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Preventing Falls using Evidence-based Interventions in a Long-term Care Facility

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B.S. Nursing, Western Governors' University of Missouri, 2018

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in partial fulfillment of the requirements for the degree
Doctor of Nursing Practice with emphasis in Adult Gerontology Nurse Practitioner

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Abstract

Falls and fall-related injuries are common and significant health issues among older adult patients living in Long-Term Care (LTC) facilities, especially those with memory impairment. The current quality improvement (QI) project aimed to educate staff members and implement a structured 4 Ps hourly rounding (HR) protocol on an LTC facility pilot unit in Missouri. The project was implemented in a memory care unit housing older military veterans patients in a large metropolitan area of Missouri. The project question that guided the intervention was: In older residents living in a memory care unit of an LTC facility, what is the impact of implementing hourly rounding using the 4 Ps approach on decreasing falls within eight weeks? The reason for implementing the project was that the memory care unit was experiencing a high fall rates with adverse effects compared to the other two skilled units of the facility. The intervention consisted of staff education and implementation of an HR protocol based on the 4 Ps approach. During the 4 Ps HR, staff members checked on veterans for **P**ain, **P**osition, **P**otty, and **P**roximity of personal belongings. The project was a descriptive, observational and a comparative intervention using a purposeful and a convenience sampling methods. The "Plan, Do, Study, Act" (PDSA) model was used as a quality improvement approach to test for change. In the two months prior to implementing the 4 Ps HR, monthly fall rates were 8.571 and 10.141 falls per 1000 occupied-bed days. As results of the QI project, the fall rates decreased to 7.936 and 7.824 falls per 1000 occupied-bed days during the two months of implementing the 4 Ps HR. The staff knowledge survey showed an improvement in knowledge with mean scores of 57.774% on the pretest and 91.665% on the posttest, representing a 33.39% increase in staff knowledge.

The p-value was 0.008, which is less than 0.05, and the null hypothesis was rejected. A conclusion was that the education sessions had a statistical difference in improving staff members knowledge. Therefore, the education session was successful. The level of completion in documenting and implementing the HR protocol was 95.85%. The current QI project improved the quality of care in the memory unit through the structured fall prevention interventions of HR. It also revived staff members' awareness about fall prevention precautions through education sessions.

Preventing Falls using Evidence-Based Interventions in a Long-Term Care Facility

Description of the Problem

The high prevalence of patient falls across healthcare facilities is becoming a significant concern in the larger public health sector. According to Gringauz et al. (2017), falling is common among patients during their hospital stay. It has both financial and clinical outcomes for the healthcare organization. Much evidence showcases the extent of patient falls in various care facilities. Bagui et al. (2019) reveal that the falls rate for the admitted patients stands at 3-5 per 1000 occupied-bed days. Of most significant concern is that these falls result in injuries and death of the patient at times. Evidence has also revealed that age is an important predisposing factor that increases the risk of patient falls. It is estimated that up to 30% of patients over 65 years and 50% of those aged 80 experience a fall every year (Cameron et al., 2018). The incidence and prevalence of falls are three times more in LTC facilities. Falls are common in older people with high prevalence and morbidity in those with cognitive impairment (Montero-Odasso & Speechley, 2018). The high prevalence of falls in older people, specifically those with impaired cognition, prompt more research to find and evaluate the effectiveness of various evidence-based interventions for preventing these falls.

Significance of the Problem

Despite standard fall prevention strategies and programs, the fall rates remained high among older adults. They had increased by 30% over the last decade (Castle,2019). Considering the high prevalence of falls, it is highly likely that every healthcare professional will encounter and handle patients with an increased risk of falling. The emerging evidence in this area reveals that the most available preventative strategies

yield little change in preventing falls across different healthcare facilities. James et al. (2020) indicate that the prevalence of falls has increased by up to 30% over the last decade despite formulating standards and protocols of care to prevent them. Falls prevalence and morbidity tend to be higher among older people in memory care units. Wong and Pang (2019) claim that patients with dementia are at increased risk of falling; therefore, they could benefit from additional fall prevention interventions. Healthcare professionals need to be aware of effective evidence-based interventions depending on the healthcare setting and specificities and master the factors that contribute to their effectiveness.

Purpose

The primary objective of this project is to evaluate the effectiveness of evidence-based interventions in reducing falls in a memory care unit of an LTC facility. The evidence-based intervention that the project will focus on is the implementation of HR using the 4 Ps approach. Frontline staff will benefit from educational sessions on the performance of the purposeful HR.

The project question is: In older residents living in a memory care unit of an LTC facility, what is the impact of implementing hourly rounding using the 4 Ps approach on decreasing fall rates within two months?

The outcome measures for this intervention are the following: the fall rates per 1000 occupied-bed days before and duirng implementation of the HR, the knowledge level of the staff after educational sessions, and the compliance level in implementing and documenting the HR protocol during execution.

The project aims to reduce the fall rates within the memory care unit of the LTC facility. The project also aims to educate the nursing staff on implementing HR to reduce falls.

Literature Review Process

The keywords of the project question guided the search to find and locate the materials and resources for completing the project. The keywords and related expressions used in the search included: falls, falls in long-term care facilities, cognitive impairment, memory care units, dementia, rounding, risk of falls, hourly rounding, PDSA model, evidence-based, and quality improvement. Boolean operators used were AND, OR, and NOT. The search for articles was conducted in high-quality databases that included PubMed, ProQuest, CINHAL, Emerald, and Research Gate. Trusted organizations such as the Center for Disease Control (CDC) and the Agency for Healthcare Research and Quality (AHRQ) were also used. The first choice was systematic reviews, meta-analyses, randomized control trials, and quasi-experimental, case-control, and cohort studies. The search using these expressions and keywords generated 5,200 articles. It was essential to have inclusion and exclusion criteria to filter out publications not directly related to this project. As inclusion criteria, articles published in 2016 and afterward in English with levels I and II of evidence were considered. After subjecting the search articles to the inclusion criteria, only 120 articles were found to fulfill and meet the requirements for the needed resources. The exclusion criteria were publications on people younger than 50 years, publications with no relevant statistics on reducing falls, studies with a low level of evidence, and studies not published in English. After subjecting the 120 articles to the exclusion criteria, 42 articles were satisfactory for this project. The exclusion and

inclusion criteria ensured that only high-quality articles were retained and used for this project. Out of the 42 articles, 15 articles were relevant to fall reduction in LTC facilities, fall reduction interventions in memory care units, hourly rounding, and staff education on fall prevention. The selected 15 articles were used for the literature review (Appendix A).

Falls and fall-related injuries continue to be significant problems among the elderly, particularly those living in LTC facilities. Fall and fall-related injuries are the leading cause of death and debility among older people living in LTC facilities (CDC, 2019). In LTC facilities, causes of falls are multifactorial such as unstable gait, muscle weakness, poor eyesight, and effects of medications and environmental factors (CDC, 2017). Among the several predisposing risk factors of patient falls, the most significant risk factors include age. A systematic review investigating fall prevention strategies conducted by Cameron et al. (2018) revealed that the risk of experiencing a fall increases with age. Patients aged 65 and above have the most significant risk of falling. Notably, 30% of the adults 65 years and above living in LTC facilities experience a fall every year compared to 50% of those living in their homes. The researchers also mentioned that falls lead to severe pain, functional impairment, and even death in some cases.

In addition to age, another factor that increases the risk of falling includes cognitive impairment. In 2018, Montero-Odasso and Speechley conducted a study to review the role of cognition impairment on falls among community-dwelling older adults who are 65 years and older. The findings stipulate that cognitive impairment is associated with slow and unstable gait, predisposing older adults to falls. The authors concluded that falls are commonplace among the elderly, with high prevalence and comorbidity among people with cognitive impairment. According to Bayen et al. (2017), patients with

dementia have the most significant risk of falling, especially if they are not monitored. The same conclusion was drawn by Lach et al. in 2017. They conducted an integrative review to evaluate the evidence of falls and fall prevention interventions among older adults with early stages of dementia. The results showed that even an early stage of dementia exposes the patient to a risk of falling due to changes in gait, balance, and fear of falling. Wong and Pang (2019) investigated factors associated with falls in psychogeriatric inpatients. The study involved 46 women and 47 men aged 65 to 94. The study found that over 66% of the falls involved patients with dementia. Over 50% of the falls happened on the way to the toilet, mainly on the night shift when staffing level is low.

