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A Quality Improvement Project to Improve the Management of Patients at Risk for Falls

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A QUALITY IMPROVEMENT PROJECT TO IMPROVE THE MANAGEMENT OF PATIENTS AT RISK FOR FALLS

A DNP Project Submitted to the
Graduate Faculty
of Jacksonville State University
in Partial Fulfillment of the
Requirements for the Degree of
Doctor of Nursing Practice

By

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ABSTRACT

Background: Falls are one of the most common adverse events in the hospital. Falls can result in injury, increased hospital length of stays, increased costs and use of hospital resources, and death. The risk of falling is even higher for hospitalized patients due to unfamiliar environments, new medications and treatments, acute illness symptoms, surgery, bed rest, lines, tubes, and catheters.

Purpose: This quality improvement project aimed to increase awareness of the importance of fall prevention in the hospital setting and educate nursing staff on fall prevention to decrease patient falls.

Methods: This project utilized a quasi-experimental study design that includes education on multifactorial fall interventions and pre-and post-educational evaluation using a convenient sample of (n=23) registered nurses, licensed practical nurses and patient care assistants on the medical-surgical floor. A pre and post-test comparison and fall rate calculations were instruments used to collect and calculate data to measure the project's outcomes.

Results: This project used a paired t-test to compare overall pre and post-test results related to knowledge gained from the educational intervention. The paired t-test looked at the pre-and post-education scores per participant. A statistically significant improvement in knowledge was found between the pre-and post-education scores of participants (t=2.7481, p=0.01174).

Conclusion: This quality improvement project aimed to educate nursing staff on fall prevention and injuries related to falls to reduce falls at the project facility. Since nurses play such a pivotal role in preventing patient falls, the literature supports educating nurses about fall prevention. The findings from this study indicate nurse education can increase knowledge of patient falls and fall prevention. Therefore, identifying risks can lead to decreased patient falls and injuries related to falls, resulting in an overall reduction in hospitalization costs.

Keywords: Falls, fall prevention, fall protocols, fall risk

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A Quality Improvement Project to Improve the Management of Patients at Risk for Falls

Introduction

Falls are a significant health concern in the acute setting, and they are one of the most common adverse events in the hospital (Watson et al., 2015). The World Health Organization (WHO, 2018) defines a fall as "an event which results in a person coming to rest inadvertently on the ground, floor, or other lower-level" (p.1). Falls can result in injury, increased hospital length of stay, and death (The Agency for Healthcare Research and Quality [AHRQ], 2021). Hospitals are responsible for keeping their patients safe but preventing falls can be a challenging problem. After a needs assessment was conducted on a medical-surgical unit in a large metropolitan hospital in the southeastern United States, the student and management team identified falls as being a significant problem on a medical-surgical unit at the chosen project site. In January 2021, the project facility had 20 falls, increasing from 16 in December 2020. In the last quarter of 2020, the facility had a fall rate of 3.44%. The purpose of this project was to improve patient safety and reduce the financial burden associated with falls by educating nursing staff on the current fall protocols in the facility chosen for the project.

Background

Falls that occur in hospitalized patients are a severe problem for patient safety. Each year 700,000 to 1,000,000 million people in the United States fall into the hospital (AHRQ, 2021). Research studies have shown that falls occur at a rate of three to five patients per 1,000 bed stays, and 30% to 50% result in injuries such as fractures, internal bleeding, lacerations, and death (AHRQ, 2021). The WHO (2021) reported falls as the

second leading cause of accidental injury deaths worldwide. Falls can cause prolonged stays, increased demands of health care resources, and poor patient outcomes. Falls that do not include injury can also be psychologically devastating to patients. It can result in fear and anxiety of falling, leading to a downward spiral of decreased mobility.

As of 2008, the Centers for Medicare and Medicaid Services (CMS) no longer reimburse hospitals for fall-related injuries that occur while the patient is hospitalized (AHRQ, 2021). Medicare costs for injuries total over $31 billion annually, with hospital costs accounting for two-thirds of that total (Center for Disease Control [CDC], 2016). The cost of a fall in the hospital is estimated at $14,000 and can increase a patient's hospital stay by six to seven days longer (Wang et al., 2019). Hospitals must absorb the cost of falls, and an injury or death can lead to expensive legal claims. Falls create a burden for the entire healthcare system. Therefore employees within the system should maintain and enforce active fall prevention efforts within the treatment plan.

Due to the vast numbers of patients who fall every year, it is a significant concern in healthcare settings (AHRQ, 2021). The risk of falling is even higher for hospitalized patients due to unfamiliar environments, new medications and treatments, acute illness symptoms, surgery, bed rest, lines, tubes, and catheters (The Joint Commission [JCAHO], 2015). Falls are in one of the top ten sentinel events reported to the JCAHO database. Four hundred sixty-five falls were reported in the database, and 63% of the falls resulted in death (JCAHO, 2015). JCAHO made fall prevention a National Patient Safety Goal in all hospitals in the United States in 2019 (JCAHO, 2020). JCAHO established these goals to ensure patient safety in all healthcare settings. Preventing falls can be very

complex and challenging, requiring a multidisciplinary approach. Successful fall prevention protocols include intensive research, thorough educational training, monitored implementation, and strict adherence to protocols. These protocols can help reduce falls and increase patient safety.

Problem Statement

Hospitalized patients are at risk for falls resulting in injury, death, and increased healthcare costs. Prevention strategies should emphasize education, training, creating safer environments, prioritizing fall-related research, and establishing effective policies to reduce risk (WHO, 2021). Nurse and patient education may reduce falls in the healthcare setting. To reduce the number of falls in the project facility, fall prevention protocols were assessed, nurses and nursing assistants were educated on current protocols, and learning retention was evaluated. This project was implemented to increase nurse and staff knowledge about fall reduction procedures to reduce falls in an acute care medical-surgical facility.

Organizational Description of Project Site

This project took place in a 505-bed facility located in a metropolitan city in the southeastern United States. The large acute care facility offers a full range of services to meet the community's diverse needs. It serves approximately 53,000 patients annually and has a 54-bed intensive care unit and a full-service emergency department (Princeton Baptist Medical Center, 2021). The medical-surgical floor where the project takes place has 41 beds and is fully staffed with full and part-time employees. Despite implementing a wide range of fall prevention protocols, falls continue to occur and are considerable

challenge for this facility.

Review of the Literature

When revising a fall prevention plan for this project, data were collected according to evidence-based findings from an exhaustive literature review. Multiple search engines, including Medline, EBSCO HOST, Cochrane, PubMed, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL), were used during this process to gather pertinent evidence-based data on fall prevention in the hospital setting. Keywords such as falls, fall prevention, falls in the hospital setting, and fall prevention interventions helped search for current literature on falls in the acute care setting.

According to the literature, many of the fall program initiatives were quality improvement projects that included implementing fall risk tool kits and educating nursing staff and patients. Educational interventions are standard for implementing change in the healthcare field. Nurses provide the most direct clinical care of patients in the hospital; therefore, the administration relies heavily on them to conduct patient education. According to DiGerolamo and Chen-Lim (2021), a fall prevention educational session was provided to a group of oncology nurses. A quasi-experimental method with pre and post-test was employed. Analysis of the data revealed the post-educational session assessment scores were significantly higher than pre-educational session scores, and overall knowledge following the educational session increased by 63%.

