IMPROVING PATIENT SAFETY: EVALUATION OF A FALL PREVENTION PROGRAM IN ASSISTED LIVING

By

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Doctor of Nursing Practice, PennWest University, 2022

A DNP Research Project Submitted to Pennwest University

In Partial Fulfillment of the Requirements for the Doctor of Nursing Practice Degree

December, 2022.

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ABSTRACT

According to the U. S. Preventive Services Task Force (2018), Falls are the leading cause of injury that are related to morbidity and mortality among older adults in the United States. In 2014, about 28.7% of adults aged 65 years or older had a history of fall resulting in 29 million falls in which about 37.5% required medical treatment or encountered restricted activity for a day or more while an estimated 33 000 resulted in death in 2015 (USPSTF, 2018).

Objectives*:* The purpose of this project is to improve safety by conducting a retrospective review of a Quality improvement (QI) measures of an evidence-based fall prevention program in Assisted Living. PICO research question was identified as Follows; P- Older adult residents, I- Evidence Based Fall Prevention Guideline C- Comparing before and after fall prevention programs, O- Decrease in falls.

Methods: This research was completed in Southern New Jersey, United States. Participants were required to be at least 65 years of age and older. This study evaluated a QI fall prevention protocol that was instituted in the Assisted Living Facility (ALF) and evaluated its effectiveness. Data were obtained from HER and paper records of a 40-bed Assisted Living located in the Southern region of New Jersey. For the purpose of this study, fall was defined as an inpatient's unknowing, sudden drop to the floor with or without injury, regardless of height of drop, whether assisted or unassisted to the floor (NDNQI, 2020). This 12-week fall prevention program focused on falls before and after intervention for the age groups 65 years and above. A weekly number of falls were retrieved 6 weeks before intervention and 6 weeks after. Data was analyzed using t-test to compare outcomes and propose policy change.

Result: Using the paired t-test analysis, findings revealed a significant difference in pre and post intervention of less than 0.05. There was a decrease in the number of falls post intervention when compared to pre-intervention data.

CHAPTER ONE: INTRODUCTION

Available Knowledge (Problem Description)

Despite being widely studied, the issue of falls in the older adult population persists and is in dire need of objective solution. For the purpose of this study, the term “older adults” will be used to discuss fall incidence and outcome. Older adults will refer to individuals that are 65 years or older. Aging is a natural process that relates to the functional impairment of the body which occurs over time. This noted change in functional capacity makes them more vulnerable to the external and internal contributing factors also known as extrinsic and intrinsic factors respectively (Teixeira, et al., 2019). Extrinsic factors relate to an individual's environment such as lighting, floors, objects around the environment while intrinsic factors relate to individual health disorders that affect their functions (Teixeira, et al., 2019). Although falls are often related to decreased functional state and individual’s vulnerability, some risk factors such as decreased activity could decrease functional capacity and potentially increase risk of falls in advanced age (Teixeira, et al., 2019).

According to the U. S. Preventive Services Task Force (2018), Falls are the leading cause of injury that are related to morbidity and mortality among older adults in the United States. In 2014, about 28.7% of adults aged 65 years or older had a history of fall resulting in 29 million falls in which about 37.5% required medical treatment or encountered restricted activity for a day or more while an estimated 33 000 resulted in death in 2015 (USPSTF, 2018). The occurrences of fall-related injuries are higher in institutionalized individuals than those in the

community which makes it a major cause for morbidity and mortality in institutionalized older adults (Baixinho, et al., 2017). It is worthy to note that anyone can encounter a fall but the consequences are greater for this population because it affects their ability to move, reduces their functional level, and leads to psychophysical, and economic changes (Teixeira, et al., 2019).

Expense

It is estimated that falls result in 6,000 to 9,000 hospital admissions in this population every year, with an average length of hospital stay between 12 to 20 days (Baixinho, et al., 2017). Falls among adults age 65 and older are very costly in healthcare. About $50 billion is spent annually on medical costs relating to non-fatal fall injuries and about $754 million is spent on fatal falls (cdc.gov). According to CDC (2020), fall death rate in the United States has risen to 30% from 2007 to 2017 and it is estimated that by 2030 there could be 7 fall related deaths every hour. Falls commonly result in Traumatic Brain Injuries and about 95% of hip fractures are caused by falls (cdc.gov). An estimated annual cost of $49.5 billion is said to be the fragment of total healthcare expenditures applicable to falls in the United States (Hadded, et al., 2019). A study revealed that in 2015, there were 3.2 million non-fatal falls that received medical treatment totaling $31.3 billion to Medicare (Haddad, et al., 2019).

Fall injuries among older adults was ranked fifth among 155 health conditions healthcare spending in 2013 with $36.8 billion in spending (Haddad, et al., 2019). The burden of expense is tremendous in healthcare with about 8% of Medicaid's expense on older adults falling (Haddad, et al., 2019). In 2016, there were over 29,000 deaths, and 3.2 million emergency department

(ED) visits due to elderly falls with 963,000 being hospitalized (Johnston, et al., 2019). As a result, it imposed a burden on the U.S. health care system and economy resulting in roughly $50 billion in medical costs for 2015 (Johnston, et al., 2019). With the older adult population in the United States estimated to increase to 55% by 2030, approximately, 49 million falls and 12 million fall injuries are anticipated to occur in that year alone unless there is a decline in the rate of falls in older adults (Johnston, et al., 2019).

Preview

The American Geriatric Society (AGS) recommends an annual falls and instability screening of individuals 65 years of age and older (Berkova & Burka, 2018). Controlling falls in older adults is difficult because the risk of fall is complicated and multifactorial given their decreasing functional state. However, in a growing aging population, there is need to be proactive to develop systematic measures to prevent falls (Baixinho, et al., 2017). The measures should include policies, prevention, and practices, with an interdisciplinary approach to its prevention (Baixinho, et al., 2017).

There are many modifiable risk factors that lead to falls such as balance, impairment, gait instability, muscle weakness, and medication use (Moncada & Mire, 2017). Fear of falling can result in increased anxiety that is attributed to a descending surge of events that could lead to social isolation and increased loss of function, then fall (Moncada & Mire, 2017).

Many recommendations are in place to reduce incidence of falls. The American Geriatrics Society (AGS) recommends that adults older than 65 years should be screened yearly for any

history of falls or impaired balance while the U.S. Preventive Services Task Force (USPSTF) and American Academy of Family Physicians (AAFP) recommend exercises alone and vitamin D supplementation if needed to prevent fracture from fall (Moncada & Mire, 2017). The CDC (2021), has a resourceful algorithm tool that is helpful in screening, assessing and providing interventions to prevent falls; this tool is known as Stopping Elderly Accidents Death and Injury (STEADI). STEADI is a resourceful tool designed for providers to proactively assess and intervene in order to prevent falls.

Purpose/Aim of Study

Most institutions have fall policies and procedures in place for fall prevention. Despite these policies, they continue to experience a high incidence of falls. The purpose of this study is to perform a retrospective chart review of a recent intervention that was instituted in an Assisted Living in Southern, New Jersey. The project system was based on Macro-level research studies. Macro level research focused on institutions and policies which were in line with this project. This project reviewed retrospective evidence-based interventions and compared outcomes. It evaluated the effectiveness of a previously implemented primary intervention of increased use of Physical Therapy in the facility as it relates to fall. Recommendations were made to update policy after a successful outcome was identified. Implication of policy update reflects on improved safety, decreased fall and decrease in fall related injuries.