Existing fall-reduction programs at US LTC facilities focus on standard safety measures such as bed alarms, call lights, non-skid socks, and environmental inspections (Hill et al., 2016). However, the usual measures' implementation was either costly or showed little effect on reducing fall incidences. Castle (2019) concluded that despite standard fall prevention strategies and programs, fall rates remain high among older adults and have increased by 30% over the last decade. Unfortunately, there is no “one size fits all" interventions for fall prevention in LTC facilities. Preventing falls in high-risk older people such as those living in memory care units requires a patient-centered approach to meet the specific needs of each individual. As stated by Hill et al.(2016), while multifaceted intervention is recommended, finding the optimal combination of interventions based on the specificity of each facility is challenging.

The high rate and prevalence of patient falls are associated with the level of training and knowledge of the healthcare professionals in the facility. For this reason,

Shaw et al. (2020) assert that the education of healthcare professionals has significant potential to reduce the risk of falls within any clinical facility. Leverenz and Lape (2018) corroborated that improving nursing staff awareness and knowledge of fall prevention interventions has an evident impact on reducing fall incidences by stimulating staff self-efficacy, leading to improved quality of care. Nurses and other frontline staff play a key role in assessing fall risk factors and implementing evidence-based interventions to reduce falls in the facility. Frontline staff education increases their knowledge and awareness of their role in improving patient safety, specifically fall prevention within LTC facilities (Zhao et al., 2019).

Timely and purposeful HR is among the most promising evidence-based interventions that healthcare practitioners can use to address patient falls. Willful and intentional HR is an excellent strategy for an intervention requiring staff members to check on the patients (AHRQ, 2013). AHRQ (2013) defines HR as visits occurring each hour between 6:00 am and 10:00 pm and every 2 hours between 10:00 pm and 6:00 am. Linehan & Linehan (2018) reiterate that HR is a befitting preventative evidence-based strategy that can easily be implemented in an LTC facility. HR provides an opportunity for staff members to check on high-risk patients, interact with them and meet their needs. For instance, an older adult with cognitive impairment is at high risk of falling when using the toilet. HR promotes the surveillance of patients at high risk of falling. It also anticipates and addresses patients' needs and reduces the attempts of self-transfer and unsupervised use of the toilet. Purposeful HR is also an opportunity for staff members to address environmental factors contributing to falls.

Daniels (2016) conducted a study to improve patient satisfaction and safety through purposeful and timely nursing rounds. Using the Joanna Briggs Institute's Practical Application of Clinical Evidence System and Getting Research into Practice audit tool, direct observation of staff nurses in a medical facility was used to evaluate the timeliness and protocol during HR. The results showed that rounding at specified intervals during awake and sleep time nearly doubled, leading to a decrease of 50% of patient falls. Purposeful and timely rounding is the best intervention to care for patients, ensure their safety, diminish the prevalence of patient preventable events and proactively find solutions to problems before they occur (Daniels, 2016).

The Institute for Healthcare Improvement (IHI) supports HR as the best intervention to reduce call lights and fall injuries and increase the quality of care and patient satisfaction (Daniels, 2016). The AHRQ (2013) states that HR has components to be mindful of when visiting the patient. It must be associated with patient-centered interventions such as the 4 Ps approach for HR to be successful. The 4 Ps HR should be consistent and timely implemented to ensure all four aspects are covered. According to Althobaiti (2019), the 4 Ps of preventing falls focus on **P**ain assessment, **P**roximity of personal items, **P**otty or **P**rompted voiding, and finally, **P**ositioning of the patient. The positioning ensures that patients' bed positioning does not predispose them to fall. The potty aspect assesses the toileting behavior of the patient. It anticipates the need to avoid the patient trying and going unsupervised. The proximity of personal items ensures that all frequently used items are easily accessible. The pain assessment addresses any discomfort or pain the patient could be experiencing. Purposeful and intentional HR appears simple but requires delicate planning before implementation (AHRQ, 2013).

Summary and Synthesis of the Findings

In summary, falls in LTC facilities are a significant health problem that requires interventions to reduce the associated costs and painful consequences suffered among the elderly, especially those living with cognitive impairment. The emerging and available evidence analysis demonstrates that many evidence-based interventions and strategies are available to prevent falls in LTC facilities. The literature review outlined the limited efficacy of traditional standard fall prevention strategies in reducing falls and fall-related injuries in LTC facilities. On the other hand, there is adequate evidence on the effectiveness of purposeful HR combined with the 4 Ps approach in reducing and addressing the issue of fall prevention in memory care units and LTC facilities in general. For the 4 Ps HR to be effective, the healthcare facility management should consider investing in training healthcare providers on its implementation. Training increases staff' skills and competency in implementing an effective evidence-based intervention. The purposeful HR is a proactive intervention through which staff members meet the residents' needs and address possible problems before they occur.

Findings have also demonstrated that much attention should be accorded to elderly patients in memory care units as they are at the most significant risk of falling. Aging weakens bones and makes the gait unsteady while walking, which increases the risk of falling. Patients with dementia and those treated in memory clinics and facilities also face a significant risk of falling. The cognitive impairment and the side effects of the medications put these residents at high risk of falling. They have poor judgment and are not aware of their limits. Preventing falls among these specific populations would require a strategy that involves consistent monitoring of their movement within the healthcare

facility. Constant monitoring through purposeful HR would help keep the high-risk older people safe. It would also require conducting an environmental assessment to ensure that any physical or ecological factor that is likely to cause and contribute to the risk of falling is eliminated and addressed. The available evidence shows that falls can be minimized within the healthcare facility through structured fall prevention interventions. Adequate evidence-based studies show that educating staff members on implementing purposeful HR can reduce fall prevalence in older people with cognitive impairment living in LTC facilities. The AHRQ (2013) recommends 4 Ps HR as an excellent intervention for preventing falls but mentions that a careful organization is required for a successful implementation.

In conclusion, the continued prevalence of patient falls warrants the need to change the approach to addressing them, especially in long-term facility care. Much attention should be accorded to elderly patients living in memory care units with cognitive impairment. Research evidence has demonstrated that the senior population with mental challenges is at a greater risk of falling because of the bodily changes, medications' side effects, and cognitive impairment. Implementing the 4 Ps HR stands as an effective intervention and solution to falls. Noticed gaps in the literature are related to the healthcare settings in which the studies were done. Some studies were done in psychiatric wards of hospitals, not explicitly in memory units of LTC facilities. Also, the studies did not consider a situation of a staffing shortage. It would be helpful to know how the literature describes implementing a timely and purposeful HR in a long-term care memory unit with a different staffing model with more extensive staff to residents ratios. The PDSA cycle described by the IHI was the model used, particularly in the

implementation phase of this project. The model was vital in attaining project outcomes by guiding the different steps of the project.

Evidence-based Model

One of the most effective evidence-based models to implement the 4 Ps HR is the quality improvement (QI) model developed by the Institute for Health Improvement (IHI). The IHI is a non-governmental organization created in 1991 and is part of the National Demonstration Project on Quality Improvement (IHI, 2019). A considerable number of healthcare facilities are utilizing and applying the IHI quality improvement model to promote and safeguard the quality of care, achieve patient safety, and the overall value of the healthcare systems (Bartoszek et al., 2018). One of the things that make the IHI quality improvement model preferable includes its three distinct steps consisting of a) identifying the desired change, b) brainstorming the change, and c) conducting the Plan-Do-Study-Act (PDSA) cycle. The PDSA cycle is a scientific approach with assumptions that all factors are not known at the beginning of a quality improvement project; therefore, the process of change must be broken down into steps (AHRQ, 2015). The IHI's quality improvement model answers three main questions: What are we trying to accomplish? How will we know that a change is an improvement? What adjustments can we make to improve the results? (IHI, 2019). The PDSA cycle is recommended for a small sample size in a short duration before the project can involve a whole practice. Therefore, the PDSA cycle would be an excellent model to test the effectiveness of HR in the memory care unit of the LTC facility.

Method

Design

The project is a quality improvement project using evidence-based interventions to reduce falls in a memory unit of an LTC facility. Through an observational, descriptive, comparative method, the project evaluated the effectiveness of fall prevention interventions before and during the implementation of the project.

Setting

The LTC facility where the QI project was implemented is a 188-bed facility in Missouri. The facility has two skilled-nursing care units and a memory care unit. All the units have staff who provide care to older adult veterans residents. Most of the residents are 50 years of age or older. The facility has a fall-reduction committee that meets every week to discuss falls and prevention strategies. A fall risk assessment tool integrated into the Electronic Health Records (EHR) system assesses and classifies the veterans as low risk or high risk depending on the fall risk assessment score. Based on each score, fall prevention interventions are implemented. Fall prevention strategies at the facility consist of traditional fall precautions. These include reminding staff about the safe use of transfer devices, fall risk identifiers in front of the rooms, call lights, non-skid socks, and environmental safety measures. These standard precautions have had little effect on reducing fall prevalence.