Basic knowledge of fall prevention is crucial for preventing accidents and can be improved through nursing education. Dykes et al. (2010) conducted a study to evaluate a

hospital-based patient-centered fall prevention kit. This study showed that the fall prevention knowledge test's mean scores obtained before and after fall prevention education improved from 5.1% to 6.6%. Results supported the belief that educating nurses and assessing their knowledge is needed to create effective fall prevention educational programs. Johnson et al. (2015) conducted a study to evaluate the impact of an e-learning educational program for nurses concerning fall risk screening, falls prevention, and post-falls management. Data was collected using a pre-, and post-test, along with an e-learning falls program. Audits of patient health records revealed an increase in hazard clearance, chair and bed alarms, non-slip footwear, flagging of high-risk patients, supervised mobilization, and allied health staff, indicating improved preventative interventions.

Most fall prevention strategies are nurse-led. A nurse's attitude can determine their performance, motivation, and learning. A cross-sectional study conducted by Cho and Jang (2020) assessed the knowledge and attitude of nurses regarding falls and fall prevention activities in small and medium-sized hospitals. The focus was participant characteristics, education regarding patient falls, knowledge of stretcher cart use, attitudes regarding patient falls, and engagement in fall prevention activities over one month. Results indicated that more experienced nurses (five years or more) had significantly higher knowledge levels than newer nurses. However, engagement in fall-prevention activities did not differ based on level of experience (see Table 1.

Nurse attitudes regarding falls were correlated with the number of educational sessions attended. Those who attended five or more fall-prevention education sessions

showed more positive attitudes toward patient falls than nurses who only attended one or two sessions. Engagement in fall prevention activities did not differ significantly by experience with fall-related education (see Table 2).

The mean proportion of correct answers on the items regarding falls was 48.9% (an average of 6.5 four out of 14 items). The lowest proportion of correct answers was the state of consciousness, while the highest was high-risk age. Attitudes about falls were positively related to engagement in fall prevention activities (r =.25, p=.001). The mean rate of positive attitudes regarding falls with 76.2% (mean 3.81, SD 0.34) (see Table 3).

No significant relationships were observed between knowledge of falls an engagement in fall prevention activities (r = -.09, p = .267) or knowledge of falls and attitudes toward falls (r = .09, p= .240); however, the mean rate of engagement in fall-prevention activities was 82.3% (mean = 3.29, SD = 0.50) (see Table 4).

There is a wide range of fall prevention interventions that hospitals can implement to reduce falls risk and incidents. Multifaceted programs that encompass a wide range of intervention strategies have shown to be effective in reducing falls. According to Walsh et al. (2018), evidence supports the use of multiple fall prevention interventions implemented in increments every few years over 11 years. The fall prevention interventions include but are not limited to (1) reorganization of the falls committee, (2) identification of high-risk patients, (3) improvement of fall reports, (4) hourly nursing rounds, (5) investigation of falls, (6) patient education, (7) the use of standardized fall prevention equipment, and (8) investigation of root causes. Findings indicated a reduction in fall rates from 3.07 to 2.22 per 1,000 patient days, and injuries declined from 0.77 to

0.65 per 1,000 patient days. This study showed implementing incremental changes over a decade caused a sustained 28% decline in falls.

Research supports fall prevention interventions in the hospital setting, including patient and nurse education to reduce falls. The study conducted by Heng et al. (2020) reviewed 43 articles in which patients were educated about falls. Patient education interventions such as face-to-face education, pamphlets, brochures, handouts, and education tools were used. The patient-centered fall prevention program analysis showed a reduction in falls in hospitals incorporating this type of fall prevention education (2020). These programs have been shown to improve knowledge and self-perception of risk and give patients the autonomy to reduce their risk of falling while in the hospital. In another study conducted by Cuttler et al. (2017), patient education videos, visual icons on fall reduction, and bed exit alarms were used to evaluate patient education effectiveness on falls. Falls decreased by 20% or 4.78 to 3.80 patients per 1,000 patients just days after implementing interventions in an acute care setting. Zhao et al. (2019) express the importance of staff education on patient safety in fall prevention. This article reinforced that staff involvement is critical for implementing fall prevention interventions and fall reduction. Involving nursing staff in developing and implementing fall prevention interventions is essential for buy-in and successful adherence to the program.

A randomized controlled trial conducted by Dykes et al. (2020) investigated whether a fall prevention toolkit decreased patient falls in hospitals. Fall rates were compared in four urban United States hospitals that received usual care and four hospitals that received a fall prevention toolkit. During the 6-month intervention period, the

number of patients with falls differed between control (n = 87) and intervention (n = 67) units (p=.02). Fall rates were significantly higher in control units with a rate of 4.18 per 1,000 patient days than in intervention units with 3.15 per 1,000 patient days. The fall prevention toolkits were found to be highly effective with patients aged 65 years or older. The study concludes use of a fall prevention tool kit significantly reduced the rate of falls. A project conducted by Chidume (2021) used a fall prevention toolkit provided by nurses to patients over 65 years of age in a long-term care facility. The project used pre and post-tests and the components of the Centers for Disease Control and Prevention campaign Stopping Elderly Accidents and Injuries (STEADI) to educate the participants on falls. An initial baseline fall assessment and fall education scores were obtained, and follow-up assessments occurred one month after the first assessment. Lower scores indicated a lower fall risk in both risk assessment tools, and both mean scores decreased over one month. Multiple studies have shown that hourly rounding can be a helpful evidence-based intervention to promote patient safety and reduce falls. In a survey conducted by Harrington et al. (2013), results indicated combining patient education with hourly rounding decreased falls on a medical-surgical floor.

Nurse knowledge and education regarding purposeful hourly rounding can be very beneficial in meeting patient needs, ensuring patient safety, and decreasing patient preventable events such as falls. Nuckols et al. (2017) conducted a study to evaluate the effectiveness and cost of hourly rounding by nurses at two different hospitals. In a hospital in Santa Monica hourly rounding was widely used but fall prevention had not been consistently incorporated into rounds. The hospital in San Francisco encouraged

hourly rounding but did not formalize or adopt it. After implementation at the Santa Monica hospital, self-reported use of hourly nursing rounds was high (99%) at baseline, and the rounding frequency per shift remained stable (9.8% vs. 9.4%, $p = .26$). At San Francisco, the percentage of nurses who reported rounding increased from 88% at baseline to 97% at follow-up ($p < .001$), rounding frequency per shift rose (9.0% vs. 9.8%, $p = .022$), and use of the 5P rounding method increased from 24% to 47% ($p <.001$). At Santa Monica, the estimated fall rate per 1000 patient days declined from 4.13% with a 95% CI [2.86-5.97] during the baseline period to 1.95% with a 95% CI [1.44-2.63] during follow-up (IRR,0.47; 95% CI, 0.26-0.87; $p = 0.16$) based on the negative binomial mixed-effects regression models. At San Francisco, the estimated rate declined from 2.54% (95% CI, 2.02-3.20) at baseline to 2.10% (95%, CI 1.66-2.66) at follow-up (IRR, 0.83, 95% CI, 0.59, 1.17; $p = 0.28$). After incorporating hourly rounding and decreasing falls, there was a projected a 67.9% to 72.2% probability of net savings due to the reduced time nurses spent with fall-related activities. The Institute for Healthcare Improvement (IHI) endorsed hourly rounding as the best way to reduce falls, fall injuries, and increase both quality of care and patient satisfaction (Daniels, 2016).