CHAPTER TWO: LITERATURE REVIEW

Research Question (PICOT)

The research question for this project is; Improving Patient Safety, Evaluation of a Fall Prevention Program in Assisted Living. Population (P), Intervention (I), Comparison (C), Outcome (O), and Time (T)- known as PICOT is a unique way of structuring components of clinical issues to guide evidence for solution (Holly, et al., 2022). The PICOT for this project is outlined as follows:

P- Older adults at least 65 years of age living in Assisted Living Facility

I- Evidence Based Fall Prevention Measure

C- Comparing outcomes before and after fall prevention programs

O- Decrease in falls and injury

T- Occurring over 12 weeks of study

Project Framework

The standard for quality improvement reporting excellence (SQUIRE) guideline was used for the systematic review of several journal articles on falls in older adults to support this project. The SQUIRE guidelines provide a structure for reporting new knowledge about how to refine healthcare and are intended for reports that explain system level work to improve the quality, safety, and healthcare value, with methods to demonstrate that observed outcomes were due to the interventions (SQUIRE 2.0, 2020).

Search History

Multiple databases were searched dating back to May 15, 2021. Databases searched are,

CINAHL, EBSCOhost, Google Scholars. Searches began in May of 2021. Criteria for search were articles from 2016 to date, evidence based original and peer reviewed articles.
CINAHL specific search words used are *"falls", "fall prevention program", "falls in the elderly"* which yielded about 28,322, 1732 and 2013 results respectively.
EBSCOhost search produced 44,780 results using the keywords *"fall in the elderly"*. Searching with *"fall prevention"* yielded 26,668 results but when searched with "*fall prevention guideline"* 1656 results were found.
Google Scholars' database yielded about 17,200 results for terms such as "*fall guideline", "fall prevention", "Falls in the elderly*". The most common keywords used in the searches are; *falls, elderly falls, Incidence of falls in the elderly, fall guidelines and fall prevention*.

Inclusion and Exclusion Criteria

Inclusion criteria are, articles written in English Language that are less than 5 years old from date of search in May 2021. Article must have different research methods and must address falls in individuals at least 60 years old. The articles' search and reviews were done by this writer independently. All articles are related to falls in older adults. Terminologies used in all literature were appropriate and clear. Articles not relating to fall or with poor evidence level were excluded.

Level of Evidence/Appraisal

Fifteen articles met the criteria for this project. Johns Hopkins Evidence-Based Practice Model for Nursing and Healthcare Professionals was used to appraise selected articles. The Model is subdivided into five levels of research evidence from Level I to Level V with varying degree of evidence types (John Hopkins, 2022). Level I, II and II are research evidence levels

ranging from experimental, quasi-experimental and non-experimental while levels VI and V are non-research evidence levels such as opinion and case reviews respectively (John Hopkins, 2022). All 15 articles were appraised and found to be within I to III evidence levels. One article which focused on gait Kinematics in elderly was studied by five individuals who are either a professor or graduate of physiotherapy (Kachhwaha, et al., 2018). Authors in a second article focused on assessment of prevalence and risk factors and listed all five qualified authors (Sharif, et al., 2018).

Authors from another article elaborated on incidence of falls in older adults (Pavlovic, et al., 2017). Each title aligned with their topic and their abstracts provided a clear overview of the research problem and briefly narrated techniques used, methodology, results and conclusion. The research problem was clearly identified in the Sharif et al., (2018), article to assess the prevalence of falls among older adults aged 60 years and above to determine the risk factors associated with falls. The research question in the Pavlovic, et al., (2017), was noted to evaluate if there were any differences in risk factors and fall incidences among older adults in the nursing homes and community.

In another article, the problem statement compared the effectiveness of strength and training exercise with that of range of motion exercise in fall related gait kinematics in elderly (Kachhwaha et al., 2018). Authors in at least 6 articles stated that fall incidence increases with age and that older individuals in nursing home facilities fall more often when compared to those in the communities; Pavlovic, J., et al., (2017), Kachhwaha et al., (2018), Sharif, et al., (2018), USPSTF, 2018, Teixeira, et al., (2019), Baixinho, et al., (2017). One article had a clear guideline presenting current evidence-based practice to help prevent falls in persons over age 65 and recommendations for exercise was clearly presented and supported (USPSTF, 2018).

Education

As noted in the previous chapter, fall can have devastating, lasting, and life changing effects on an individual. The key is to have a prevention solution to ensure that this population can live a safe, healthy, productive and independent life. A safe and healthy living can help improve one's quality of life. To have a successful prevention strategy and intervention, the process must be able to address those factors that contribute to this situation in the first place. Factors ranging from intrinsic and extrinsic factors. Some targeted extrinsic factors would include, medications, environment, gait stability and balance, lighting. The intrinsic factors would focus on patient cognitive and balance capabilities. Another factor to consider is the staff's inability to consistently implement an already existing policy in an institution. Clearly, the willingness of a resident or an individual to participate in a proposed policy will also affect the outcome.

Understanding Aging Process

There is growing interest in the mechanisms of aging and this is likely due to the increasing population of older adults in our society today. Obviously, the world's life expectancy is said to be increasing and as a result, the world population of individuals 60 years and older are poised to increase (Dieuleveult, et al., 2017). This population is expected to increase to 2.1 billion by 2050, which is up from 1 billion in 2019 and is currently noted to have outnumbered children under age 5 as of today (WHO, 2022).

Aging is a natural process that correlates with cognitive and functional decline as well as social impairments. The hippocampus is a part of the brain that is known to play a crucial role in learning and memory as well as behaviors and mood regulation (Bettio et al., 2017). This structure is also important in both functional and structural flexibility into adulthood. During the aging process there are neurobiological variations that are noted in the aging hippocampus

(Bettio et al., 2017). These variations are often thought to be associated with age-related cognitive and functional decline. Notably, some non-invasive techniques such as physical exercise are said to have impeded many of the age-related alterations in the hippocampus and as such, may have therapeutic value in slowing the deleterious effects of aging and somewhat protect the brain against age-associated neuro-degenerative processes (Bettio et al., 2017).

Age is one major key risk factor for falls. Older adults have the highest risk of death or serious injury resulting from a fall and the risk increases with increasing age (WHO, 2022). According to WHO (2022), 20-30% of older individuals in the United States who fall usually suffer moderate to severe injuries such as bruises, hip fractures, or head trauma due to risks like physical, sensory, and cognitive changes that are associated with aging, this is in co-occurrence with environments not easily adapted for the aging population.

A decrease in brain volume has been reported as the cause of vital changes in older adult's functional abilities partly because after age 35, this reduction in volume rises constantly with age to an annual brain volume loss of about 0.5% at age 60 (Dieuleveult, et al., 2017). Motor and cognitive functional abilities have been studied to examine age-related changes and when compared to younger adults, there is decline in range of movements, perception, gait speed, attention, memory, and decision making (Dieuleveult, et al., 2017).

Fall Risk Factors in Older Adult

In order for an individual to live independently and safely, they need some level of stable mobility function such as walking, climbing or reaching. These are precursors to one's ability to perform (ADL) activities of daily living (Dieuleveult, et al., 2017). Basic Activities of Daily Living (Basic ADL) include one's daily self-care activities such as self-grooming which includes; bathing, dressing, and feeding, while Instrumental Activities of Daily Living (IADL)