The memory care unit is the pilot floor for this QI project. This unit is a 25-bed unit housing veterans with cognitive impairment. Falls remain the most reported incidents on this floor, including consequences like bruises, skin tears, and fractures that sometimes require hospitalization. In 2021, the falls rate in the memory unit was 4.7 per

1000 occupied-bed days compared to 3.6 per 1000 occupied-bed days in the skilled nursing care units. Residents in the memory unit require around-the-clock care and monitoring by nursing staff. The staff providing direct care to the residents of the memory unit consists of Registered Nurses (RNs), Licensed Practical Nurses (LPNs), and Certified Nurses Assistants (CNAs).

Sample

To implement the QI project, a combination of purposeful and convenience sampling methods was used.

Staff: Participants of this project consisted of staff members who provide direct care to the veterans. Based on the budgeted full-time equivalent (FTE), the following direct care providers are needed to cover the unit: 3 RNs, 6 LPNs, and 16 CNAs. At the time of the project the following regular staff positions were filled:1RN, 5 LPNs, and 11 CNAs. All regular staff participated in the project. Float staff and agency staff get assigned from other units to cover the unfilled positions. Fall prevention champion volunteers were recruited among charge nurses and CNAs as project leaders during their shifts. They trained new or float staff members and made sure hourly rounding and documentation are correctly done.

Residents: The beneficiaries of the HR were residents who were assessed as at high fall risk. Increased fall risk veterans have a fall risk assessment score of 10 or higher based on the fall risk assessment tool used at the facility. The number of high fall risk veterans on the unit fluctuated depending on changes in conditions or fall events. At the project's beginning, ten veterans out of 20 on the unit were considered high fall risk residents. They benefit from the HR interventions included in the QI project. Residents

participating in the project were decreased to eight participants due to the deaths of two of them.

Procedures

The Plan-Do-Study-Act cycle guided the structure of the procedures.

Plan stage

Individual meetings with the facility administration and key stakeholders were held at the Plan stage. The current QI project was identified as one of the areas needing improvement at the facility. The management gave the green light to conduct the project. Several meetings and phone calls were made to discuss the project with the administrator, the director of nursing (DON), the assistant director of nursing (ADON), the quality improvement coordinator, and the unit manager (UM). Front line staff members on the memory unit were informed about the project. Some of the staff played the role of fall prevention champions and made sure the HR and documentation were done correctly during their shifts. Educational documents and support were developed before the education sessions.

Do stage

The Do stage consisted of the staff education and implementation of the HR. The education sessions were done on the floor by the DNP student with the assistance of the staff development coordinator and the ADON. The education sessions occurred over 7 days from 2/7/2022 to 2/14/2022. Using handouts (Appendix B), the education covers various topics, including the definition of fall, causes and effects of fall, falls prevention strategies, and more importantly, how to perform HR with 4 Ps approach. The DNP student developed the material used in appendix B, using evidence-based articles on falls

and fall prevention and the AHRQ materials. The content of the handouts was approved by the facility management and the staff education coordinator.

The education was regularly done during the three shifts (morning, evening, and night) until all regular staff members of the unit completed the education. Each session lasted approximately 15 minutes. At the beginning of each session, a pretest was administered to the regular staff participants to evaluate their baseline knowledge on falls and fall prevention interventions. Fall prevention champions educated new or float staff members. The DNP student is a charge nurse on the pilot unit and also educated float and new staff members as needed. Float staff members received the education on the go before starting their shifts.

The AHRQ (2013) developed a knowledge assessment tool to help improve staff knowledge about falls. This assessment tool was used for this project (Appendix C). All the regular staff members took the pretest, and their baseline knowledge was evaluated before the education. A post-test was administered one month after the education sessions to assess the level of knowledge retention of the teaching by staff members. The posttest included the same questions as the pretest. The pretest and posttest forms have no demographic details to identify the person taking the test. Only the test-taker's role (RN, LPN, or CNA) is requested. The pretest and posttest tool is modified to adapt to the context of a memory care unit and include the 4 Ps HR concept.

After the education, implementing the 4 Ps HR was integrated into the veterans' routine care and fall prevention activities. Hourly rounds were done every hour from 6:00 am to 10 pm and every 2 hours from 10 pm to 6:00 am. Nurses did rounds on even hours and CNAs on odd hours.

During the HRs, staff members asked residents about pain, and potty; checked the position of the beds, and made sure the veterans' frequently used items like cell phones, Kleenex, shoes, canes, TV remotes, and call lights were within reach (proximity of possessions/ personal items). The HR was also an opportunity for staff members to verify that standard fall prevention measures were in place. An HR log (Appendix D) was kept in each room. Staff members initialed the logs after completing the round. The daily logs were used as a data collection instrument to measure staff members' compliance level with implementing and documenting the roundings. The fall prevention champions on the unit oversaw the implementation during their shifts and made sure float staff members understood their assignments related to the project. Charge nurses were responsible for collecting the logs and keeping them in a binder at the nursing station. During the implementation, managers did " leadership rounds" to check on the implementation and encourage frontline staff for their efforts. The leadership rounding was materialized by the leader's signature on the daily logs.

The 4 Ps HR was continuously monitored and evaluated every two weeks by the project leader. He met with the frontline staff to talk about difficulties encountered during the implementation. Concerns from direct care staff were heard, and education was reinforced. The HRs lasted eight weeks and took place from 2/15/2022 to 4/16/2022.

Study stage

Data collection/Analysis: The number of falls before and during implementation was obtained through fall incident reports documented in the EHR. The number of falls was used to calculate the falls rate per 1000 occupied-bed days. Falls rate is calculated using the recommended method of AHRQ (2020) as follows:

- Add up the total occupied beds each day for the whole month.
- Divide the number of falls per month by the number of occupied-bed days for the month.
- Multiply the result by 1000 to get a monthly fall rate per 1000 occupied-bed days.

Documentation related to the completion of HR was collected from the logs (Appendix D) placed in the veteran's rooms. The HR completion percentage was calculated based on the logs. A run chart was the primary analysis tool used to analyze and give meaning to the fall data collected during the implementation. The run chart compared fall rates of eight weeks prior to implementating the 4 Ps HR with fall rates during the eight weeks of HR. Descriptive statistics were used to analyze the completion level of HR based on the documentation. Descriptive and inferential statistics were used to analyze staff performance on pretest and posttest knowledge assessments.

Act stage

At the end of the eight weeks of implementation, the project's outcomes, strengths, and weaknesses were analyzed. Based on the results of this project in reducing falls in the memory unit, suggestions were made for the large-scale implementation of the HR on the other units in the facility and recommendations made to sustain the expected outcomes of the project.

Approval process

Due to ethical concerns, veterans' rights and dignity were respected during the implementation of this QI project. No personal identifiers of the staff members or veterans were included. The execution of the current QI project did not alter the veterans' daily routine. The HR was integrated with the daily care routine of the veterans

participating in the project. The focus was on how staff members perform their daily duty and bring changes to their work habits. The facility has no Institutional Review Board (IRB). The facility administrator approved the project. The director of nursing (DON), the assistant director of nursing (ADON), and the unit manager (UM) also provided support for the project. The University of Missouri-Saint Louis' IRB reviewed the project and determined it to be a Quality Improvement activity not requiring IRB review.

Results

The daily compliance level in implementing and documenting the 4 Ps hourly rounding ranged from 74.37% to 100%. The overall compliance level was 95.85%.

Eighteen staff members knowledge was assessed pre and post intervention through a ten questions test. Results from each question are shown in table 1. The mean score on the pre-test was 57.77 and the mean score on the post-test was 91.66.
A unpaired t-test found a significant difference between the overall pre and post knowledge survey scores ($t(18)= 2.1009$, $p=0.008$).