Evidence-Based Practice: Verification of Chosen Option

Evidence-based practice is frequently used to solve problems and provide helpful insight into healthcare. This project educated nurses on evidence-based practice to prevent falls. Multiple studies support the implementation of fall prevention strategies within the hospital setting. The approach used to solve this clinical issue will be based upon the evidence found in the literature and the recommendations from Joint

Commission and the Agency for Healthcare Research and Quality (AHRQ). The AHRQ (2021) describes universal fall precautions as the basics of patient safety. These include but are not limited to making sure patients are familiar with their environment, ensuring the call light is in reach, placing the hospital bed in the lowest position with the brakes locked, and keeping the floor surface clean, dry, and uncluttered. Using a standardized assessment of risk factors for falls, creating a fall prevention care plan, and providing patient education on falls are examples of evidence-based practices from the AHRQ used in this project (AHRQ, 2021).

Theoretical Framework/Evidence-Based Practice Model

The Johns Hopkins Evidence-Based Practice (JHEBP) Model created by Newhouse et al. (2005) was used to guide this project (see Figure 1). The JHEBP Model is designed to integrate the latest research findings and best practices to clinical practice and patient care. This model uses a three-step process that includes practice questions, evidence, and translation (PET). Each phase has tools and steps that are easily used for clinical decision-making and problem-solving. This model also shows the relationship between research, theory, and education during a project proposal. This project was developed by using the steps of this model. Step one included creating a practice question based on the need for patient safety in hospital settings. Step two contained research and a search for evidence on fall prevention interventions. Step three involved project implementation and translating the research into practice through nurse education.

The JHNEBP Model starts with a focused clinical question such as the PICO(T) question. A question development tool that was used is located in Table 2. A PICO(T)

question allows the clinician to take a clinical problem and turn it into a focused and answerable question to help narrow research. The next phase in this model is searching and appraising evidence. Some of the most robust studies include systematic reviews, meta-analyses, and randomized control trials. Evidence-based practice search engines such as Cochrane, PubMed, National Clearing House, and CINAHL were used in this project to find the most recent and reliable research available. A critical appraisal was also done to determine the research's reliability, value, and relevance. The last phase of the JHNEBP model is the translation phase. It includes creating and implementing the action plan, evaluating outcomes, and communicating findings (Dang and Dearholt, 2017).

Falls are a significant healthcare concern and one of the most common adverse events in the hospital setting, and research shows that close to one-third of falls can be prevented (AHRQ, 2021). After investigation on the medical-surgical unit, it was revealed that nursing staff needed to be educated, and the current fall protocols needed to be revised based upon the most recent research and best practices. The JHEBP model will be used to develop a clinical question, gather and evaluate the most current evidence, and put an action plan into practice to reduce the number of falls.

The Plan Do Check Act (PDCA), a model developed by Edward W. Deming, best addresses this DNP project's clinical concern and PICOT question (The American Society for Quality [ASQ], 2021). A diagram of this model can be found in Figure 2. This model can be used to develop a method of improving fall prevention protocols in any inpatient acute care facility. Deming's continuous quality improvement model was

used in this project as a framework to execute a plan for quality improvement. Elements of the PDCA model include plan, do, check, and act (2021). Each component of the four-step model is essential for achieving continuous improvement for this project.

In the planning phase, problems and opportunities are identified for quality improvement, and an action plan is developed (Patel and Deshpande, 2017). During this phase, objectives and processes that will allow for achieving the targeted goals are established. The second part of the model is the 'Do' phase. This phase includes implementing the plan and carrying out the steps for change. The next step in Deming's model includes the 'Check' phase. The data is gathered and evaluated to see what has been achieved compared to the project's measurable objectives.

In the 1990s, the PDCA model was introduced in the medical field for quality management and was used widely in medical quality control and improvement (Wu et al., 2015). This framework will be used to guide the project because it can be used in any inpatient acute care facility when starting a new improvement project, implementing change, and revising old protocols. The model can be used when starting a new improvement project, developing a new or improved process, and when implementing change (ASQ, 2021). Numerous preventable falls occur every year. This data-based framework will drive this project's continuous efforts to achieve fall prevention improvements and improve the management of patients at risk for falls.

Goals, Objectives, and Expected Outcomes

The objectives of this project are (1) increase awareness of the importance of fall prevention in the hospital setting, (2) assessment of the current fall prevention protocols

based on Joint Commissions Best Practices, (3) implementation of an evidence-based practice fall prevention program that can be quickly adopted and used in an acute care setting, and (4) improve nursing knowledge and behavior for fall prevention strategies. This project's primary goal is to educate nursing staff on the facility's current fall protocols and evidence-based practice guidelines to reduce patient falls and promote patient safety on a medical-surgical floor. The overall expected outcomes will include better identification of fall risks, decrease the number of falls and fall-related injuries, decrease in the length of hospital stays and healthcare costs, and the development of an overall culture of safety.

Project Design

This project provided the opportunity to implement multifactorial interventions to reduce falls among adults on a medical-surgical floor while providing education to the patient care team on evidence-based practices. This is a quality improvement project that has sought to improve the efficiency and knowledge of current fall protocols of the facility by providing education to nurses and nursing assistants. This project utilized a quasi-experimental study design that includes education and multifactorial fall interventions and pre-and post-educational evaluation using a convenience sample of (n= 23) registered nurses, licensed practical nurses, and patient care assistants on the medical-surgical unit. Current fall protocols were assessed, and then participants were educated on these protocols. The information obtained through Joint Commission's evidence-based guidelines allowed the patient care team to recognize, assess, and monitor falls and fall risk patients on this medical-surgical floor.

Project Site and Population

This project took place on a medical-surgical floor in an acute care facility located in a large metropolitan city in the southeastern United States. This facility is owned by a large for-profit healthcare corporation that operates 65 hospitals and approximately 500 other healthcare facilities across the United States. It offers acute care services, state-of-the-art operating and recovery rooms, and a wide range of services, including radiology, respiratory, physical therapy, laboratory, and pharmacy. This floor has 41 private rooms and can accommodate many patients, with the majority being surgical patients.

The targeted population included members of the patient care team. The participants consisted of registered nurses, licensed practical nurses, patient care assistants, and a nurse manager who provided direct care to patients on this floor. The patient care team had a wide range of experience and education. Participant inclusion criteria stipulated that a participant must be a full-time patient care team member and excluded any employees in the float pool or travel contracts. The project team included the student, the chair, and the preceptor to offer expertise and follow interventions and changes.

Setting Facilitators and Barriers. This project's primary stakeholders include hospital administration, nurse manager, house supervisor, chief nursing officer, patient safety coordinator, registered nurses, licensed practical nurses, patient care assistance, patients, and family members. The project facilitator was the student, and they were responsible for developing and maintaining an environment for education. The facilitator was also responsible for establishing goals and objectives for the educational session.

Participant recruitment was done via email, and a flyer was posted in the employee break room.

Barriers and limitations to this project and its education were participant compliance, lack of time, and lack of interest in fall prevention. Motivation to change and lack of leadership to help facilitate change became a barrier to implementing fall prevention interventions. The staffing shortage and inadequate time for this study also caused constraints. Encouraging everyone's participation, providing an opportunity for discussion, and minimizing distractions helped overcome some barriers and limitations to this study. Snacks and refreshments were also given during the educational session as an incentive.

Implementation Plan/Procedures

When implementing the project, each phase will be based upon the Plan Do Check Act Model (see Figure 2) created by Edward W. Deming (ASQ, 2021). This model will be utilized for this project because it translates quality improvement into clinical practice through structured steps.

