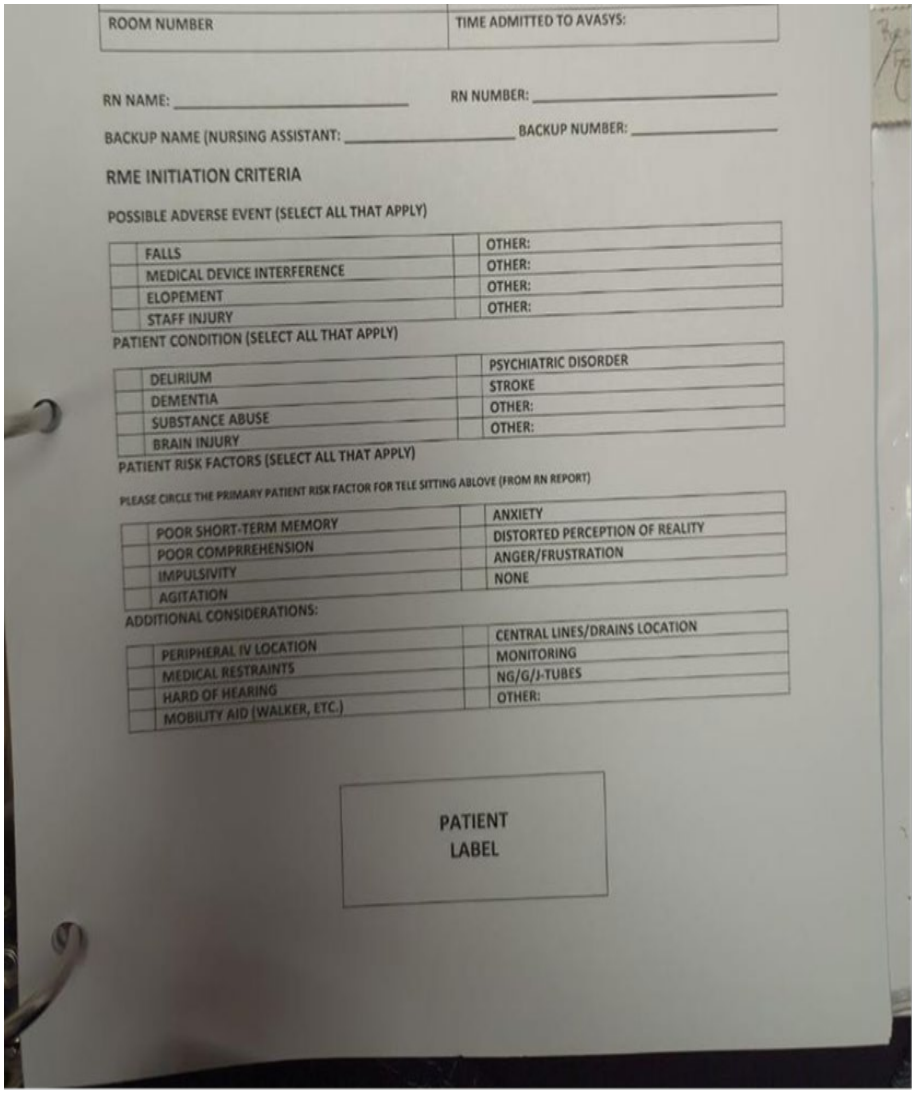
Appendix G

Facility Intake Form



ROOM NUMBER	TIME ADMITTED TO AVASYS:

RN NAME: _____ RN NUMBER: _____

BACKUP NAME (NURSING ASSISTANT: _____ BACKUP NUMBER: _____

RME INITIATION CRITERIA

POSSIBLE ADVERSE EVENT (SELECT ALL THAT APPLY)

	FALLS		OTHER:
	MEDICAL DEVICE INTERFERENCE		OTHER:
	ELOPEMENT		OTHER:
	STAFF INJURY		OTHER:

PATIENT CONDITION (SELECT ALL THAT APPLY)

	DELIRIUM		PSYCHIATRIC DISORDER
	DEMENTIA		STROKE
	SUBSTANCE ABUSE		OTHER:
	BRAIN INJURY		OTHER:

PATIENT RISK FACTORS (SELECT ALL THAT APPLY)