Table 1

Staff members' performances on pre and posttests

Question	Pre Survey Correct Responses		Post-Survey Correct Responses	
	n	%	n	%
Q1	15	83.3	18	100
Q2	6	33.33	12	66.66
Q3	17	94.4	18	100
Q4	8	44.4	15	83.3
Q5	18	100	18	100
Q6	18	100	18	100
Q7	7	38.8	16	88.8
Q8	7	38.8	14	77.7
Q9	8	44.4	18	100
Q10	0	0	18	100

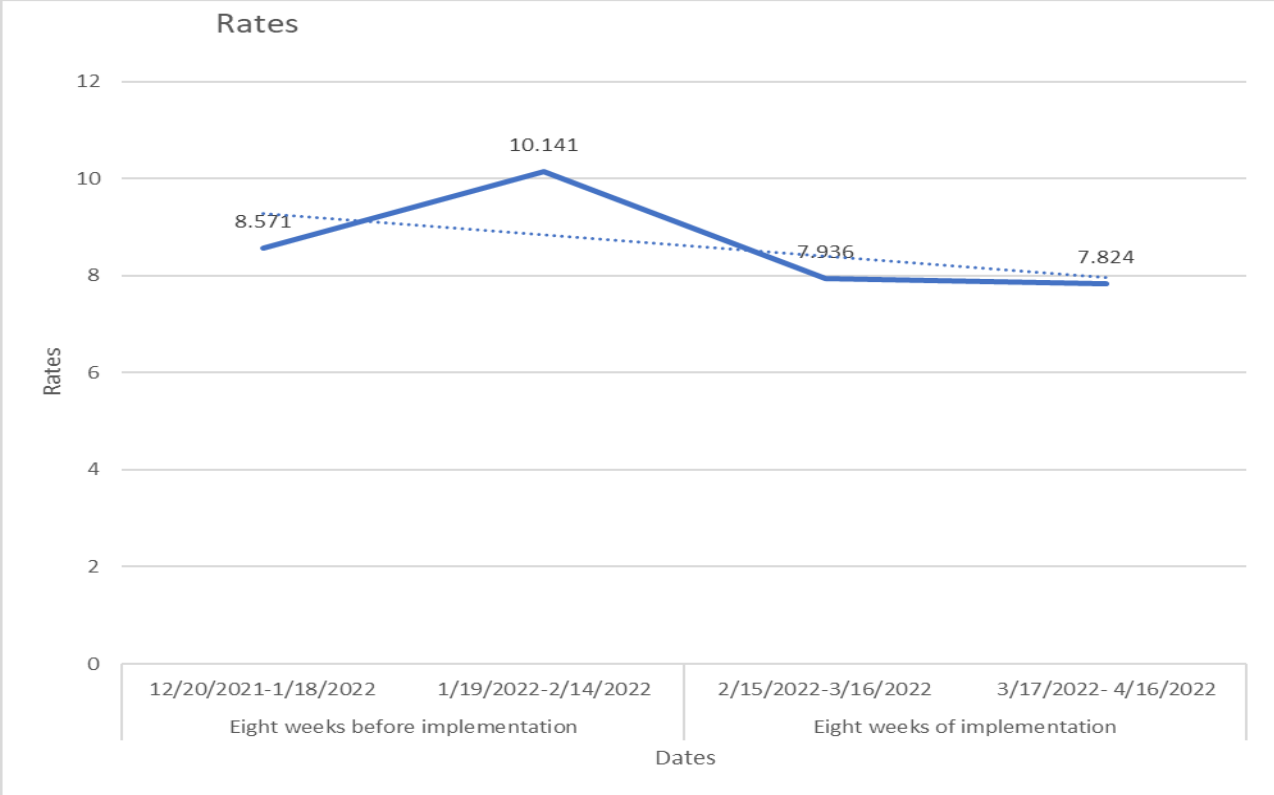
Note: n represents the number of staff members on the pre and posttests. Total participants: 18 Pre-test mean (57.77), posttest mean (91.66).

Fall rates during the eight weeks (2/15/2022 – 4/16/2022) of implementing the 4 Ps HR were calculated and compared to fall rates in the previous eight weeks before implementation. For the first four weeks of implementation, the falls rate was 7.936 per 1000 occupied-bed days and 7.824 per 1000 occupied-bed days on the second four weeks of implementation. During the two four week periods immediately preceding the implementation, the fall rates were respectively 8.571 and 10.141 falls per 1000 occupied-bed days. Figure 1 displays a run chart with a trend line showing the variations

of the falls trend eight weeks before implementation and eight weeks of implementing of the 4 Ps HR

Figure 1

Falls rate per 1000 occupied bed days before and during the implementation of HR.



Note: Trendline has a negative slope.

Discussion

Performance on Knowledge Test

The main objective of pretest and posttest questions was to determine whether the education sessions had any impact on staff members' knowledge of falls and fall prevention interventions, specifically, the 4 Ps HR approach. There was a statistically significant increase in test scores from the pre-test to the post-test.

The objective of the first question was to determine staff members'general knowledge related to risk factors for falls. Correct answers accounted for 83.33% in the pretest. However, this increased to 100% in the post-test, indicating that education significantly impacted the staff members' knowledge about the risks. The second question aimed at assessing whether staff members know that fall prevention requires teamwork and that many falls can be prevented even in a memory care unit. Only 33.33% of the respondents in the pretest knew the correct answers. However, these figures doubled to 66.66% in the posttest. The third question was meant to evaluate whether staff members understand how patient safety can be improved. Up to 94.44% of the respondents in the pretest knew how safety could be improved. However, after the education, the score increased to 100%. The fourth question was designed to determine whether the staff members know the components of the 4Ps HR approach for fall prevention. In the pretest, 44.44% of the respondents were able to check all the four components (Pain, Position, Potty, Proximity of possessions). After the education, the score increased to 83.33%, meaning that many staff members improved their knowledge. The fifth question was meant to determine if the staff members know that 4 Ps HR can improve communication and prevent patient falls. All the respondents in both pretest and posttest knew the correct answers. The sixth question was meant to evaluate whether the staff members know that HR can improve patient safety. According to the responses, all the respondents in the pretest and posttest knew the correct answers. The seventh question assessed if staff members know how often HR is conducted on the day and night shifts. In the pretest, only 38.88% knew compared to 88.88% in the posttest. The eighth question was meant to determine whether staff members know that HR can still be conducted even in staffing

shortages. In the pretest, only 38.88% stated that it is feasible compared to 77.77% in the posttest, who admit that HR is doable even when the staffing is short. The ninth question assessed whether the staff members had heard about 4 Ps HR before the current project. Only 44.44% of staff members have already heard about 4 Ps HR. After the education and one month of implementation, 100% of staff members stated having heard of 4 Ps HR concept. There was a 55.56% change between the pretest and posttest. The final question was to determine if staff members are using the 4 Ps HR approach to prevent falls at the job place. Before the test, all the test takers acknowledged that the 4 Ps HR is not used to prevent falls at the current project site. However, after one month of implementation, 100% of staff members involved in the project stated that the 4 Ps HR is used to prevent falls, even if this is still limited to the memory unit. The questions and answers analysis above showed an improvement after the education sessions.

From the results we can conclude that the education sessions increased staff members' knowledge on fall prevention interventions and specifically how to implement 4 Ps HR. Zhao et al. (2019) stated that frontline staff education increases their knowledge and awareness of their role in improving patient safety, specifically fall prevention within LTC facilities.

Hourly rounding compliance

The overall compliance level with implementing and documenting the daily HR is high. The daily compliance levels fluctuated due to the staffing shortage and the use of float staff and agency staff members on the pilot unit. On the one day, the compliance level was below 80%, the question was asked of staff if there was anything that may have contributed to the lower compliance on that day. The answer was: “It was a chaotic

day". The DNP student also noticed that daily compliance tended to be low when the charge nurse is a float nurse or is from agency personnel; on the other hand, the level of compliance was high when the pilot unit was charged by regular staff members or by the DNP student. There was no significant gap in compliance levels between day, evening, and night shifts.

This high level of daily compliance is a sign that staff members accepted the project and followed the protocol as planned. Another factor is the support from management. The management and the administrator periodically conducted leadership roundings to assess the implementation and encourage staff members for their effort. The fact that the DNP student is a regular charge nurse on the pilot unit and was able to oversee the implementation and documentation closely is also a contributing factor.

Falls rate reduction

The HR protocol was able to reduce the fall rates in the memory care unit during the eight weeks of implementation. The trendline of the run chart has a negative slope indicating that fall rates gradually decreased after the 4 Ps HR started.

Only minor injuries (bruises, skin tears) occurred with all of the falls. There was no fracture or lengthy hospital stay due to fall-related injuries. One veteran was sent to the hospital for evaluation due to post-fall altered mental status. The CT scan revealed no head injury, and the veteran ended up being treated for urinary tract infection (UTI) as the cause of his altered mental status. During the eight weeks of implementation, the pilot unit had ten falls. All the falls happened among three veterans who had recurrent falls. For instance, the first fall happened on day 1 of the HR. The veteran lost his balance when walking with a walker. The same veteran fell again three days in a row a month

later, probably due to an acute infection as he ended up being diagnosed and treated for UTI on the fourth fall. The second veteran was found sitting on the floor. This fall was counted as an unwitnessed fall. He later had three witnessed falls in one week and was diagnosed and treated with cellulitis on bilateral lower extremities. The third veteran slid down from a chair to the floor two times. All the falls happened during awake times when the veterans were alert and active.