In phase one, the ‘planning’ phase includes identifying the problem and opportunities for quality improvement and develop an action plan for change (Patel and Deshpande, 2017). A needs assessment revealed that the participants needed to be educated on the facility’s fall prevention protocols and different fall prevention interventions. After the problem was identified, the project was developed, objectives and goals were established, and quality improvement processes were constructed. During this phase, a plan was developed to implement best practices to decrease falls on the medical-

surgical floor, a proposal was created, and the Institutional Review Board at Jacksonville State University approved the project.

The second phase of the model was the ‘do’ phase. This phase includes implementing the plan and carrying out the steps for change (ASQ, 2021). During this phase, fall prevention education was introduced to participants. The participants signed informed consent forms for this study, and they were given a pre-test to measure their knowledge of falls and the hospital's fall prevention protocols. All participants were given a 30-minute educational session through a PowerPoint presentation and then completed a post-test evaluation.

The third phase in Deming's Model included the ‘check’ phase. The data were collected and analyzed to evaluate nursing education and fall prevention interventions compared to the project's objectives. Data were gathered through a pre and post-test comparison and fall rate calculations. Once all data were collected, the project results were analyzed with the assistance of a statistician. The project analysis measured the knowledge of the patient care team before and after the educational session.

In the fourth phase, known as the ‘act’ phase, the researcher took action based on what was learned in the previous stages. The administration, the unit manager, and the safety coordinator were contacted with the results. This phase included a final report completion, a two-month follow-up assessment of falls, and submission of project outcomes. After the fall prevention education, participant’s knowledge was increased. Education and fall prevention interventions resulted in decrease fall rates and mandatory yearly education for all staff.

Measurement Instruments

A pre and post-test comparison and fall rate calculations were instruments used to collect and calculate data to measure this project's outcomes. Fall rates are measured before the start of the project. Fall rates are reported as the number of falls per 1,000 occupied bed days and are the most commonly used statistic to measure and track falls in acute care settings. The pre and post-test included 20 multiple choice questions and were used to measure any knowledge gained by participants from the education provided. The questions focused on falls, the facility's current fall protocols, and fall prevention strategies. Scores of the pre and post-test were compared, and each question was analyzed to determine the deficiency of knowledge as it pertains to each question. The educational session and tests were presented by the project leader and were conducted in a face-to-face format. Each participant completed the test before and after the educational session without prompting and participants were discouraged from talking about questions with each other. Pre and post-tests are often used to measure knowledge gained from participating in the educational course and have proven to be a useful method to acquire new knowledge and learning processes (Shivaraju et al., 2017). These tests help to achieve the learning objectives with a better understanding and focus on critical topics covered during the educational sessions.

Data Collection Procedures

All data were collected by the project leader and stored safely, ensuring no participation data was exposed. Data on fall knowledge was collected through pre and post-test results where each participant was assigned a number to protect anonymity.

Data was collected from the test before and after each education session. All questions were identical on the pre and post-test. Additional data on fall rates were collected before the implementation of the project and again following the project implementation for comparison.

Data Analysis

The data analyzed from this project included the pre and post-test results. Descriptive statistics were used to summarize project results. The project analysis measured the knowledge of the participants before and after the educational session. The project leader utilized the assistance of a statistician which used a paired sample t-test to analyze the differences. A paired t-test was used to examine the difference between pre-education and post-education scores to measure the significance of education on fall risk reduction. A paired t-test is a statistical procedure used to determine whether the main difference between two sets of observations is zero (Kent State University, 2021). The process for a paired sample t-test can be summed up into four steps that include calculating the sample mean, sample standard deviation, the test statistic, and the probability of observing the test statistic under the null hypothesis (Kent State University, 2021). The statistical significance is predicted or determined by looking at the p-value. The differences between the mean scores are assessed, and the lower the mean difference, the higher the statistical significance.

The methodology used for data analysis was a paired t-test. The paired t-test was used to compare overall pre- and post-test results related to knowledge gained from the educational intervention. The paired t-test looked at the pre-and post-education scores per

participant. The results indicated that per participant (t=2.7481, p=0.01174), a statistically significant improvement in knowledge was found between the pre-and post-education scores. The implementation of fall prevention education to the nursing staff increased knowledge and impacted overall scores.

Box plots are statistical representations for organizing and displaying data that uses a five number summary of the dataset (Edwards et al., 2017). The box plot in Appendix H shows pre-test scores have a wider range of median scores, and post-test scores have a narrower range of median scores. This boxplot also shows the five-number summary of scores, including the minimum score, first quartile, median, third quartile, and maximum score (see Table 5).

Fall rates were collected and compared. In April and May 2020, there was a total of ten falls on the medical-surgical unit. In April and May 2021, after the project was implemented, there was a total of six, resulting in a 40% reduction in the number of falls. Among the six falls that occurred in April and May 2021, there were no reported injuries. These results indicate nursing education can increase knowledge of falls for employees and decrease the number of patient falls.

Upon conclusion of the data analysis from the pre and post-tests, it was concluded that nurses were least knowledgeable about documentation following falls. Seventy-five percent of nurses were unsure of the policy and procedure. The process of documentation was reviewed, and results were forwarded to the unit manager and preceptor. Thorough documentation helps to ensure appropriate nursing care and medical attention are given when a fall occurs. Proper documentation also provides evidence of care and is a legal

and professional requirement of nursing.

Cost-Benefit Analysis/Budget

The average cost for a fall with an injury is about $14,000 and can prolong the hospital stay by an average of 6 days (JCAHO, 2015). Thirty to 50% of patients who fall in the hospital result in injury, so healthcare facilities cannot afford to not have a fall prevention program (JCAHO, 2015). Each year about $50 billion is spent on medical costs related to non-fatal fall injuries, and $754 million is spent related to fatal falls (CDC, 2020). It is far more effective to prevent falls than to deal with them after the fact. Centers for Medicare and Medicaid Services do not reimburse hospitals for additional costs associated with patient falls (WHO, 2021). During the time of the project implementation, a sister hospital owned by the same corporation as the project site failed to follow policies and procedures on fall prevention following a patient fall. A judge awarded the patient and the family $1,125,000 in compensatory damages. This example reflects the devastating financial burden falls can be to an institution.

A cost benefit analysis aides in determining if the project is a good economic investment for the facility. The project leader absorbed the cost of labor, which included hours for performing a literature review, creating the educational sessions, development of pre and post-tests, presenting the educational sessions, and analyzing data. The cost and resources used for this project were minimal and included printing costs and the cost for refreshments. Refreshments cost approximately $40 for each session. There was a total of 4 sessions. Printing costs included ink and paper, and the total cost was approximately $50. Cost to the project facility consisted of nursing payroll because each

participant attended a 30-minute educational session. The facility absorbed these costs, and a specific time for implementing education sessions was discussed with management for managing time costs and maximizing teaching time. Not all participants have the same hourly wage, so an estimation of cost for each participant paid by the project facility would be around $25 per nurse per hour. With 23 participants, the cost to the project facility for the educational sessions was approximately $575. After refreshments, printing costs, and nursing payroll, an overall cost of $785 was spent implementing this project. The average price for a fall with an injury is about $14,000. In 2020, there was a total of 35 falls on the unit where the project was implemented. If the project decreases falls and injuries by 50% compared to the last year,
it could save the hospital approximately $245,000 in one year.