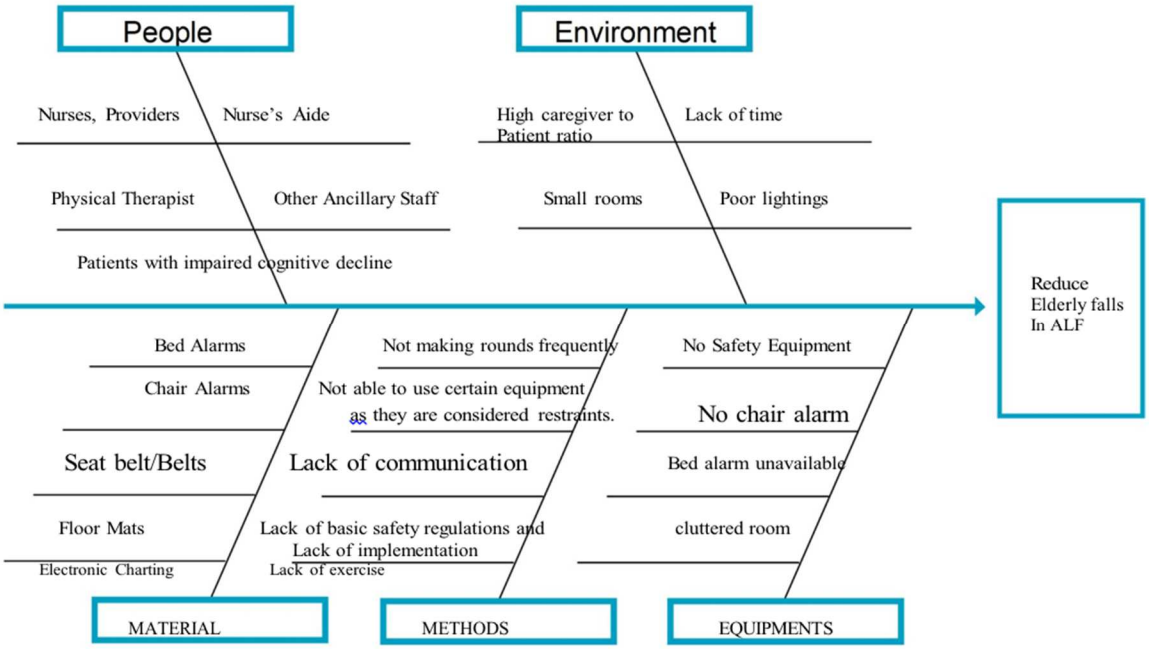
refers to activities requiring more cognition and are essential to independent living such as using a phone or shopping (Dieuleveult, et al., 2017).

Extrinsic Factors

As stated earlier, extrinsic factors are outside elements that cause someone to fall. There is no one particular cause of fall. Combination of these factors are said to be multifactorial. The extrinsic factors are those factors relating to one's environment that they live in, especially, the home being a location of most common exposure to risks (Teixeira, et al., 2019). Conditions in the home such as uneven floors, slippery floors, objects all over the floor, lack of handrails or support bars, poor lighting, steep or high steps are a few of unfavorable extrinsic factors that can lead to a fall (Teixeira, et al., 2019). Studies reveal that about 72.8% of falls occur at home with women representing about 80.2% of fall injury victims (Alshammari, et al., 2018).

It is worthy to note that the most common location of fall injuries in the home is the bathroom which is about 35.7% of that incident (Alshammari, et al., 2018). Other environmental hazards include poor stairway design and poor repair or lack of repair, clutter in the home, slippery floors, unsecured mats, and the lack of non-skid surfaces in the bathtubs (Alshammari, et al., 2018). For this project in assisted living, other pertinent factors include, lack of safety equipment, inability to use certain equipment like seat belts or alarms in the institution because they are considered restraints by state regulations, reduced visual rounds by staff often due to high caregiver to patient ratio. These are evident cause and effect factors that result in falls in this population (Appendix A, fishbone diagram/cause and effect).

(Appendix A)- Cause and Effect: Fishbone Diagram



Intrinsic Factors

Intrinsic factors are somewhat the opposite of extrinsic factors. They are factors that are within an individual. It is safe to say that they are internal. These factors are often due to deterioration of health caused by acute and chronic diseases or physical problems that are taking place due to aging (Teixeira, et al., 2019). Changes in the nervous system that lead to prolonged reaction time, decrease in the gait pattern, reduction in muscle strength and mass, bone density, and impaired vision are a few of the changes noted with aging (Teixeira, et al., 2019). Some health disorders that can increase risk of falling include: osteoporosis, balance disorders, osteoarthritis, dizziness, and they frequently coexist with other medical diagnoses like degenerative changes, orthostatic hypotension, electrolyte imbalance and Parkinson's disease (Teixeira, et al., 2019). Certain medications such as benzodiazepines and antihypertensive drugs can further increase risk of fall due to their side effects (Teixeira, et al., 2019). Individuals with

dementia have an even higher risk of falls and its related injuries when compared to their counterpart without dementia and this is due to cognitive and physical impairment/decline (Toot et al., 2018).

Consequences of Fall

In the United States, national estimates of incidence of falls and direct medical costs relating to fall-related injuries in patients aged ≥65 in 2000, revealed that 10,300 were fatal and additional 2.6 million nonfatal fall-related injuries were reported (Alshammari, et al., 2018). Studies show that fall injuries result in 2.8 million emergency department visits annually (Moncada & Mire, 2017). Although it was noted that the majority of falls does not cause injuries, about 20% of them result in serious injuries such as a fracture or head injuries (Alshammari, et al., 2018). Clearly, these injuries can limit one's ability to perform certain daily activities or cause them to be dependent on ADL's (Alshammari, et al., 2018). Falls can cause fractures at different sites like proximal femur, pelvis, distal radius ankle and proximal humerus often diagnosed in individuals between the age of 70 and 89 years (Scheckel, et al., 2021). It is revealed that fall-related fractures have profound socio-economic repercussions for both the patient, family and society (Scheckel, et al., 2021).

Fall Prevention

Individuals older than 65 years should undergo fall history annual assessment. Number of fall and last encountered fall should be inquired. Patient's ability to balance or walk independently or with assistance should be assessed (Moncada & Mire, 2017). The CDC's STEADI initiative provides physicians and caregivers the screening tool for fall risk (Moncada & Mire, 2017). The

Timed up and go (TUG) test is one of the quick and easy tests that should be administered to help establish a patient's balance status.

Evidence Based Guideline

The USPSTF and the AAFP recommends exercise or physical therapy alone to have some benefit in fall prevention and therefore, physical therapy that includes strength and balance training should be offered to older adults (Moncada & Mire, 2017). The USPSTF guideline identified steps to consider during implementation and provided specific tools for implementation into practice using the grading scales of A, B, C and D as well as level of certainty ranging from high, moderate to low with regards to overall benefits (USPSTF, 2018). The authors recommended specific use of resources such as exercise and multifactorial interventions with consideration for Osteoporosis monitoring as a risk factor for fracture during fall and possibility of implementing use of Vitamin D (USPSTF, 2018). In this project review, the QI intervention measure of primary focus is Physical Therapy (PT).

PRE-ASSESSMENT

From the pre-assessment of policy completed in the facility, some barriers to the current high fall rates were identified. Current fall Protocol in the ALF was mainly procedural after a fall and focused on secondary and tertiary prevention. Patients are assessed prior to moving in and documented in the facility approved initial assessment form. If a patient falls, staff are required to complete a Neuro check or send resident to the emergency room depending on the severity of the fall, notify family, executive director and patient provider. If a patient falls three times in a month, recommendation is made for the patient to be transferred to a skilled nursing facility (SNF) as the patient's level of care is no longer deemed appropriate for the ALF. Patients who could be getting therapy were noted to not have therapy in several months and for some, > 1 year. A project team that included providers, therapists nursing and ancillary staff was set up and the planned intervention was presented. It recommended specific use of resources such as exercise and multifactorial interventions. This guideline is more proactive as it requires participants to be actively involved in some form of exercise for strengthening to potentially prevent fall.

CHAPTER 3: METHODS

Purpose of this project is to evaluate a previously implemented primary intervention of Physical therapy and its effect on fall in older adults living in an assisted living facility. As part of a QI project, the facility care team instituted a plan to implement physical therapy as a primary intervention to prevent fall. Data was collected 6 weeks prior to intervention and 6 weeks after intervention. My role as the DNP student for this project was to perform a retrospective chart review of this QI intervention and evaluate the program objectives. Objectives of this QI project are to improve safety, propose policy and procedure updates in the facility, decrease injury that results from fall and thereby reduce cost of care originating from fall injuries. The project team included providers, physical therapists and staff working at the facility. For the purpose of this QI project, fall was defined as a resident's unknowing, sudden drop to the floor with or without injury, regardless of height of drop, whether assisted or unassisted to the floor (NDNQI, 2020).