Many factors may have contributed to the difference between the before and after implementation rates. One limiting factor of the study was using a protocol designed for hospitals and readapted into a nursing home setting. In hospital settings, licensed nurses were responsible for performing hourly rounding and assessing patients for pain and other acute conditions. In this project, the 4 Ps HR was performed predominately by LPNs and CNAs. This could have impacted the quality of the assessments for early detection of acute conditions like UTIs and cellulitis, which contributed to recurrent falls. Falls related to sudden and acute conditions were accounted for 60% of the falls in this study. Also, in hospitals, many patients spend most of their time in their room and can call for help. Many veterans are wanderers in the current pilot unit and do not know how to call for help or express discomfort due to cognitive impairment.

Another limiting factor that influenced the project results was the staffing shortage. Throughout the implementation, the staff worked short-handed. The administration used float staff and staffing agencies to fill the open positions. The use of float and staffing agencies on the pilot unit was not beneficial to the project's success. The memory unit provides specialty care to cognitively impaired residents. New staff members had difficulties handling the behavior disturbances exhibited by the residents on

this unit. Not having enough knowledge about the veterans' daily routines in this particular unit, float and agency staff members were not as proactive as regular staff in anticipating and preventing fall risk behaviors from veterans. The staffing shortage has likely contributed to an overall increase in fall rates across the facility. In previous years, the falls rates in the memory care unit used to be 4.7 per 1000 occupied-bed days without any structured fall prevention interventions. In the last four weeks before implementing this project, the falls rate increased to 10.141 per 1000 occupied-bed days. The 4 Ps HR decreased the fall rates, but they are still not close to where they were before the current staffing shortage.

To answer the study question, it can be inferred from the above discussion that implementing the 4 Ps HR protocol has contributed to reducing fall rates among older adults living in the memory care unit of the LTC facility during the two months of implementation. The current QI project had positive results related to documenting and complementing the 4 Ps HR, and the staff knowledge was statistically improved during the education sessions.

Implications for Practice

This study has clear implications for the practice. To start with, the QI project can be used to improve staff members' knowledge. In this study, the staff members' knowledge was improved in understanding the causes and consequences of falls and implementing a structured prevention intervention such as the 4Ps HR. Secondly, The project implementation also showed that staff members could assimilate and integrate new protocols to change their care delivery habits. Throughout the project, staff members were attentive to the recommendations and followed the suggestions of the 4 Ps HR

protocol as planned. The current project offered the opportunity to evaluate the impact of structured fall prevention interventions never implemented before on the unit. The project also created a constant awareness about falls and the role of staff members in preventing them. Finally, this project allowed the DNP student to apply skills learned throughout the DNP program to become a better practitioner and leader in the nursing field.

Recommendations for further study and strategies for maintaining and sustaining change

To better appreciate the impact of the 4 Ps HR on reducing fall rates in LTC facilities, further studies are recommended in other settings. The current project was implemented in memory care unit. The cognitive impairment of the residents and the acute staffing shortage impacted the final results of the study.

The 4 P's HR protocol need to be integrated into the already established prevention measures and expanded to all the units of the LTC facility.

A multidisciplinary approach combined with a strong advocacy for the HR protocol is necessary to improve and maintain the expected outcomes.

To sustain the decrease in falls rate and fall related injuries after the the eight-weeks of implementation, the staff education coordinator should continue to remind staff members of the recommendations of the 4 Ps HR during the multiples in-services held at the facility.

Filling the open positions on the memory unit with regular staff who are familiar to the veterans' routines to provide consistent care. When additional staff are needed, the use of float staff from other units in the LTC who are familiar with this insutition may be preferred to using agency staff unfamiliar with this setting. This will avoid frustration

among new staff members who do not know how to handle veterans with behavior disturbances. It will also minimize the anxiety and confusion of the veterans when receiving care from unfamiliar caregivers.

Conclusion

Patient falls remain recurrent problems in healthcare settings, with a significant impact on patient care across the country, leading to injuries, prolonged hospital stays, and even death (Najafpour et al., 2019). The situation is even worse in memory care units of LTC facilities, where cognitive impairments are factors for falls. Traditional standard measures failed to reduce fall rates.

Using Evidence-Based Practices interventions, this project, implemented in a memory care unit of an LTC facility in Missouri, improved the baseline knowledge of staff members and reduced the fall rates during eight weeks of implementation. The overall general knowledge about falls prevention in the healthcare setting improved by 33%. In addition to that, an unpaired t-test proved that education sessions were statistically significant in improving staff knowledge. The level of completion of the protocol was 95.85%. Fall rates were respectively decreased from 8.571 and 10.141 per 1000 occupied-bed days before implementation to 7.936 and 7.824 falls per 1000 occupied-bed days during implementation.

Implementing 4 Ps HR provided direct care givers with a better understanding of veteran’s daily routines, living patterns, and preferences through the frequent monitoring system. Hourly rounding should not be a stand-alone intervention, but must be incorporated with other pre-established interdisciplinary fall prevention interventions to sustain the expected outcomes.

Although hourly rounding protocols are designed for hospital settings, this project had positive outcomes when used in a memory care unit of an LTC facility.The delicate question of staffing shortage needs to be addressed to have all staff members aware of the residents' fall risk behaviors in the memory care unit.

The 4 Ps hourly rounding protocol remains a structured fall prevention intervention, but further studies should be done in other settings of LTC facilities menmory units to fully apprehend the impact of 4 Ps HR to prevent falls among older adult with cognititive impairment.

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Appendix A

Reference matrix (Evidence Table)

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
Author(s), Date, Title, Journal Information, DOI	Purpose & Outcome Measures or Goals (Aims)	Sample & Setting	Study Design & Interventions	Results, Strengths/Weaknesses, Limitations, & Recommendations
Althobaiti, S. W. (2019). Impact of the use of the 4Ps in hourly rounds on reductions inpatient falls inwards. Journal of Contemporary Scientific Research (ISSN (Online) 2209-0142), 3(7), 1-7. http://www.jcsronline.com/wpcontent/uploads/2019/09/Volume3Issue7Paper1.pdf	**Purpose:** To improve patient satisfaction and safety through the implementation of purposeful and timely nursing rounds. **Outcome Measures:** Improved practice knowledge among staff nurses, and increase compliance with these criteria.	**Sample:** A sample of 88 patients was considered in this study. **Setting:** Baltimore VA medical center.	**Study design:** Direct observation of staff nurses on a medical-surgical unit in the United States was employed to assess timeliness and utilization of a protocol when rounding. **Interventions:** A follow-up audit was conducted to determine compliance with the same criteria.	**Results:** Following training, there was a 40% increase in the *SEPF-A* and a 67% increase in the *SEPF-N* indicating an improvement in self-efficacy related to falls. **Strengths:** The skills given to the nursing staff were relevant in helping them to reduce the patient's fall cases in health care facilities. **Weakness:** Lack of patients' participation in the training. **Limitation:** The 4Ps approach ensures that all patient needs are met on time, which not only helps increase patient safety but also encourages patients to develop trust in the nursing care. However, in this study, the 4Ps approach haven't been given

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
				priority as a measure of reducing the number of falls in hospitals. **Recommendations:** a) The study should consider emphasizing on the 4Ps approach through demonstrations and training on how it can help in reducing patients fall in primary health centers. b) The study should consider involving the patients on measures to be undertaken in reducing the fall cases in hospital.
Bagui, S., Long, T., & Bagui, S. (2019). Selecting the Optimal Morse Falls Scale Cut-Off Point for Patient Fall Risk. Health, 11(07), 924. https://www.scirp.org/html/7-8204655_93854.htm	**Purpose:** To determine the optimal cut-off value for patients at risk for falls using a Falls Screening Tool, the Morse Falls Scale. **Background:** Analyzing the optimal morse falls scale cut-off point for patients' fall risk.	**Sample:** n=1000 patients out of a population of 13,626 were studied. **Setting:** The study was conducted at a community-owned hospital with 256 acute care private rooms and 36 critical care rooms. This study used	**Study design:** Statistical Analysis. **Interventions:** Admission MFS score analysis	**Results:** The cut-off value of >45 had quite low sensitivity of 52.17%, acceptable specificity of 63.43, good NPV 83.55%, and 39.8% of patients in our sample categorized as at risk for falling. **Strength:** The standard cut-off value used in the study with the MFS was of great value and therefore may be the most common value used by health care workers as they transition between organizations. **Weakness:** Not accurately assessing a patients' MFS value due to either variation