Timeline

The timeline for this project extended from August 2020 to May 2021. August 2020 to January 2021 was phase one (planning phase). Phase one included identifying the problem and opportunities for quality improvement and the development of an action plan. The plan was then developed to implement best practices to decrease falls on the medical-surgical floor, a proposal was created, and the Institutional Review Board at Jacksonville State University approved the project. From February to March (phase two), the do phase was started and included project immersion and implementation. This phase involved implementing the plan and carrying out the steps for change. During this phase, fall prevention education was introduced to participants. The check phase occurred in April and May 2021. This part of the project encompassed data collection and analysis to

evaluate nursing education and fall prevention interventions compared to the project's

objectives. The fourth and final phase (active phase) occurred in June 2021. The phase entailed a two-month follow-up to gather data on fall rates, final report completion, and submission of the project. After everything was completed, recommendations and comprehension of the project were then given to the facility.

Ethical Considerations/Protection of Human Subjects

The Jacksonville State University Institutional Review Board (IRB) approval was obtained before initiating the project. Participants in this project consisted of registered nurses, license practical nurses, and patient care assistants. Participation in the project was voluntary. Each participant signed a written informed consent before the initiation of the pre-test. Participants were given a thorough explanation of the project and ensured that risks were minimal. Participants were then told they could withdraw from the session at any time without penalty. All data were examined to ensure there was no identifying information associated with participants. The pre and post-tests were assigned a number to coincide with the informed consent. Extensive efforts were made to protect participant's privacy and confidentiality. All forms were kept behind a locked door by the project leader.

Conclusion

Preventing falls can be very complex and challenging, requiring a multidisciplinary approach. Successful fall prevention protocols include intensive research, thorough educational training, monitored implementation, and strict adherence

to protocols. These measures have been shown to help reduce the number of falls and improve patient safety. The goal of this quality improvement project was to educate participants on fall prevention, reduce the number of falls and fall-related costs, and improve overall patient safety and outcomes. Since nurses play such a pivotal role in preventing patient falls, the literature supports educating nurses about fall prevention. The findings from this study indicate that nurse education can increase knowledge of patient falls and fall prevention and decrease fall rates. Knowledge of how to prevent falls and identify risks can lead to better patient safety. This project provided a foundation for improving fall prevention education on the project facility's current protocols based on the most current evidence-based practice recommendations. As a result, hospital administration should require more frequent fall prevention education to be completed to ensure that the nursing staff is fully trained and prepared. A combination of evidence-based fall prevention recommendations such as the Johns Hopkins Evidence-Based Practice Model and the Plan Do Check Act model were used to develop and guide this project. The results from a paired t-test indicated that there was a statistically significant improvement in knowledge between the pre-and post-education scores. The implementation of fall prevention education to nursing staff increased knowledge, and as a result, fall rates decreased by 40%. Encouraging participation and management buy-in helped with the facilitation of this project. Due to limitations with time, obtaining quarterly and yearly fall rates from 2021 was not feasible. It is recommended administration compare fall rates from the 2020 year to the 2021 year when data are available. Inpatient hospital falls are a challenging topic. Due to factors affecting falls, future research should focus on patient population, different admitting diagnoses, and

levels of patient impairment. To promote fall reduction activities and improve patient care, the administration should consider requiring education and training on falls to all units in the project site facility.

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Appendix A

Table 1

Differences in Knowledge, Attitudes, and Engagement in Fall-prevention Activities according to Participants' Characteristics (n=62)

Characteristics	***n***	**Knowledge**				**Attitude**				**Fall-prevention activities**			
		M	***SD***	χ^2	***p***	***M***	***SD***	χ^2	***p***	***M***	***SD***	χ^2 (***p***)	***p***
Work experience													
< 5 years	62	6.92	1.54	0.51[a]	0.611	3.73	0.40	2.25[a]	.026	3.25	0.51	0.75[a]	.46
≥ Five years	100	6.79	1.59			3.85	0.29			3.31	30.5		
Experience of the patient falling													
No	80	6.54	1.60	2.46[a]	.015	3.76	0.32	1.61[a]	.110	3.26	0.51	0.82[a]	.415
Yes	82	7.13	1.49				3.85	0.37			3.32	0.49	
Fall-prevention education													
No	35	6.86	1.59	0.08[a]	.940	3.73	0.26	1.56[a]	.122	3.14	0.57	1.95[a]	.053
Yes	127	6.83	1.57			3.83	0.36			3.33	0.47		

Mann-Whitney U-test result; *M* = mean; *SD* = Standard deviation.

Appendix B

Table 2

Differences in Knowledge, Attitude, and Engagement in Fall-prevention Activities according to the Experience of Fall-related Education (n = 127)

Characteristics	***n***	**Knowledge**				**Attitude**				**Fall-prevention activities**			
		M	***SD***	χ^2	***p***	***M***	***SD***	χ^2	***p***	***M***	***SD***	χ^2 **(*p*)**	***p***
Instructor													
Nursing professor	16	7.19	1.33	3.40	.334	3.87	0.40	1.50	.683	3.26	0.52	3.34	.342
Nurse	107	6.79	1.61			3.83	0.36			3.35	0.47		
Hospital administrator	2	5.50	0.71			3.73	0.27			2.88	0.04		
Other	2	7.50	0.71			3.62	0.22			3.25	0.35		
Number of education sessions													
1	39	6.82	1.41	0.58	.966	3.74	0.39	22.7	<.001	3.21	0.52	3.79	.435
2	38	6.92	1.73			3.72	0.28	above 5 > 1,2[a]		3.37	0.44		
3	22	6.86	2.01			3.86	0.31			3.37	0.49		
4	6	6.67	1.03			4.06	0.31			3.55	0.39		
Above 5	22	6.73	1.24			4.08	0.37			3.36	0.42		

[a]Bonferroni correction; *M* = mean; *SD* = standard deviation

Appendix C

Table 3

Average Scores for Attitudes Regarding Falls (n = 162)

Rank	Item	Items about attitudes regarding falls	*M*	*SD*
1	10	I think I should respond promptly when patients ask for help to move.	4.36	0.58
2	7	I think that patients' fall risk should be assessed upon admission.	4.21	0.59
3	11	I do not think that fall-related physical injury is severe. [a]	4.20	0.73
4	6	I think I should actively nurse patients to prevent falls.	4.14	0.62
5	1	I am interested in the occurrence of inpatient falls.	4.07	0.71
6	4	I think that fall prevention is a high priority in nursing.	4.04	0.59
7	5	I am interested in nursing interventions to prevent falls.	3.99	0.66
8	13	I would feel guilty if a patient fell.	3.80	0.80
9	3	I think that falls in hospitals are an important responsibility for nurses.	3.78	0.67
10	2	I think that inpatient falls are inevitable. [a]	3.55	0.90
11	12	I think that the hospital environment is safe concerning falls. [a]	3.41	0.85
12	8	I think that fall-prevention education provided upon admission is sufficient. [a]	2.71	0.89
13	9	I think that falls occur because of the patient's condition. [a]	2.65	0.86
		Total	3.81	0.34

*Reverse scored; *M* = mean; *SD* = standard deviation

Appendix D

Table 4

Participants' Engagement in Fall-prevention Activities and Average Item Scores n = 162