IMPLEMENTATION PROCESS

Inclusion Criteria

Patients who qualified for this QI project included all residents who fell and received physical therapy regardless of cause or reason for fall, individuals that are 65 years or older, residents who had fallen in the past 6 months, residents with eligible health care insurance coverage.

All participants are residents of the assisted living facility and were at least 65 years old, and had fallen in the past 6 months prior to the start of intervention. All patients who fell regardless of the reason for fall received physical therapy. All patients who participated had healthcare coverage. The project team reviewed charts and performed verification of healthcare insurance and eligibility for coverage prior to being included in the project. Self-pay residents were not included in the project due to strain on out-of-pocket expenses or refusal. All physical therapy was conducted in the facility by a qualified physical therapist. Therapy was tailored to each resident's needs.

Context/Process

A 12 week fall prevention program was exercised with the primary intervention of physical Therapy. The first 6 weeks previewed outcomes of the facility's current fall prevention policy. A fall monitoring data form (see Appendix B) was completed by nursing staff each week capturing the number of falls for each resident encountered weekly before intervention was introduced. The form also documented active therapy for each resident. The EBP fall prevention program of PT was instituted during week 7 and monitored by all team members.

(Appendix B): Fall Data Form

Participants	Age	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	PT (Y/N)
Week 1								
Week 2								
Week 3								
Week 4								
Week 5								
Week 6								

Sustainability

Sustainability is highly possible and realistic as funding for the program was paid for by the residents' health care benefits as fall qualified them for physical therapy services. All patients who participated had insurance coverage and received physical therapy. During insurance verification, patients who were not covered by their health care insurance were excluded from the intervention.

INTERVENTION

Iowa Model

The IOWA model was used to do a retrospective review of the success of the program. It was used at the beginning of the QI project as a foundation for the project. The Iowa Model helped direct decision-making and EBP process from both the clinician and system's point of view (Iowa Model Collaborative, 2017). Model was an approach-based tool developed by clinicians

who are experts in utilization of research for healthcare improvement (Hanrahan & Fowler, 2019). The Iowa Model has 6 steps that this project followed for program implementation.

1st Step: Identifying a Problem

Fall in elderly is a well-documented researched topic with many interventions but has persisted in the older adult. Fall incidence increases with age and older individuals in institutions fall more often when compared to those in the communities (Pavlovic, J., et al., 2017). About 28% of individuals aged 65 and older reportedly fall annually, this is more than one in four people (cdc.gov). At the study site, a 40-bed assisted living facility, there are about 1 to 10 falls documented weekly. The need to decrease the rate of fall in this facility and improve safety and quality healthcare was paramount.

2nd Step: Is this topic a Priority?

With the known data that falls commonly result in Traumatic Brain Injuries and about 95% of hip fractures are caused by falls (cdc.gov) and that falls are the leading cause of injury that are related to morbidity and mortality among older adults in the United States (USPSTF, 2018), it was evident that this problem was a priority. The goal of the organization was for residents to

live independently and safely with a good quality of life. With this goal, the need to improve safety was a priority.

3rd Step: Form a Team

The project team included all providers, therapists and staff. The proposed project was presented to the team. Goal of this team was to help evaluate past intervention strategies and implement them towards fall prevention.

4th Step: Gather and Appraise pertinent Literature

This step involved gathering pertinent literature that was related to the desired practice change. This step helped explore evidence-based research available and evaluated its validity and evidence level.

5th Step: Is There Sufficient Evidence?

This stage came after literature appraisal and focused on making a decision whether there was enough data to make a change or recommend more research if less data.

6th Step: Implementation:

In this stage, the project team began to retrieve data on a previously implemented intervention. Data needed included: age of participants, number of falls within 6 months preceding start of intervention, actual intervention and number of falls after intervention. Data would be analyzed using t-test and presented in graphs, bar charts and pie charts for comparison and presentation. Proposals for policy change will be made based on improved outcomes.

DATA COLLECTION

The data collection process is the first step to the start of this retrospective review of a QI project. This project reviewed current fall prevention policies in ALF. Permission to access charts was obtained from the Executive Director of the facility. A retrospective chart review of patient fall data before and after QI project intervention was conducted. Data was retrieved by team members such as the DNP student, nursing staff and physical therapists. The team collected data on the number of falls 6 weeks prior to start of intervention (pre-test) and 6 weeks after start of intervention (post-test). Data was retrieved from the facility's EHR and hard copy records for each qualifying resident at a 40-bed assisted living. To identify patients who were included in the intervention, team members reviewed the age of residents, their health insurance coverage and eligibility, and participation in physical therapy. Comparison of pre and post intervention data will help determine if there was a difference in the number of reported falls among the study population between the pre and post data. All data obtained were entered into a computer using EXCEL spreadsheet and securely saved in a password protected computer. Data was then calculated and analyzed.

PLAN FOR DATA ANALYSIS

Analysis

All data obtained were entered into an Excel spreadsheet. Percentage rate of the variables were calculated before and after intervention. Timeline for project was determined (Appendix C: Planned DNP Timeline). The national rate of fall is known to be 28.7% (cdc.gov).

The fall and variable rates of the assisted living were calculated as follows:

(f)= # of falls

(n)= sample size

(p)= # active physical therapy (PT rate)

(a)= age

To explain the percentage of falls and other variables such as age, a descriptive analysis was used. All data were completed before and after intervention and compared. Using the Excel, a t-test was performed to compare the pre-test and post-test data. The difference in findings for falls and variables such as the different age groups and active physical therapy for each phase of testing was presented on a bar chart, and graphs to further explain findings. Recommendations were made to institute new policy changes. All data was stored and secured safely in a password protected computer. Access to QI data will be limited only to the reviewer.

(Appendix C): Planned DNP Timeline

Task	Target Date

Identify Chair and committee	4/30/2022
Submit Ch. 1, 2, 3	6/30/2022
Make recommended change and submit to committee	8/25/2022
Schedule overview with committee	8/29/2022
Submit application to IRB	8/30/2022
Conduct research/complete intervention	9/10/2022
Complete data collection, analyze results	9/12/2022
Write chapters 4 & 5	10/17/2022
Submit final paper to committee	11/18/2022
Prepare PowerPoint and schedule defense	12/2/2022
Defense	12/9/2022
Make final project revisions, get title page signed, upload documents to ProQuest	12/12/2022
Submit manuscript for publication to a peer-reviewed	12/19/2022

Ethical Considerations

The Institutional Review Board (IRB) approval was obtained from PennWest University IRB board (Appendix D). Request for approval to protect study participants from any potential harm as a result of study. The most important consideration in this project was protecting participant's data and maintaining confidentiality. Participation was voluntary and no consequences for not

participating. To maintain the Health Insurance Portability and Accountability Act (HIPAA), all data obtained were anonymous and confidential and patients' names and dates of birth were not used. Information provided in the study contained no identifiers for all participants and project team. All data obtained were entered into a computer using EXCEL spreadsheet and securely saved in a password protected computer.

Appendix D, IRB Approval Letter

Institutional Review Board
250 University Avenue
California, PA 15419
instreviewboard@calu.edu
Melissa Sovak, Ph.D.

Dear Ihuoma,

Please consider this email as official notification that your proposal titled "Improving Patient Safety, Evaluation of a Fall Prevention Program in Assisted Living" (Proposal #PW22-054) has been approved by the Pennsylvania Western University Institutional Review Board as submitted.

The effective date of approval is 10/07/2022 and the expiration date is 10/06/2023. These dates must appear on the consent form.

Please note that Federal Policy requires that you notify the IRB promptly regarding any of the following:

(1) Any additions or changes in procedures you might wish for your study (additions or changes must be approved by the IRB before they are implemented)

(2) Any events that affect the safety or well-being of subjects

(3) Any modifications of your study or other responses that are necessitated by any events reported in (2).