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
		only the admission Morse Falls Scale (MFS) score in its analysis.		between caregivers in the interpretation of the sub-questions of the MFS or haphazardness in its usage due to low perceived value use could result in poor predictive power. **Limitation:** Ideally, a study with this purpose should be conducted before implementing a falls prevention program, but in this case, it was conducted after the fall prevention implementation program. **Recommendations:** To attain the highest predictive power, the researcher should consider doing an assessment of the patient's MFS value, besides reconsidering reversing the implementation of falls prevention program in relation to the period of conducting the study.
Bayen, E., Jacquemot, J., Netscher, G., Agrawal, P., Noyce, L. T., & Bayen, A. (2017). Reduction in fall rate in dementia managed care through video incident review: a pilot study. Journal	**Purpose: T**o analyze how continuous video monitoring and review of falls of individuals with dementia can support a better quality of care.	**Sample:** n=53 rooms out of 83 public and private patient rooms were monitored. **Setting:** The study was carried out in a Californian	**Study design:** A pilot observational study. **Interventions:** Video review was provided to facility staff which	**Results:** Over 3 months, 16 falls were video captured. A drop-in fall rate was observed in the last month of the study. **Strengths:** Acceptability was good as video review enabled screening for the severity of falls and fall-related injuries.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
of Medical Internet Research, 19(10), e339. https://www.jmir.org/2017/10/e339	**Outcome Measures:** The outcome measures were the count of residents' falls happening in the video-covered areas, the acceptability of video recording, the analysis of video review, and video replay possibilities for care practice.	memory care facility.	had a customized mobile device app.	**Weakness:** Video cameras don't provide instant support to the falling patients even if it gives an alert to the management on how to improve the healthcare facility to reduce the patients fall cases. **Limitation:** Although video monitoring offers high potential to support conventional care in memory care facilities, it requires 24/7 monitoring which is tiresome and costly. **Recommendation:** The study will be made better if the researcher would have considered inventing of an alternative program that would provide surveillance in the patient's areas and give an instant support to the patients in case of any fall. For instance, the researcher should conduct more research on how to invent a patient's bed which will sense when the patient wants to move out of bed, and sends a signal to the caregivers alerting them that a particular patient needs assistance.
Cameron, E. J., Bowles, S. K., Marshall, E. G., & Andrew, M. K.	**Purpose:** The study aimed at exploring risk factors and potential prevention strategies	**Sample:** A total sample of 395 residents was	**Study design:** This was a cross-sectional study design using data from the Care by	**Results:** Falls were frequent; 56.2% of our sample of 395 residents fell at least once. In univariate analyses, male gender ($p = 0.009$), dementia ($p = 0.005$), and use of Selective

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
(2018). Falls and long-term care: a report from the care by design observational cohort study. BMC Family Practice, 19(1), 1-7. https://link.springer.com/article/10.1186/s12875-018-0741-6	for falls in elderly residents of Long-Term Care Facilities (LTCF). **Outcome Measures:** The number of falls was determined by chart review during a six-month timeframe.	considered in the study. **Setting:** This study was carried out within Nova Scotia's Capital District Health Authority.	Design (CBD) study, within Nova Scotia's Capital District Health Authority. **Interventions:** CBD implementation.	Serotonin Reuptake Inhibitors or Selective Serotonin-Norepinephrine Reuptake Inhibitors (SSRI/SNRI) ($p = 0.084$) showed statistically significant associations with having fallen. **Strengths:** The multivariable linear regression model gave out almost all results with a minimized number of errors. **Weakness:** The study did not use a standardized method of recording falls, as the LTCF did not have a formal tool for recording falls. **Limitation:** This was an observational study, and sampling of LTCF residents was not random; those with emergency ambulance calls were over-sampled. **Recommendation:** The researcher should consider doing further research to identify risk factors and target interventions in patients fall alongside studying why it's necessary to do screening for falls incidents.
Castle, S. C. (2019). New strategies for falls prevention.	**Purpose:** To help health care stop doing what is not working	**Sample:** A total sample of 60 health facilities around	**Study design:** Observational and	**Results:** Almost 90% of the falls were recorded among the aging population.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
Clinics in Geriatric Medicine, 35(2), xi-xiv. DOI: 10.1016/j.cger.2019.02.001 PubMed: 3092989 https://doi.org/10.1016/j.cger.2019.02.001	and instead pivot to develop better "behaviors" to address the patient's fall crisis. **Outcome Measures:** The number of falls was analyzed with the use of videos and recordings.	California was considered in this study. **Setting:** Geriatric Medicine UCLA School of Medicine VA Greater Los Angeles	statistical analysis design. **Interventions:** Introduction of large-scale use of patient-engaged video surveillance.	**Strengths:** Acceptability was good as video review enabled screening for the severity of falls and fall-related injuries. **Weakness:** No contact interaction with the patients. **Limitation:** The study mode wasn't feasible for the patient fall investigation. **Recommendation:** The research should consider on the review of exercise interventions as part of the core area in reducing the patients fall.
Daniels J. F. (2016). Purposeful and timely nursing rounds: a best practice implementation project. JBI database of systematic reviews and implementation reports, 14(1), 248–267. https://doi.org/10.11124/jbisrir-2016-2537	**Purpose:** To improve patient satisfaction and safety through the implementation of purposeful and timely nursing rounds. **Outcome Measures:** Improved practice knowledge among staff nurses and increase compliance with these criteria.	**Sample:** A sample of 88 patients was considered in this study. **Setting:** The Institute for Healthcare Improvement (IHI).	**Study design:** Direct observation of staff nurses on a medical-surgical unit in the United States was employed to assess timeliness and utilization of a protocol when rounding. **Interventions:** A follow-up audit was conducted to	**Results:** Responsiveness of hospital staff increased moderately (15%) with a significant sub-element increase in toileting (41%). Patient falls decreased by 50%. **Strengths:** Purposeful and timely rounding on the patient's safety. **Weakness:** The baseline audit results of the study were not shared with the public and necessary relevant authorities. Either, the study didn't prove areas for future research.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
			determine compliance with the same criteria.	**Limitation:** Three elements of patient satisfaction had substantive rate increases but the hospital's goals were not reached. **Recommendation:** The researcher should consider including in the study some of the supportive infrastructure and an organized approach that will help the caregivers to improve their efficiency in support provision for the elderly patients, hence reducing the number of falls.
Gringauz, I., Shemesh, Y., Dagan, A., Israelov, I., Feldman, D., Pelz-Sinvani, N., Justo, D., & Segal, G. (2017). The risk of falling among hospitalized patients with high modified Morse scores could be further Stratified. BMC health services research, 17(1), 721 https://bmchealthservres.biomedcentral.com/	**Purpose:** To ascertain our study hypothesis that certain patients' characteristics (e.g., serum electrolytes, usage of a walking device, etc.) could further stratify the risk of falls among hospitalized patients with MMFS. **Outcome Measures:** Falling during hospitalization is a common phenomenon among hospitalized	**Sample:** A sample size of 428 patients aged 76.8±14.0 years was considered in this study. **Setting:** Sheba Medical Center	**Study design:** A retrospective cohort analysis of adult patients. **Interventions:** Use of major tranquilizers	**Results:** All patients had high (9 or more) MMFS upon admission, and their mean MMFS (Modified morse fall scale) was 16.2±6.1. A group of 139 (32.5%) patients who fell during their hospitalization was compared with a control group of 289 (67.5%) patients who did not fall. The fallers had higher MMFS, a higher prevalence of mild dependence, and greater use of a cane or no walking device. **Strengths:** Only the authors mentioned were involved in study design, data collection, and analysis. No external members were involved in this study, hence an accurate result.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
articles/10.1186/s12913-017-2685-2	patients, becoming more frequent and hazardous among the elderly and the frail.			**Weakness:** There were no further study topics that were recommended in this research study. **Limitation:** The datasets generated during and/or analyzed during the current study are not publicly available in accord with the IRB regulations. **Recommendation:** The researcher should include in the study the ways in which further risk stratification of hospitalized patients can be attained.
James, S. L., Lucchesi, L. R., Bisignano, C., Castle, C. D., Dingels, Z. V., Fox, J. T., ... & Murray, C. J. (2020). The global burden of falls: global, regional, and national estimates of morbidity and mortality from the Global Burden of Disease Study 2017. Injury Prevention, 26(Supp 1), i3-i11.	**Purpose:** To help health care stop doing what is not working and instead pivot to develop better "behaviors" to address the patients' fall crisis. **Outcome Measures:** Patient falls can lead to severe health loss including death. That falls are an important	**Sample:** A total sample of 60n health facilities around California was considered in this study. **Setting:** Global Injury Analysis.	**Study design:** Analytical estimation framework design. **Interventions:** Introduction of large-scale use of patient-engaged video surveillance.	**Results:** Globally, the age-standardized incidence of falls was 2238 (1990–2532) per 100 000 in 2017, representing a decline of 3.7% (7.4 to 0.3) from 1990 to 2017. Age-standardized prevalence was 5186 (4622–5849) per 100 000 in 2017, representing a decline of 6.5% (7.6 to 5.4) from 1990 to 2017. The most common injury sustained by fall victims is a fracture of the patella, tibia or fibula, or ankle. Globally, age-specific YLD rates increased with age.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7571347/	cause of death and disability globally.			**Strengths:** Acceptability was good as video review enabled screening for the severity of falls and fall-related injuries. **Weakness:** No contact interaction with the patients. **Limitation:** The study mode wasn't feasible for the patient fall investigation. **Recommendation:** The researcher should do more research on some of the best ways of fall prevention strategies, besides coming up with ways of motivating the nursing staff for their great work of helping the falling patients.
Lach, H. W., Harrison, B. E., & Phongphanngam, S. (2017). Falls and Fall Prevention in Older Adults with Early-Stage Dementia: An Integrative Review. Research in gerontological nursing, 10(3), 139–148.	**Purpose: T**o evaluate evidence on fall risk and fall prevention in this population. **Outcome Measures:** Falling during hospitalization is a common phenomenon among hospitalized patients, becoming more frequent and	**Sample:** A sample of 40 hospitals was considered in the research study. **Setting:** Hospital Setting	**Study design:** Statistical Analysis Design was Used. **Interventions:** Exercise and multifactorial	**Results:** Responsiveness of hospital staff increased moderately (15%) with a significant sub-element increase in toileting (41%). Patient falls decreased by 50%. **Strengths:** Purposeful and timely rounding on the patient's safety. **Weakness:** The baseline audit results of the study were not shared with the public and necessary relevant authorities. Either the study didn't prove areas for future research.