PLEASE CIRCLE THE PRIMARY PATIENT RISK FACTOR FOR TELE SITTING ABLOVE (FROM RN REPORT)

	POOR SHORT-TERM MEMORY		ANXIETY
	POOR COMPRREHENSION		DISTORTED PERCEPTION OF REALITY
	IMPULSIVITY		ANGER/FRUSTRATION
	AGITATION		NONE

ADDITIONAL CONSIDERATIONS:

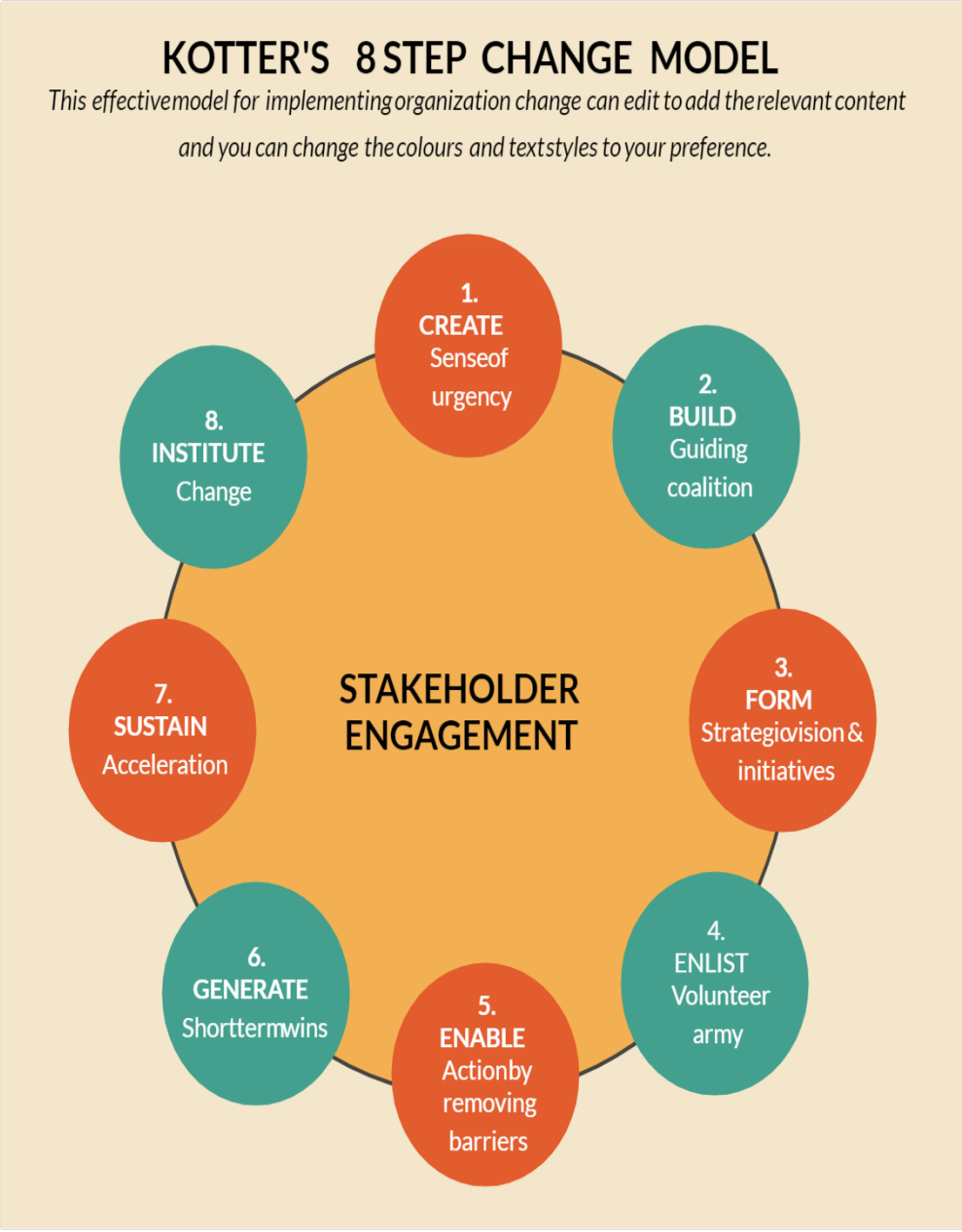
	PERIPHERAL IV LOCATION		CENTRAL LINES/DRAINS LOCATION
	MEDICAL RESTRAINTS		MONITORING
	HARD OF HEARING		NG/G/J-TUBES
	MOBILITY AID (WALKER, ETC.)		OTHER:

PATIENT LABEL

*Note: this document is specific to the institution and as such was only available in this form

Appendix H

Kotter and Cohen Change Theory



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Appendix I

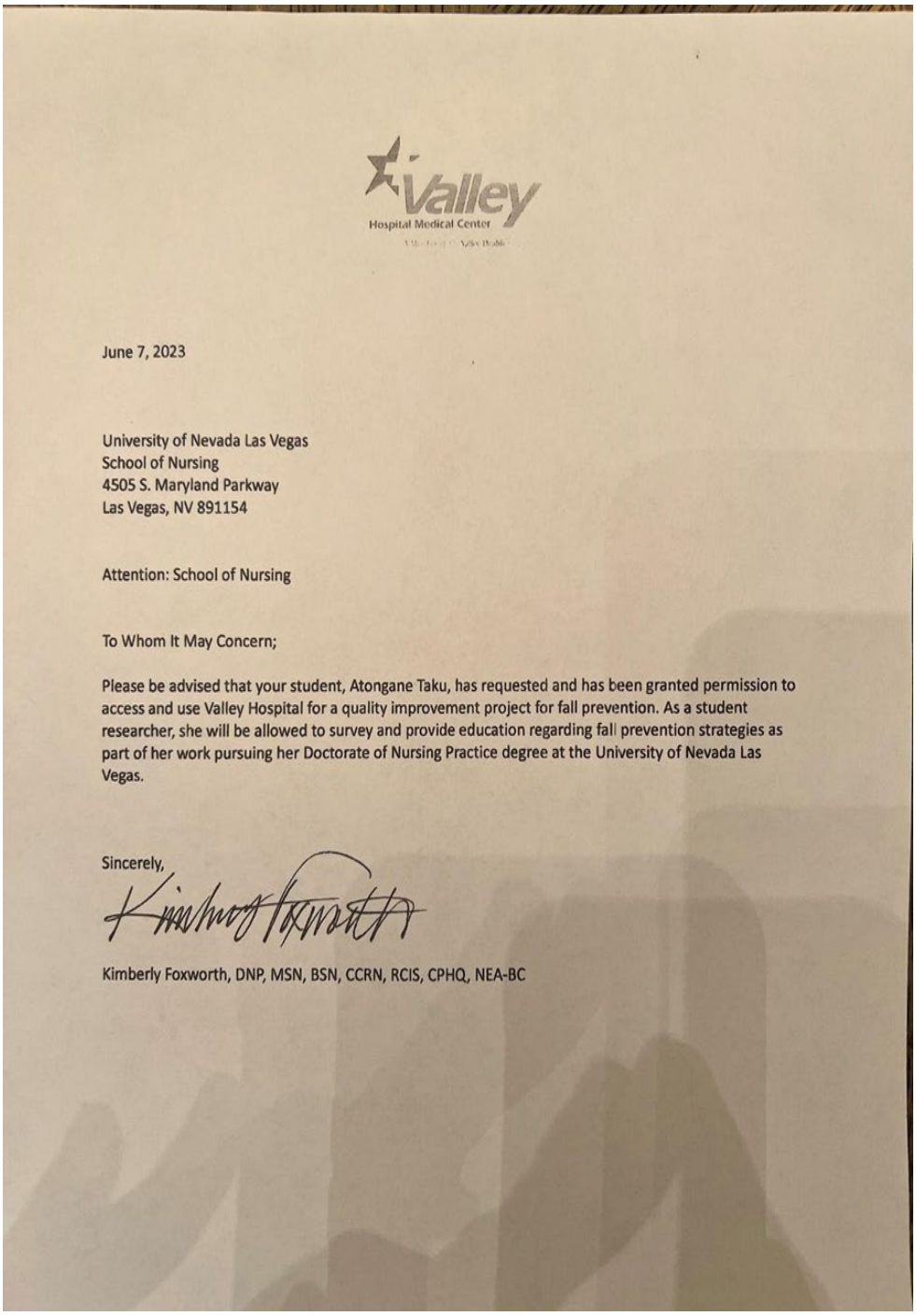
Gantt Chart

Task/Date	Date	Date	Date	Date	Date	Date	
Project team meeting	1/10	1/19	2/2	2/24	3/24		
Meet with Librarian	2/10	4/4					
Proposal/Draft Updates	2/13	2/26	3/15	3/20	3/26	4/2	4/10
Create/update evidence table	3/4	4/8					
Meet with rep from writing center	3/8						
Update ROL –Update Study Flow Diagram	3/10	4/5					
Update Literature appraisal and synthesis	3/10	4/5					
Create project tools	3/15	3/20					
Budget Plan	3/19	3/1/24					
Oral defense PowerPoint	3/20	3/25	2/28/24	2/29/24	3/1/24	3/2/24	2/5/24
Proposal for presentation/final draft	3/11/24						
Statistical consultation	4/14/23	1/19/24	2/8/24	2/14/24			
Schedule oral defense	4/24						

Attend Avasure conference	5/4						
Update methods	5/10						
IRB determination	7/7						
Conduct organizational assessment	8/1						
Complete pre intervention survey	10/1/23 - 11/19/23						
Complete education with staff	11/26/23						
implementation phase	11/27/23- 1/17/24						
Post survey	1/18/24 - 1/30/24						
Final Defense	04/8/24						

Appendix J

Facility Approval Letter



Valley
Hospital Medical Center

June 7, 2023

University of Nevada Las Vegas
School of Nursing
4505 S. Maryland Parkway
Las Vegas, NV 891154

Attention: School of Nursing

To Whom It May Concern;

Please be advised that your student, Atongane Taku, has requested and has been granted permission to access and use Valley Hospital for a quality improvement project for fall prevention. As a student researcher, she will be allowed to survey and provide education regarding fall prevention strategies as part of her work pursuing her Doctorate of Nursing Practice degree at the University of Nevada Las Vegas.

Sincerely,

Kimberly Foxworth, DNP, MSN, BSN, CCRN, RCIS, CPHQ, NEA-BC

Appendix K

IRB Approval Letter

UNLV

School If Nursing

DNP Project Human Subject Safety and Protection Review

Notice of Excluded Activity

DATE: August 14, 2023

TO: Atongane Taku
FROM: School of Nursing DNP Project Course Committee