(4) To continue your research beyond the approval expiration date of 10/06/2023, you must file additional information to be considered for continuing review. Please contact instreviewboard@calu.edu

Please notify the Board when data collection is complete.

Regards,

Melissa Sovak, PhD.
Chair, Institutional Review Board

CHAPTER 4: RESULTS

Data collection occurred for residents living in the assisted living facility within the QI timeframe from May 2022 to August 2022. There were 32 people included in the project. The criteria for inclusion required that the patient must be 65 years or older, must be living in the ALF at the start of the QI project, must have insurance with verified eligibility for physical therapy. The sample data were retrieved from a retrospective chart review of fall records in the facility. Self-pay residents and residents hospitalized during intervention were excluded. Initial data were collected using an excel spreadsheet and were organized, assessed and analyzed. One patient was self- pay and was therefore excluded. Two patients were hospitalized and subsequently went to rehab for the duration of the study. One patient expired in week 6 of the

study and was therefore excluded. There were 3 unoccupied apartments in the facility and there was 1 unoccupied model room.

Table 1: Demographics and Incidence (Pre-Intervention)

Age Range	Number of falls (pre-test)
65-69	2
70-74	1
75-79	5
80-84	4
85-89	11
90-94	6
95-100	3

Table 1 shows the demographics of the project population placed in different age groups. The median age was 85.303. All participating residents had insurance and were verified for eligibility. It also illustrates the number of falls that were encountered in each age group. The age group with the most falls was the 85-89 years old with 11 falls for the cumulative 6 weeks before intervention. See graphic and chart display of this data in figure 2 below.

Age Range	Number of falls (post-test)
65-69	0
70-74	0
75-79	1
80-84	2

85-89	5
90-94	1
95-100	4

Table 2: Demographics and Incidence (Post-Intervention)

For the post-intervention group, the median age and insurance eligibility were unchanged (Table 2). The age group with the most fall posttest was the 85-89 years old with 5 falls. The oldest age group, 95-100 years, were a close second with 4 falls post-test. A graphic and bar chart representation of this data is displayed on figure 3.

Figure 2 (Graph and Bar): Fall prevalence in relation to Age groups (pre-intervention)

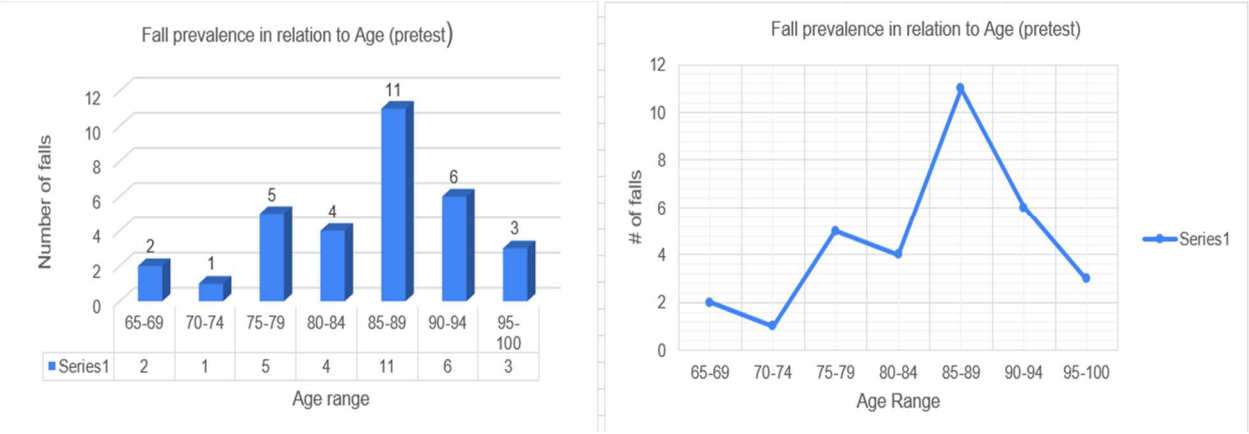


Figure 2 illustrates the number of falls that occurred in 6 weeks pre-intervention for each age group using graph and bar chart respectively. Each figure revealed that the average age range with the most falls was 85-89 years old with 11 falls and the least age group with the least

number of falls prior to intervention was the 70–74-year-olds with 2 falls. Figure 3 displays in graph and chart, the number of falls that occurred during 6 weeks of the post intervention phase for each age group. The figure shows a side-by-side display of data in a bar chart and graph respectively. The average age range with the most falls in this phase was the 85–89-year-old with 5 falls and the 95-100 years a close second with 4 falls.

Figure 3 (graph and bar): Fall prevalence in relation to Age groups (post-intervention)

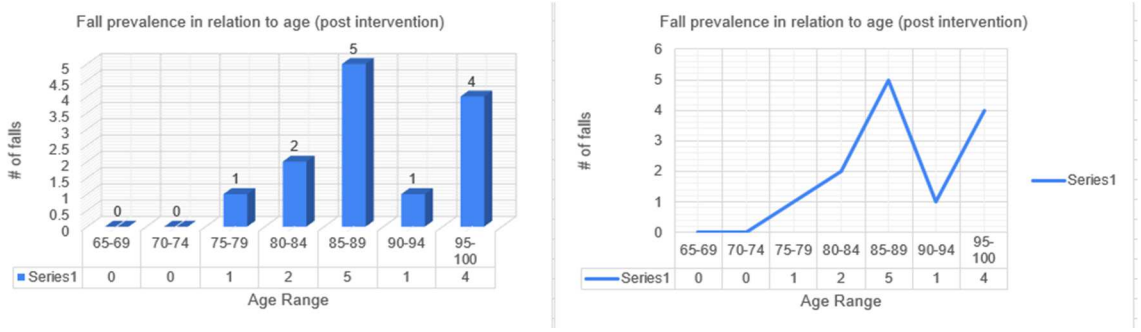


Table 4: Application of Physical Therapy Pre and Post Intervention

Physical Therapy	Physical Therapy PRE QI	Physical Therapy Post QI
YES	4	22
NO	28	10

In Table 4, there is a visible increase in physical therapy intervention. Prior to QI intervention, only 12.5% (4 patients) of the participants were actively receiving physical therapy as opposed to 28 that were not. The use of physical therapy (PT) increased during intervention phase with 22 patients (68.75%) receiving therapy and 10 patients not receiving therapy by post

intervention. Patients who did not receive therapy have had one within the past 12 weeks prior to initiation of intervention per insurance eligibility guideline. The # of active PT (p) pre-QI is 4, # of PT (p) post QI is 22. The PT (%) rate was measured as (#/n = p/100). Where p is the number of people getting PT (pre and post).

Pre (QI) PT rate is (4/32 = p/100) = 12.5%

Post (QI) PT rate is (22/32= p/100) = 68.75%

Figure 4: Physical Therapy Comparison Pre and Post Intervention

A side-by-side PT comparison of the pre and post-tests is presented in figure 4 above (physical therapy comparison pre and post intervention). It shows that 22 residents were actively getting physical therapy post-test as opposed to 4 in the pre-intervention phase (Figure 4).