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https://doi.org/10.3928/19404921-20160908-01	hazardous among the elderly and the frail.			**Limitation:** Three elements of patient satisfaction had substantive rate increases but the hospital's goals were not reached. **Recommendation:** The researcher should consider including in the study some of the supportive infrastructure and an organized approach that will help the caregivers to improve their efficiency in support provision for the elderly patients, hence reducing the number of falls.
Leverenz, M. D., & Lape, J. (2018). Education on fall prevention to improve self-efficacy of nursing staff in long term care: A pilot study. Internet Journal of Allied Health Sciences and Practice, 16(3), 6 .https://nsuworks.nova.edu/ijahsp/vol16/iss3/6/	**Purpose:** To determine whether it's true or false on the hypothesis that, "fall prevention education by an occupational therapist would be effective to improve the self-efficacy of nursing staff for implementation of fall prevention strategies and self-efficacy to prevent resident falls". **Outcome Measures:** The scales have	**Sample:** A sample size of 8 certified and assistant nurses was used. **Setting:** Chatam University Hospital	**Study design:** A pretest posttest pilot study design. **Interventions:** Exercising regularly and using a balanced diet.	**Results:** Following training, there was a 40% increase in the *SEPF-A* and a 67% increase in the *SEPF-N* indicating an improvement in self-efficacy related to falls. **Strengths:** The skills given to the nursing staff were relevant in helping them to reduce the patient's fall cases in health care facilities. **Weakness:** Lack of patients' participation in the training. **Limitation:** Three elements of patient satisfaction had substantive rate increases but the hospital's goals were not reached.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
	demonstrated validity and reliability relative to individual items and scale totals in the assessment of nursing staff's self-efficacy beliefs for preventing falls. Though these scales were originally tested in a hospital setting, there are similarities between the hospital and long-term care environments. In both settings, nursing staff care for patients with multiple medical conditions who are at risk for falls			**Recommendation:** The researcher should consider carrying out research and including the findings in this study, some of the best trainings to be offered to the hospital staff to increase the self-efficacy of the staff for implementation of fall prevention strategies and prevention of patient falls in long-term care. Also, the researcher should consider including an alternative training of the measures to reduce fall risks on the patients category.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
Linehan, J., & Linehan, J. (2018). Fall prevention in long-term care using purposeful hourly rounding. Journal of the American Medical Directors Association, 19(3), B17 https://doi.org/10.1016/j.jamda.2017.12.056	**Purpose:** To investigate the reason why the elderly populace in the Long-Term Care (LTC) facilities are at an increased risk of suffering from falls. **Outcome Measures:** Falls can lead to injury, diminished functional ability, loss of independence, even death. A large retirement community in Baltimore, Maryland has identified falls on the LTC floor as a patient safety concern. As the LTC floor phases out using bed alarms, they are seeking other methods to monitor for and prevent falls.	**Sample:** 182 participants aged ≥65 living in autonomous residences for elderly adults **Setting:** Long-Term facilities in Baltimore, Maryland	**Study design:** RCT **Interventions:** Participants randomly assigned to strength-balance (n = 98) or strength-balance-cognitive (n = 84) training	**Results:** Participants in strength-balance-cognitive group had significant improvements in fast gait velocity (*P* = .04), dual-task gait cost (*P* = .03), executive function (Trail-Making Test Part B, *P* = .001), and fall rate (*P* = .001) **Strengths:** Purposeful and timely rounding on the patient's safety. **Weakness:** The method wasn't effective in the research on individuals below 60 years of age. **Limitation:** The study mode wasn't feasible for the patient fall investigation. **Recommendation:** The researcher should have used a different method of research that will accommodate all the patients regardless of their age bracket. For instance, the use of t-test design method.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
Montero-Odasso, M., & Speechley, M. (2018). Falls in cognitively impaired older adults: Implications for risk assessment and prevention. Journal of the American Geriatrics Society, 66(2), 367–375. https://doi.org/10.1111/jgs.15219	**Purpose:** To provide an overview of the role of cognition in falls, with potential implications for managing and preventing falls in older adults. **Outcome Measures:** The relationship between gait and cognition in aging and neurodegeneration was reviewed in the medical literature to highlight the role of brain motor control deficits in fall risk. The benefits of dual-task gait assessments as a marker of fall risk were reviewed. Therapeutic approaches for reducing falls by improving certain aspects of cognition were appraised.	**Sample:** Community-dwelling older adults (65 years and older). **Setting:** Observational and interventional studies addressing the role of cognition on falls.	**Study design:** Reviewing **Interventions:** Regular exercise and doctor check-ups.	**Results:** Low performance in attention and executive function are associated with gait slowing, instability, and future falls. Drug-enhancement of cognition may reduce falls in Parkinson's disease, and cognitive training, dual-task training, and virtual reality modalities are promising to improve mobility in sedentary older adults and those with cognitive impairment and dementia. **Strengths:** There is an effective use of both quantitative and qualitative types of research in the analysis of the patient's fall facilitating factors. **Weakness:** The result of this research doesn’t provide enough evidence on how drug enhancement of cognition may reduce falls. **Limitation:** There are no recommended areas for future research. **Recommendation:** The research can be improved by including the disentangling mechanisms in the study as it contributes to cognitive deficits in fall risks.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
Shaw, L., Kiegaldie, D., & Farlie, M. K. (2020). Education interventions for health professionals on fall prevention in health care settings: a 10-year scoping review. BMC Geriatrics, 20(1), 1-13. https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-020-01819-x	**Purpose:** To investigate the extent of fall prevention education interventions available for health professionals, and to determine the quality of reporting. **Outcome Measures:** The scales have demonstrated validity and reliability relative to individual items and scale totals in the assessment of the nursing staff's self-efficacy beliefs for preventing falls.	**Sample:** 13 participants aged 68.3 ± 6.5, with a history of falls **Setting:** A five-stage scoping review process was followed based on Arksey and O'Malley's framework and refined by the Joanna Briggs Institute Methodology for JBI Scoping Reviews.	**Study design:** RCT **Interventions:** Dual-task cognitive-gait intervention: simultaneous motor (walking 30 m) and cognitive (memory recall) tasks (n = 8); control group (n = 5) walked while listening to music	**Results:** Working memory under dual-task conditions improved ($P < .05$); o significant changes in gait velocity and variability found **Strengths:** The study incorporated interactive learning activities, experiential learning, supported learning such as coaching, and written learning material. **Weakness:** The research study wasn't favorable to the illiterate participants. **Limitation:** Including the synthesis of qualitative and quantitative research in the same review, and balancing the breadth and depth of analysis, was challenging. **Recommendation:** This research will be improved by recommending the most appropriate standardized reporting clinical practices to be used in reporting the patients falls in hospitals.
Wong, M. M. C., & Pang, P. F. (2019). Factors associated with falls in psychogeriatric inpatients and	**Purpose:** To investigate factors associated with falls in psychogeriatric inpatients and compare	**Sample:** 21 participants aged ≥65, with balance impairment	**Study design:** RCT and retrospective review. **Interventions:** Participants randomly assigned to 1 of 3	**Results:** Over 66% of falls involved patients with dementia, 75% involved women, and over 50% occurred on the way to the bathroom, mostly during the night shift when the staffing level was low.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
comparison of two fall risk assessment tools. East Asian Archives of Psychiatry, 29(1), 10–14. https://doi.org/10.12809/eaap1774	two fall risk assessment tools. **Outcome Measures:** The scales have demonstrated validity and reliability relative to individual items and scale totals in the assessment of nursing staff's self-efficacy beliefs for preventing falls.	**Setting:** United Christian Hospital	interventions: single-task training (n = 7), dual-task training with fixed-priority instructions (n = 8), dual-task training with variable-priority instructions (n = 6)	**Strengths:** The review of this study highlighted gaps in the planning, reporting, and evaluation processes for health professional education in fall prevention. **Weakness: P**sychometric properties of WSFRAT were not calculated in the study. **Limitation:** The sources of evidence for this review are limited because we excluded articles that were not published in countries with similar pedagogical approaches, only reported on falls prevention to health professionals in hospitals or healthcare facilities and excluded non-empirical studies. **Recommendation:** The study can be improved by the researcher investigating on the best hospital environment where Patients with dementia and women should accommodated as they have a higher risk of falls.
Zhao, Y., Bott, M., He, J., Kim, H., Park, S., and Dunton, N. (2019). Evidence on fall and injurious fall prevention	**Purpose:** To investigate the clinical implications and recommendations for adult inpatient fall and	**Sample:** 26 participants without dementia with subjective	**Study design:** RCT, double- blind, placebo- controlled	**Results:** MPH improved Timed Up and Go (P = .004), stride time variability (P = .03), and EF (P = .03);