PROTOCOL TITLE:
Identifying the Efficacy of Remote Video Monitoring in Preventing Patient Falls

SUBMISSION TYPE: Initial

ACTION: No Human Subjects Research
REVIEW DATE: June 27, 2023
REVIEW TYPE: ADMINISTRATIVE REVIEW

Thank you for your submission of materials for this proposal. This memorandum is notification that the proposal referenced above has been reviewed as indicated in Federal regulatory statutes 45 CFR 46.

In accordance with the UNLV IRB and Human Subject Safety and Protection considerations, the review of the DNP project as a review process has been approved by the UNLV IRB. This process includes a review by Graduate Faculty in the School of Nursing and the DNP Program Director with Human Subjects Safety and Protection training prior to approval for implementation. This process is carried out as an additional review given DNP projects are typically Quality Improvement (QI) or meet the clarification of an exempt IRB status.

The School of Nursing DNP Project Review Committee has determined this request does not meet the definition of 'research with human subjects' according to federal regulations, and there is no further requirement for IRB review. As such, the School of

DNP Project Proposal for Human Subject Safety and Protection

Nursing provides a level of review and consideration for human subject safety and protection through this course associated review. As a formal IRB submission is not required, the following guidance is applicable and must be followed to ensure ongoing transparency and oversight of the proposed project.

Any changes to this excluded activity may cause this request to require a different level of review, so please contact our office to discuss any anticipated changes.

If you have questions, please contact the DNP Program Director and your course faculty. Please include your project title in all correspondence.

Proposal Reviewed and Approved by:

Kathleen Thiessen DNP — August 14, 2023
DNP Project Course Faculty — Date

Leslie Seter — 8/16/2023
DNP Project Course Faculty — Date

Candace W Burton — 8-16-23
DNP Program Director — Date

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Curriculum Vitae

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