DATA ANALYSIS (T-Test)

Table 5 (Weekly fall data pre and posttest)

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Pre QI Falls	9	8	9	9	10	6
Post QI Falls	1	4	2	1	3	2

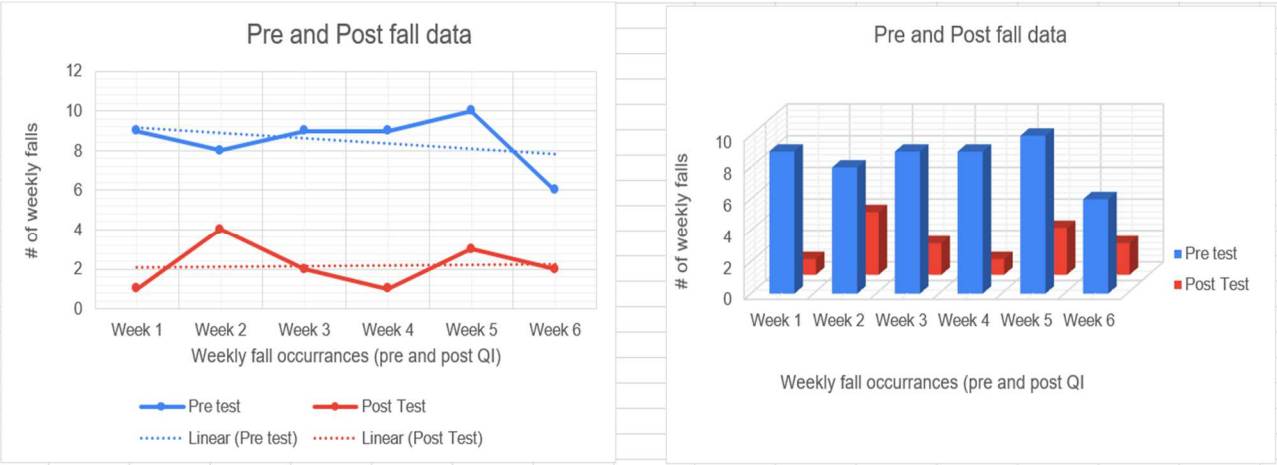
We reviewed the number of weekly falls (Table 5) that occurred during this study before and after QI. Table 5 demonstrates number falls that occurred each week before and after

intervention. The *Pre QI-Falls* showed a higher number of falls with 10 falls in week 5 of the pre-intervention phase. The Post QI Falls showed a lower number of falls with 4 being the highest falls in week 2 of that phase. The graph and chart comparison of the pre and posttests are shown in figure 5 below. The chart shows week-by-week number of falls before and after intervention. The # of falls (f) pre QI was 51, # of falls (f) post QI was 13. Sample size, (n) = 32. Fall rate (%) in this community is calculated as (#/n = f/100)

Pre (QI) fall rate is (51/32 = f/100) = 159.3%

Post (QI) fall rate is (13/32 = f/100) = 40.6%

Figure 5: Pre and Post Fall data analysis (Graph and Chart comparison)



Interpretation

A t-test analysis was performed to evaluate the difference between the pre and post intervention. The paired t-test value was calculated to be 0.000204 ($p = <0.05$). A paired t-test value indicates the probability that there is a significant difference in the two phased data. A probability of $p < 0.05$ is an indication that a difference exists. Therefore, the paired t-test of this retrospective chart review of a QI intervention is significant at 0.000204. The fall and variable rates of the assisted living was calculated as follows:

(f)= # of falls: pre-intervention = 51; post-intervention = 13

(n)= sample size is 32; (a)= age >/= 65.

(p)= # active physical therapy (PT rate): pre-intervention= 12.5%, post-intervention=68.75%

CHAPTER 5: SUMMARY

Discussion and Conclusion

This project's primary aim was to perform a retrospective chart review of a QI intervention. The actual intervention was physical therapy. Using the 2018 USPSTF fall guideline which recommended use of physical therapy to reduce fall, the project was able to implement new intervention to reduce the number of falls in the ALF among the older adult population. The

organizational stakeholders supported and adopted the DNP project because it aligned with the organizational goal of reducing fall and improving safety in their facility.

During the QI implementation phase, residents were able to receive therapies that were tailored to their individual needs. Outcome analysis showed a significant reduction in the number of falls when compared with previous organizational practices. The analysis also supported the ability to assess change and use the evidence-based result to improve care and safety in older adults. Overall, analysis significantly showed a statistical difference in the number of falls post intervention when compared to the number of falls pre-intervention with a paired t-test value of 0.000204 ($p<0.05$). This was without a doubt an impressive number to recommend and implement change.

Limitations/Barriers

A potential challenge or barrier to study was the extent to which this organization would be receptive to accept, adopt and/or implement a proposed policy update. One major limitation was the current ongoing COVID-19 pandemic which limited contact with residents and physical therapists due to fear of exposure. Another barrier identified was the limited amount of time frame provided for data collection, intervention phase and implementation phase. The implementation phase could have lasted up to 12 weeks on its own but was constrained to 6 weeks due to the limited amount of time available to complete the project by deadline. Despite all the limitations, team members were able to effectively and efficiently complete the project successfully as evidenced by the data analysis outcome presented.

Recommendations and Implication for Practice

Recommendations:

Assess fall risk on all patients when admitted and periodically after to determine the need for start of physical therapy. Goal is to begin PT initiation as early as possible and periodically in order to prevent fall. By being proactive, fall can be prevented. Recommending consistent use of the USPSTF guideline by providers to perform fall risk assessment and begin therapy is key to successful prevention. Providing this workflow of care process for fall prevention will be an effective tool to assist providers improve compliance in assessment and therapy.

Implication for Practice

The main focus of healthcare is to improve quality of health and health outcomes. To achieve this, patient and staff education will help improve awareness about the importance of preventative care. It is estimated that by 2030 there could be 7 fall related deaths every hour (CDC, 2020). To reduce this staggering estimation, this project will be a resourceful, reliable, evidence- based tool. The Healthy People 2030 goal is now focused on reliable, evidence based statistical data that is dedicated to bring positive change in healthcare (CDC, 2020).

DNP Essentials

The DNP student aligned with all the DNP essentials in several ways as follows:

Domain I: Knowledge for Nursing Practice

Domain I was accomplished by integrating knowledge and ability. It was able to incorporate nursing knowledge to make clinical judgment and implement changes in practice (AACN, 2021).

The multiple EBP articles that were integrated in this project were effective in providing the knowledge base needed to bring about change in care.

Domain II: Patient Centered Care

Domain II was demonstrated by providing a patient centered care that utilized evidence-based approach which supports attainment for an overall positive health outcome. Patient centered care is holistic and builds on the scientific wealth of knowledge to guide nursing practice (AACN, 2021).

Domain III: Population Health

Completion of this project has helped meet this domain by promoting population health culture in the communities, promote safety and prevent injuries due to evidence-based interventions that led to decrease in number of falls in older adults (AANC, 2021)

Domain IV: Scholarship for Nursing Practice

This domain involves the creation, combination and dissemination of nursing knowledge to improve health and positively modify health care (AANC, 2021). This was done by developing a workflow that should be followed to avoid lapse in care. Example of this workflow is ensuring initial fall assessment is performed on admission and periodically to determine risk and address it proactively.

Domain V: Quality and Safety

The goal of this project was to improve quality and safety. This project was able to meet this domain by doing just that. The ability to reduce fall rate will reduce injuries that result from fall. This was achieved by implementing physical therapy as recommended by the USPSTF fall guidelines.

Domain VI: Inter-professional Partnership

This involves working together with the interdisciplinary care team to achieve optimal care. It requires mutual clarity and understanding as well as respect for all team members (AANC, 2021). This was met by working with physical therapists, nursing staff, ancillary staff, providers to meet the common goal of promoting quality care and safety.

Domain VII: System Based Practice

This domain centers on the ability to respond and lead within a complex system by proactively coordinating resources to bring about safe and quality care (AANC, 2021). This project did just that. With the staggering prediction of fall rate by 2030, this project was able to lead this complex case and can effectively bring about quality and safety in health care.

Domain VIII: Informatic and Healthcare Technologies

This domain focuses on use of information technology and informatics to provide care and gather data (AANC, 2021). The information technologies used in this project helped meet this domain.

Domain IX: Professionalism

Practice in the area of Advanced Nursing Practice prepares professionals within the domain of nursing to be proficient in all areas of specialization (AANC, 2021). This DNP program which helps reflect on nursing values prepares individuals to meet this domain.