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
interventions in acute care hospitals. Journal Of Nursing Association, 49(2), 86-92 https://journals.lww.com/jonajournal/Abstract/2019/02000/Evidence_on_Fall_and_Injurious_Fall_Prevention.8.aspx	injurious fall prevention in hospitals. **Outcome Measures:** Falls can lead to injury, diminished functional ability, loss of independence, even death. A large retirement community in Baltimore, Maryland has identified falls on the LTC floor as a patient safety concern.	memory complaints aged 73.8 +-1.2, MMSE score 27.8 +- 1.4 **Setting:** MedStar Good Samaritan Hospital	**Interventions:** Before and 2 hours after taking 20 mg MPH or a placebo	effects not observed after treatment with placebo **Strengths:** There is an effective use of both quantitative and qualitative types of research in the analysis of the patient's fall facilitating factors. **Weakness:** The baseline audit results of the study were not shared with the public and necessary relevant authorities. Either the study didn't prove areas for future research. **Limitation:** Three elements of patient satisfaction had substantive rate increases but the hospital's goals were not reached. **Recommendation:** The researcher should consider doing further research to identify risk factors and target interventions in patients fall alongside studying why it’s necessary to do screening for falls incidents.

Appendix B

Fall prevention education

Definition of fall

- A fall is an involuntary/unplanned descent to the floor with or without injury to the resident/patient (AHRQ,2013b).
- In a care setting, a fall is any loss of the upright position leading to a landing on the floor, object, furniture..(National Center for Patient Safety, 2019).

Few risk factors for falls

- History of falls: People who already fell, will fall in the future
- Cognitive impairment: Dementia and other cognitive diseases increase the risk of falls.
- Medications: Psychotropics, hypotensives, sedatives, diuretics…
- Impaired mobility, vision
- Poor lighting, wet/slippery floor, uneven surfaces…
- Inappropriate assistive devices and walking aids
- Inappropriate footwear and clothing.

Effects of falls

- Fall have negative outcomes for patients and facility (King, 2016)
- Fall affect quality of care and can have serious consequences for the institution/facility (law suits…)
- They decrease the quality of life (inability to take care of oneself)

- By 2040, global expenditures for fall-related injuries are expected to be $240 billion (Ott, 2018).
- Increased workload for caregivers
- Damage institution reputation

Falls have various impact on patients including:

- injuries/fractures, bruises, cuts.
- long term pain, reduced mobility and independence
- prolonged hospital stay
- increased morbidity and mortality (falls with fracture decrease life expectancy by 10-15%

  (King, 2016; Ott, 2018; Slade et al.2017).

Fall prevention strategies

- Traditional fall prevention strategies led to little changes in falls rate**.**
- Fall prevention strategies are effective when they target multiple risk factors in each patient.

Hourly rounding

- Opportunity to ensure that universal fall precautions are in place
- Patients' needs are being met
- Roundings integrate fall prevention activities with patients routine care.
- Hourly visits done between 6:00 am and 10:00 pm
- Visits every 2 hours between 10:00 pm and 6:00 am
- Nurses (even hours) and CNAs (uneven hours) take turns on rounding.

  (AHRQ, 2013)

Hourly rounding- with 4 P's approach

- Assess for **pain** (notify charge nurse if patient in pain)
- Suggest assistance for **Potty** (if incontinent, check if patient is dry or change diapers when necessary)
- Check and make sure patient is in comfortable **Position** (bed locked in low position, patient in a safe environment).
- Ensure patients' **Possessions** (or frequently used items) are within reach: call light, phone, garbage, bedside table, telephone, remote control) (AHRQ,2013).

APPENDIX C

Falls prevention Pre & Post-test Questionnaires

Instructions:

- ✓ Each question may have more than one option as the correct answer.
- ✓ Please circle the letters that correspond to the correct answers.
- ✓ Do not put names on the pre & posttest sheets.
- ✓ Put a checkmark in front of your role.

Nurse: ☐ **Certified nurse assistant**: ☐

1. **Which of the following statement (s) is/are correct?**
    a. Many residents on the memory care unit are high fall risk.
    b. Residents on the memory care unit are very often confused and exposed to falls.
    c. The risk of falling will be lessened when a patient's toileting needs are met.
    d. All of the above.
2. **Which of the following statements is false?**
    a. Falls prevention efforts are only the responsibility of the CNAs.
    b. Falls prevention requires a teamwork
    c. Falls can never be prevented in a memory care unit.
    d. Many falls can be prevented by staff members.

INTENTIONAL PURPOSEFUL HOURLY-ROUNDING

3. **Which of the following is recommended to improve patient safety?**
    a. Locking wheeled furniture when it is stationary.

b. Having nonslip flooring.

c. Placing frequently used items (including call bell, telephone, and remote control) within reach of the patient.

d. Rounding hourly to address patient needs.

e. All of the above.

Circle the right answer. Y= Yes N= No - T=True F=False

4. The 4 P's of hourly rounding for fall prevention are :

    a. Pain,

    b. Potty,

    c. Practice,

    d. Position,

    e. Post fall,

    f. Proximity of belongings.

5. Does hourly rounding improve communication and patient outcomes, such as avoiding falls? Y/N
6. Is patients'safety increased with hourly rounding? Y/N
7. Is hourly hourly rounding performed every hour during the day and every two hours during the night? Y/N
8. Hourly rounding is totally impossible when the staffing is short: T/F
9. Have you ever heard about 4 P's hourly rounding? Y/N
10. Do you currently use hourly rounding with 4 P's approach to prevent falls at your job place? Y/N

Appendix D

Hourly rounding Log

Date: _____	Room: _____	Bed #: _____		Day M ☐ T ☐ W ☐ Th ☐ F ☐ Sat ☐ Sun ☐			
TIME PERIOD	STAFF INITIAL	TIME ROUNDING	PAIN	POSITION	POTTY	POSSESSION	Interventions/comments
EVERY 1 HOUR ROUNDS							
7 am							
8 am							
9 am							
10 am							
11 am							
12 pm							
1 pm							
2 pm							
3 pm							
4 pm							
5 pm							
6 pm							
7 pm							
8 pm							
9 pm							
10 pm							
EVERY 2 HOURS ROUNDS							
12 am							
2 am							
4 am							
6 am							
Weekly leadership round (signature):							