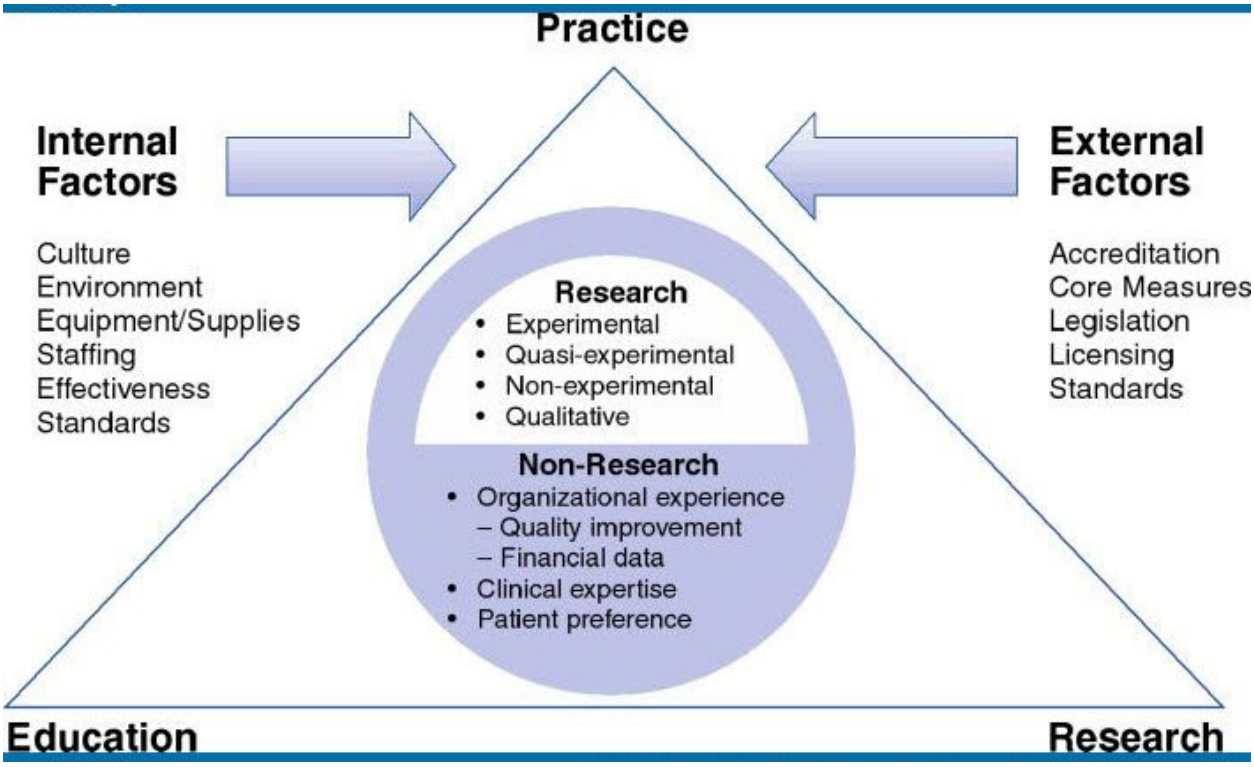
Rank	Item	Items about engagement in fall-prevention activities	*M*	*SD*
1	20	I always raise the bed rails when moving a patient on a stretcher cart.	3.82	0.47
2	19	I always engage the lock when transferring patients to wheelchairs.	3.77	0.51
3	6	I always raise the bed rails for elderly people, children, unconscious patients, and very unstable patients.	3.73	0.53
4	11	I educate patients to ensure that they ask for help to prevent falls.	3.68	0.53
5	8	I ensure that unconscious patients, very unstable patients, or surgical patients are moved from the bed with assistance from a nurse or caregiver.	3.60	0.62
6	10	I ensure that patients at risk of falling walk with their caregivers.	3.60	0.60
7	7	I ensure that patients at risk of falling who wake up to go to the bathroom are helped off the bed by a nurse or guardian	3.52	0.69
8	9	In cases of abuse of drugs that can cause falls, I monitor the occurrence of the drug's effects.	3.41	0.75
9	1	I inform all inpatients and caregivers of the possibility of falls while introducing them to hospital life.	3.38	0.75
10	13	I educate patients and caregivers in moving to the bed, chair, bathroom, and wheelchair safely.	3.36	0.76
11	16	I ensure that patients wear non-slip shoes of the correct size.	3.31	0.76
12	17	I maintain proper illumination on the bed and in the bathroom.	3.29	0.76
13	15	Paths should be cleared for easy use.	3.28	0.74
14	12	I provide patients and caregivers with instructions on fall prevention and remind them of these frequently.	3.09	0.93
15	14	I encourage high-risk patients to exercise regularly unless it is contraindicated (once per day).	3.01	0.91
16	5	I attach fall hazard signs to patient charts, patient rooms, and beds for high-risk patients.	2.94	1.11
17	4	I assess patients' levels of normal motor function.	2.93	0.88
18	2	I assess patients' fall risk factors using a fall risk assessment scale upon admission.	2.91	1.15
19	3	I regularly (e.g., twice) reassess fall risk factors in connection with changes in a patient's condition after admission.	2.77	1.06
20	18	I place a non-slip mat on the floor when taking a barrel bath or shower.	2.36	1.13

aBonferroni correction; M = mean; SD = standard deviation

Appendix E

Figure 1

Johns Hopkins Nursing Evidence-Based Practice Model



Note. The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) model is a powerful problem-solving approach to clinical decision-making, and is accompanied by user-friendly tools to guide individual or group use. It is designed specifically to meet the needs of the practicing nurse and uses a three-step process called PET: practice question, evidence, and translation. The goal of the model is to ensure that the latest research findings and best practices are quickly and appropriately incorporated into patient care.

Appendix F

Johns Hopkins Model and Tools Copyright Permission Form

JOHNS HOPKINS
NURSING

JHNEBP MODEL AND TOOLS- PERMISSION

Johns Hopkins Nursing
Center for Evidence-Based Practice

Thank you for your submission. We are happy to give you permission to use the JHNEBP model and tools in adherence of our legal terms noted below:

- You may not modify the model or the tools without written approval from Johns Hopkins.
- All reference to source forms should include "©The Johns Hopkins Hospital/The Johns Hopkins University."
- The tools may not be used for commercial purposes without special permission. If interested in commercial use or discussing changes to the tool, please email ijhn@jhmi.edu

Appendix G

Figure 2

Question Development Tool based on Johns Hopkins EBP

What is the problem, and why is it important?
What is the current practice?
What is the focus of the problem?
How was the problem identified (check all that apply)
☐Safety and risk-management concerns ☐Quality concerns (efficiency, effectiveness, timeliness, equity, patient-centeredness) ☐Unsatisfactory patient, staff, or organizational outcomes ☐Variations in the practice within the setting ☐Variations in practice compared with external organizations ☐Evidence validation for current practice ☐Financial concerns
What is the scope of the problem?
☐Individual ☐ Population
What are the PICO components?
P (Patient, population, problem) I (Intervention) C (Comparison with other interventions, if foreground question O (Outcome measures to determine success)
Initial EBP question:
☐Background ☐Foreground
List possible search terms, databases to search, and search strategies
☐Publications (e.g., CINAHL, MEDLINE, PubMed, Embase) ☐Standards (regulatory, professional, community) ☐Guidelines ☐Organizational data (e.g., QI, financial data, local clinical expertise, patient/family preferences) ☐Position statement
Revised EBP Question
(Revisions in the EBP question may not be evident until after the initial evidence review; the revision can be in the background question or a change from the background to a foreground question)
Outcome Measurement Plan
What will we measure (structure, process, outcome measure) How will we measure it? (metrics are expressed as rate or percent) How often will we measure it? (frequency) Where will we obtain the data? Who will collect the data? To whom will we report the data?