Domain X: Personal, Professional and Leadership Development

Being part of activities that self-reflect and promote personal health and well being with support for nursing leadership is a quality that is necessary to meet this domain (AANC, 2021). All activities taken to complete this project align with these qualities.

Dissemination

Dissemination of evidence-based information in healthcare is important in improving and updating care. It can lead to improved health outcomes and patient satisfaction. This project was the first of its kind in this facility. Outcomes of this study will be presented to the facility director, employees and providers. The project will also be presented to the Pennwest University faculty and project committee members. The goal is to submit manuscript and project results to the *American Journal of Nursing* (AJN) for review and possible publication. This will help other healthcare facilities with similar challenges explore interventions and possibly implement new evidence- based findings..

References:

Alshammari, S. A., Alhassan, A. M., Aldawsari, M. A., Bazuhair, F. O., Alotaibi, F. K., Aldakhil, A. A., *et al*., (2018). Falls among elderly and its relation with their health problems and surrounding environmental factors in Riyadh. Journal of Family Community Medicine. Pp. 29-34.

American Association of Colleges of Nursing (2021). The Essentials: Core Competencies for Professional Nursing

Education. Retrieved, September 6, 2022 from https://www.aacnnursing.org/Portals/42/AcademicNursing/pdf/Essentials-2021.pdf

Baixinho, C. R. S. L., Dixie, M. A. C. R., Henriques, M. A. P. (2017). Falls in Long Term Care Institutions for elderly people: protocol Validation. Rev Bras Enferm, 70(4), 740-746.

World Health organization (2022). Aging. Retrieved June 13, 2022 from https://www.who.int/health-topics/ageing#tab=tab_1

Berková M, Berka Z (2018). Falls: a significant cause of morbidity and mortality in elderly people. Europe PMC. 64(11):1076-1083

Bettio, L. E. B., Rajendran, K., Gil-Mohapel, J. (2017). The effects of aging in the hippocampus and cognitive decline. *Neuroscience and Behavioral Reviews.* Elsevier; Vol 79, 66-86.

Centers for Disease Control (2021). Facts About Falls. Retrieved June 6, 2022 https://www.cdc.gov/falls/facts.html

Centers for Disease Control (2020). Cost of Older Adult Falls. Retrieved June 6, 2022 from https://www.cdc.gov/falls/data/fall-cost.html

Center for Disease Control (2020) Healthy People 2030. Retrieved October 10, 2022 from https://www.cdc.gov/nchs/about/factsheets/factsheet-hp2030.htm

Centers for Disease Control (2020) Older Adult Falls. Retrieved June 11, 2022 from

https://www.cdc.gov/falls/data/falls-by-state.html

Centers for Disease Control (2021). STEADI: Older Adult Fall Prevention. Retrieved June 13, 2022 from https://www.cdc.gov/steadi/

Dieuleveult, A. L., Siemonsma, P. C., Van Erp, J. B. F., Brouwer, A. (2017). Effects of Aging in Multisensory Integration: A Systematic Review. Frontiers in Aging Neuroscience. https://doi.org/10.3389/fnagi.2017.00080

Haddad, Y. K., Bergen, G., & Florence, C. (2019). Estimating the Economic Burden Related to Older Adult Falls by State. Journal of Public Health Management and Practice, 25(2): E17–E24.

Hanrahan, K. & Fowler, C. (2019). Iowa Model Revised: Research and Evidence-based Practice Application. Journal of Pediatric Nursing 48 (2019) 121–122.

Holly, C., Salmond, S., Saimbert, M. (2022). Comprehensive Systematic Review for Advanced Practice Nursing, 3rd ed. Springer Publishing.

Iowa Model Collaborative (2017). Iowa model of evidence-based practice: Revisions and validation. *Worldviews on Evidence-Based Nursing, 14*(3), 175-182. doi:10.1111/wvn.12223

John Hopkins Health Systems (2022). Johns Hopkins Evidence-Based Practice Model for Nursing and Healthcare Professionals. Retrieved June 20, 2022 from

file:///media/archive/2022%20EBP%20Tools%20_fillable.zip/Appendix%20D%202022%20Final.pdf

Johnston, Y. A., Bergen, G., Bauer, M. Parker, E. M., Wentworth, L., McFadden, M., Reome, C., Garnett, M. (2019). Implementation of the Stopping Elderly Accidents, Deaths, and Injuries Initiative in Primary Care: An Outcome Evaluation. *The Gerontologist*, 59(6); Pages 1182–1191

Kachhwaha, R., Sriraghunath, S., Arunkumar, Arunkumar, D., Vyas, I., (2018). A Study to analyze the Efficacy of Strength Training Exercise for Fall Related Gait Kinematics in elderly– An Experimental Study. Indian Journal of Physiotherapy & Occupational Therapy. 12(4), pp 101-106.

Moncada, L. V. V. & Mire, L. G. (2017). Preventing Falls in Older Persons. *American Family Physician*. (96) 4; 239-247.

NDNQI (2020), Guidelines for Data Collection and Submission On Patient Falls Indicator Retrieved June 6, 2022 from https://members.nursingquality.org/NDNQIPortal/Documents/General/Guidelines%20-%20PatientFalls.pdf?linkid=s0_f776_m73_m230_a0_m236_a0_m242_a0

Pavlovic, J., Racic, M., Kekus, D., Despotovic, M., Jokovic, S., Hadzivukovic, N. (2017). Incidence of falls in the elderly population. Medicinski Pregl. 9(10), p277-282.

Scheckel, B., Stock, S., & Müller, D. (2021). Cost-effectiveness of group-based exercise to prevent falls in elderly community dwelling people. BMC Geriatrics (2021) 21(440); https://doi.org/10.1186/s12877-021-02329-0

Sharif, S. I., Al-Harbi, A. B., AL-Shihabi, A. M., Al-Daour, D. S., Sharif, R. S., (2018). Falls in the elderly: Assessment of prevalence and risk factors. Pharmacy Practice. 16(3).

SQUIRE 2.0 (2020). Revised Standards for Quality Improvements Reporting Excellence. Retrieved June 6, 2022 from http://www.squire-statement.org/index.cfm?fuseaction=Page.ViewPage&PageID=471

Teixeira, D. K. D., Andrade, L. M., Santos, J. L. P. Caires, E. S., (2019). Falls among the elderly: Environmental Limitations and Functional Losses. Rev. Bras. Geriatr. Gerontol. 22(3).

Toot, A., Wiklund, R., Littbrand, H., Nordin, E., Nordström, P., Lillemor Lundin-Olsson, L., Gustafson, Y., Erik Rosendahl, E. (2018). The Effects of Exercise on Falls in Older People With Dementia Living in Nursing Homes: A Randomized Controlled Trial. https://doi.org/10.1016/j.jamda.2018.10.009

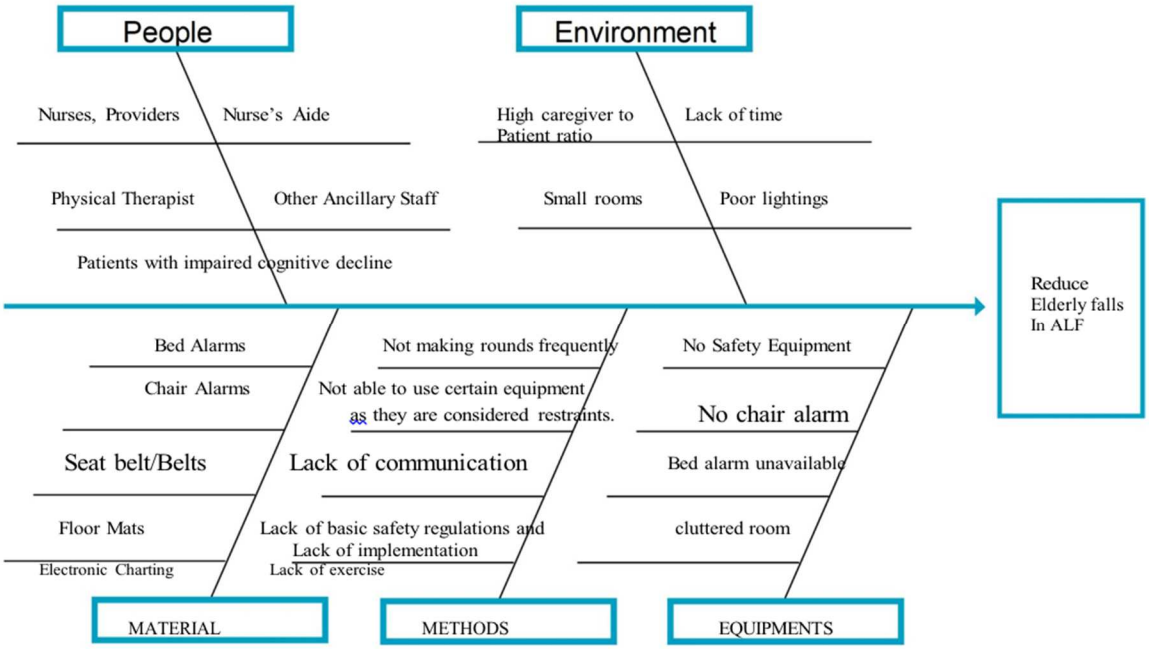
U.S. Preventive Services Task Force (2018). Interventions to Prevent Falls in Community-Dwelling Older Adults US Preventive Services Task Force

Recommendation Statement. JAMA 319(16):1696-1704. doi:10.1001/jama.2018.3097

World Health organization (2022). Aging. Retrieved June 13, 2022 from

https://www.who.int/health-topics/ageing#tab=tab_1

Appendix A: Cause and Effect: Fishbone Diagram



Appendix B: Fall Data Form

Participants	Age	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	PT (Y/N)
Week 1								
Week 2								
Week 3								
Week 4								
Week 5								
Week 6								

Appendix C: Planned DNP Timeline

Task	Target Date
Identify Chair and committee	4/30/2022
Submit Ch. 1, 2, 3	6/30/2022
Make recommended change and submit to committee	8/25/2022
Schedule overview with committee	8/29/2022
Submit application to IRB	8/30/2022
Conduct research/complete intervention	9/10/2022
Complete data collection, analyze results	9/12/2022
Write chapters 4 & 5	10/17/2022
Submit final paper to committee	11/18/2022
Prepare PowerPoint and schedule defense	12/2/2022
Defense	12/9/2022
Make final project revisions, get title page signed, upload documents to ProQuest	12/12/2022
Submit manuscript for publication to a peer-reviewed	12/19/2022

Appendix D: IRB Approval Letter

Institutional Review Board
250 University Avenue
California, PA 15419
instreviewboard@calu.edu
Melissa Sovak, Ph.D.

Dear Ihuoma,

Please consider this email as official notification that your proposal titled "Improving Patient Safety, Evaluation of a Fall Prevention Program in Assisted Living" (Proposal #PW22-054) has been approved by the Pennsylvania Western University Institutional Review Board as submitted.

The effective date of approval is 10/07/2022 and the expiration date is 10/06/2023. These dates must appear on the consent form.

Please note that Federal Policy requires that you notify the IRB promptly regarding any of the following:

(1) Any additions or changes in procedures you might wish for your study (additions or changes must be approved by the IRB before they are implemented)

(2) Any events that affect the safety or well-being of subjects

(3) Any modifications of your study or other responses that are necessitated by any events reported in (2).

(4) To continue your research beyond the approval expiration date of 10/06/2023, you must file additional information to be considered for continuing review. Please contact instreviewboard@calu.edu

Please notify the Board when data collection is complete.

Regards,

Melissa Sovak, PhD.
Chair, Institutional Review Board

Table 1: Demographics and Incidence Pre-Intervention

Age Range	Number of falls
65-69	2
70-74	1
75-79	5
80-84	4
85-89	11
90-94	6
95-100	3

Age Range	Number of falls (post-test)
65-69	0
70-74	0
75-79	1
80-84	2
85-89	5
90-94	1
95-100	4

Table 2: Demographics and Incidence Post-Intervention

Figure 2: Fall prevalence in relation to Age groups (pre-intervention)

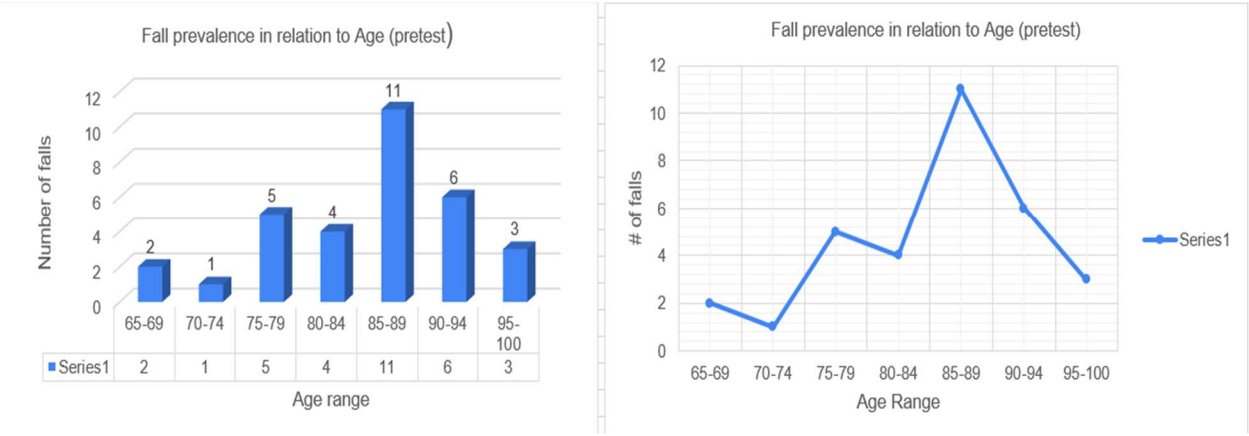


Figure 3: Fall prevalence in relation to Age groups (post-intervention)

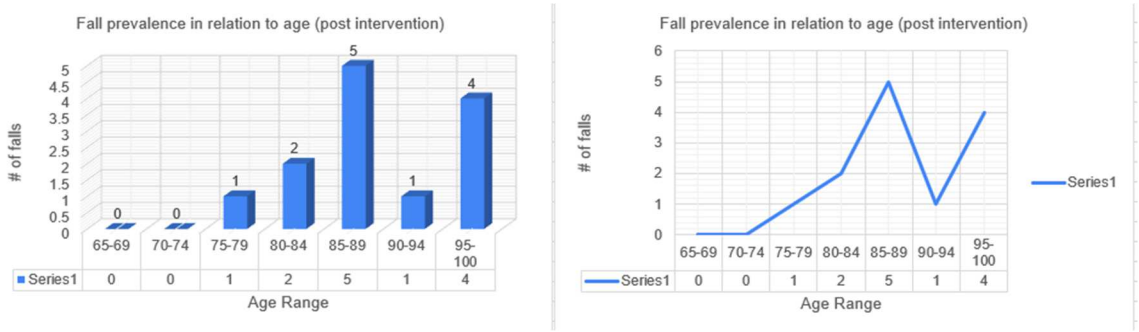


Table 4: Application of Physical Therapy Pre and Post Intervention

Physical Therapy	Physical Therapy PRE QI	Physical Therapy Post QI
YES	4	22
NO	28	10

Figure 4: Physical Therapy Comparison Pre and Post Intervention

Table 5: (Weekly fall data pre and post QI)

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Pre QI Falls	9	8	9	9	10	6
Post QI Falls	1	4	2	1	3	2

Figure 5: Pre and Post Fall data analysis (Graph and Chart comparison)