Appendix H

Figure 3

The Plan Do Check Act Model

Appendix I

Table 5

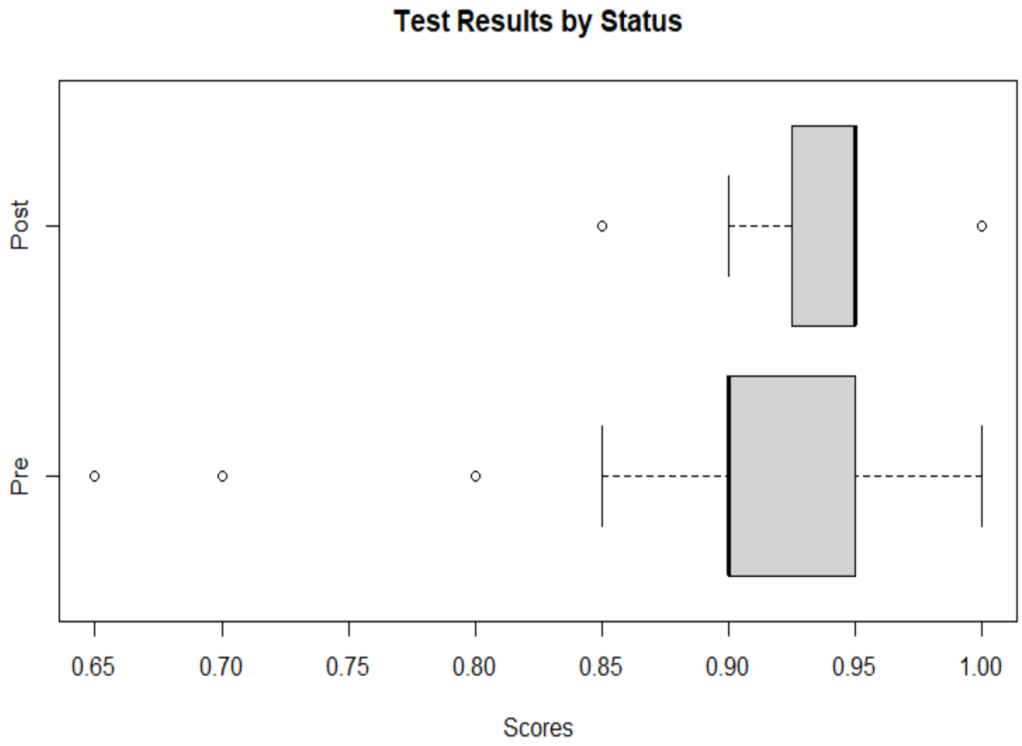
Pre and post-test education scores per question.

Pre-Test	Answer Choices				Post-Test	Answer Choices				Change	Answer Choices			
Questions	A	B	C	D	Questions	A	B	C	D	Questions	A	B	C	D
1	4.3%	0.0%	4.3%	91.3%	1	0.0%	0.0%	4.3%	95.7%	1	-4.3%	0.0%	0.0%	4.3%
3	4.3%	0.0%	87.0%	8.7%	3	0.0%	0.0%	91.3%	8.7%	3	-4.3%	0.0%	4.3%	0.0%
4	91.3%	0.0%	4.3%	4.3%	4	95.7%	0.0%	0.0%	4.3%	4	4.3%	0.0%	-4.3%	0.0%
5	0.0%	0.0%	4.3%	95.7%	5	0.0%	0.0%	0.0%	100.0%	5	0.0%	0.0%	-4.3%	4.3%
6	0.0%	0.0%	8.7%	91.3%	6	0.0%	0.0%	0.0%	100.0%	6	0.0%	0.0%	-8.7%	8.7%
9	4.3%	95.7%	0.0%	0.0%	9	0.0%	100.0%	0.0%	0.0%	9	-4.3%	4.3%	0.0%	0.0%
11	0.0%	0.0%	0.0%	100.0%	11	0.0%	0.0%	0.0%	100.0%	11	0.0%	0.0%	0.0%	0.0%
12	0.0%	0.0%	0.0%	100.0%	12	0.0%	0.0%	0.0%	100.0%	12	0.0%	0.0%	0.0%	0.0%
13	0.0%	0.0%	4.3%	95.7%	13	0.0%	0.0%	0.0%	100.0%	13	0.0%	0.0%	-4.3%	4.3%
14	0.0%	95.7%	0.0%	4.3%	14	0.0%	100.0%	0.0%	0.0%	14	0.0%	4.3%	0.0%	-4.3%
18	0.0%	0.0%	0.0%	100.0%	18	0.0%	0.0%	0.0%	100.0%	18	0.0%	0.0%	0.0%	0.0%
19	73.9%	4.3%	21.7%	0.0%	19	95.7%	0.0%	4.3%	0.0%	19	21.7%	-4.3%	-17.4%	0.0%
20	0.0%	0.0%	0.0%	100.0%	20	0.0%	0.0%	0.0%	100.0%	20	0.0%	0.0%	0.0%	0.0%

Appendix J

Table 6

Overall score (by paired pre and post) Results



Appendix K

Informed Consent Number

Research Topic: Quality Improvement to Improve the Management of Patients at Risk for Falls

Principal Investigator:
Crystal Odom Medici
Jacksonville State University, DNP Student
(205) 473-5225
cmedici@stu.jsu.edu

I, _____, agree to participate in the research for the Quality Improvement Project to Improve the Management of Patients at Risk for Falls, which is being conducted by Crystal Odom Medici. I understand that my participation is voluntary, and I can withdraw my consent at any time. If I draw my consent, my data will not be used as part of this study and destroyed.

The following points have been explained to me:

1. The purpose of this study is to improve the management of patients at risk for falls on this medical-surgical floor.
   The study will include, and I will pre-test and post-test and a fall prevention education class and take a post-test
2. For this project, the researcher will:
   a) Administer a pre and post-test with questions on fall prevention knowledge, provide an educational session, assess the pre and post-test results after the education session, and assess the medical-surgical floor fall rates.
3. I will not list your name on the pre-or post-test datasheets. Therefore, the information gathered will be confidential.
4. You will be asked to sign two identical consent forms. You must return one form to the investigator before the study begins, and you may keep the other consent form for your records.
5. If you become uncomfortable answering any questions, you may cease participation at any time.
6. You are not likely to experience physical, psychological, social, or legal risks beyond those ordinarily experienced during the performance of routine examinations or tests.
7. Your responses and documentation will be confidential and will not be released in any identifiable form without your prior consent unless required by law.
8. The investigator will answer any further questions about the research.
9. In addition to the above, further information, including a full explanation of the purpose of this research, will be provided after the research project on request.

Signature of Participant _____Date _____

Signature of Investigator _____Date_____

Appendix L

Pre/Post-Test Questionnaire

1. All of the following are examples of good teamwork to prevent falls except:
    a. Every team member feels equal responsibility for improvement.
    b. A nurse coordinator, a backup coordinator, and a falls team meet each week.
    c. The team members have the authority to complete appointed tasks.
    d. When you help your team member with a resident who is not assigned to you, leave your resident in restraint until you get back.
2. Falls are a significant health concern in the acute setting, and they are one of the most common adverse events in the hospital.
   True or False (circle one)
3. Which of the following is the best reason to have an individualized care plan?
    a. The team has to watch out for any environmental risks.
    b. Everything has to be documented.
    c. An individual's condition and treatment can directly impact his/her fall risk.
    d. The more the team thinks about care plans, the better they get at responding to falls.
4. What fall risk screening tool needs to be completed within the electronic medical record as part of the initial admission assessment per facility policy and document.
    a. Modified Morse Fall Risk tool
    b. Post Fall Huddle Form
    c. Post Fall Assessment Tool
    d. Patient Assessment
5. How do fall management and response lower the likelihood of future falls?
    a. It requires the assessment of new developments in a patient's condition.
    b. An assessment of the environment is done after each fall.
    c. The staff is educated on how to prevent falls.
    d. All of the above.
6. A fall risk assessment:
    a. Promotes implementation of appropriate interventions based on need
    b. Notifies all key health care staff of a patient's fall risk
    c. Reduces potential of serious harm or even death through screening
    d. All of the above
    e. Only A and B
7. One way to standardize an approach to fall risk identification is through the use of a fall risk screening tool or assessment.
   True or False (circle one)
8. What are patients at the highest risk for falling? (check all that apply)
    _ History of falls
    _ Impaired cognition
    _ Impaired mobility
    _ Patients taking diuretics or narcotics
    _ Patient cluttered rooms
9. You only need to do a fall risk assessment once on your patient because they likely will not change status during their stay.
   True or False (circle one)

10. Conducting a fall risk assessment on every patient ensures each patient's fall risk level is considered when developing their individualized care plan.
    True or False (circle one)
11. Reassessment should be completed when:
    a. There is a change in the patient's condition
    b. There is a change in medication
    c. Immediately after a fall
    , d. Each shift for high-risk patients,
    e. All of the above
12. What is included in post-fall management?
    a. Monitor patient as condition warrants per policy.
    b. Report the fall to the charge nurse and at shift reports.
    c. Complete a Midas Report.
    d. All of the above
13. What is included in fall risk reduction strategies?
    a. Hourly rounding
    b. Keeping needed personal belongings within reach
    c. Keeping assistive devices close
    d. All of the above
14. All of the following are included inpatient fall prevention education except?
    a. Keep your call light in reach
    b. Keep your bed in the highest position
    c. Call for help if you feel dizzy, weak, or light-headed
    d. Notify staff immediately if a spill occurs on the floor.
    e. Call when you are done with your lunch tray.
15. The patient's fall risk status, including the last score and actions, are taken to prevent and reduces, should be reported during each change of shift handoff and transfer.
    True or False (circle one)
16. What needs to be charted in Epic when your patient falls?
17. Where are the fall binder and fall protocols located 6 west?
18. Who should be included post-fall huddle?
    a. All staff involved
    b. The patient and the family
    c. Charge nurse
    d. All of the above
19. The estimated cost of a fall in the hospital is approximately how much?
    a. $14,000
    b. $2,000
    c. $7,000
    d. $500
20. Is it my responsibility as a nurse on six west too?
    a. Keep my patient safe
    b. Help prevent falls
    c. Chart hourly rounding
    d. All of the above

Appendix M

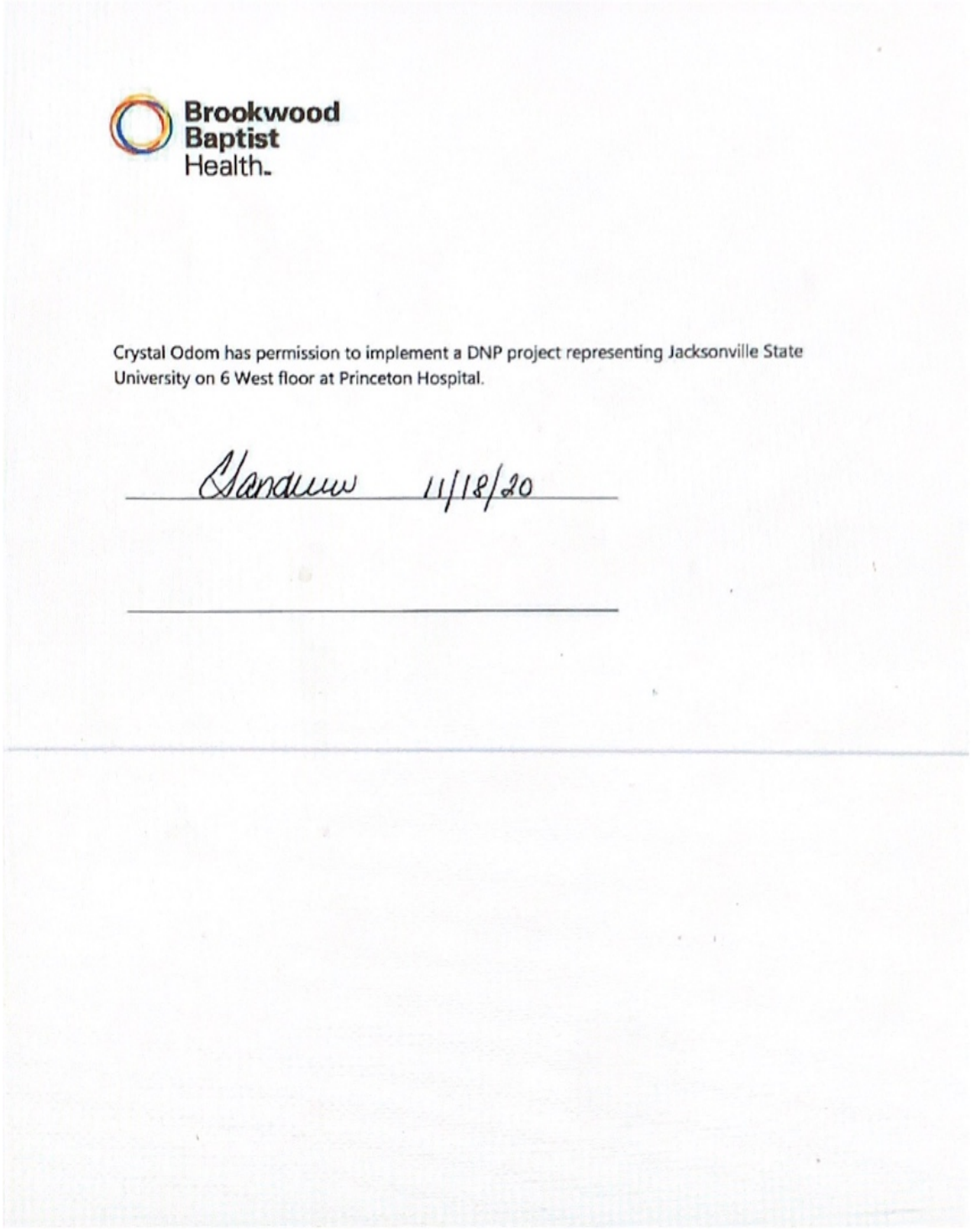
Table 7

Timeline

	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May
Phase 1	★	★	★		★				
Phase 2						★	★		
Phase 3								★	
Phase 4									★

Appendix N

Project Permission Form



Brookwood Baptist Health

Crystal Odom has permission to implement a DNP project representing Jacksonville State University on 6 West floor at Princeton Hospital.

Glanduw 11/18/20

Appendix O

IRB Approval

JSU | OFFICE OF THE VICE PROVOST
JACKSONVILLE STATE UNIVERSITY

October 30, 2020

Dear Crystal Odom Medici:

Your proposal submitted for review by the Human Participants Review Protocol for the project titled: "A Quality Improvement Project to Improve the Management of Patients at Risk for Falls" has been approved as exempt. If the project is still in process one year from now, you are asked to provide the IRB with a renewal application and a report on the progress of the research project.

Sincerely,

Joe Walsh
Executive Secretary, IRB

JW/dh

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