Fall Prevention in Dementia Care: The Integration of an Evidence-Based Fall Scale to Identify Fall Risk and Reduce Fall Events

Kate N. Ebea

Arizona State University

Abstract

Falls are prevalent among those aged 65 years and older and may result in minor to debilitating injuries in this vulnerable population. Frailty, unsteady gait, and medication side effects all contribute to fall risk as well as dementia, a type of cognitive impairment that disrupts memory and judgment leading to an underestimation of fall risk. Fall prevention evidence suggests that interventions aimed at decreasing fall rates begin with a fall risk assessment and tailored fall prevention measures that promote safety. To examine the effectiveness of a fall prevention program in dementia care, an evidence-based pilot was conducted in a long-term care facility focused on dementia care. A convenience sample of 16 nurses received a fall prevention education intervention. A fall prevention knowledge instrument measured pre and post-fall prevention knowledge. There was a significant increase in fall risk knowledge from the pre-test ($p < .001$). The participants then conducted a fall risk assessment of 50 dementia patients using the Morse Fall Scale. Of the 50 dementia patients, 28 were identified as high risk for falls. The nurses then instituted tailored fall risk prevention measures for those high risk for falls. As a result of the pilot, 40 fall events were noted within a three-month time period, reflecting a significant reduction in falls ($p < .001$) from the previous year. The institution of a fall prevention program in dementia care incorporating nursing education, a fall risk scale, and measures to promote safety can reduce fall risk in dementia patients.

Keywords: elderly fall, dementia, risk for falls, fall prevention, fall risk assessments, fall risk assessment tool

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The prevalence of falls rises with age, and they are especially prevalent in those aged 65 years and older. Falls occur among individuals regardless of age, race, and gender, and a fall can affect the body's ability to function, especially if they sustain debilitating injuries. In older adults with cognitive impairment such as dementia, falls and fall risk, rises due to a combination of poor judgment and physical decline (Salb et al., 2015). Falls are defined as unintentionally displacing the body from the initial level to a lower level without the ability to correct it, caused by multifactorial circumstances which affect the stability of the body (Luzia, Victor, & Lucena, 2014). A person who is at "risk" for falls has a higher possibility of falling, which may cause physical harm (Luzia et al., 2014). Studies conducted on fall risk, prevention, and tools suggest that interventions aimed at decreasing fall rates or events begin with a fall risk assessment and tailored fall prevention measures that promote safety. The purpose of this manuscript is to review the results of an evidence-based pilot project aimed at identifying those at risk for falls and reducing fall events through the institution of a fall prevention program in a dementia care setting.

Background and Significance

Falls pose threats to the lives of the elderly population, and the life-threatening injuries that can accompany a fall necessitate fall prevention measures and their institution. According to Slade, Cari, Hill, and Morris (2017), falls have become a worldwide health problem that leads to injuries resulting in possible death, thereby ranking falls second after traffic-related accidents. Frequently, elderly patients who have had a history of falls are afraid of falling again due to the

potential injuries they might sustain (Walker et al., 2015). Therefore, preventing falls is vital in promoting safety.

According to the Arizona Department of Health Services, the Arizona Healthy Aging Plan (2014-2018) states that as the population of Arizona gets older, the health and life expectancy of individuals who reside in Arizona are hampered by a variety of disease processes. Different risk factors are associated with falls among older adults who dwell in the community (Phelan et al., 2016). Risk factors such as visual impairment, cardiovascular disease, hypotension, age-related musculoskeletal and joint weaknesses, peripheral neuropathy, among others, can lead to possible falls (Guse et al., 2015).

In persons older than 65 years, approximately one-third of them fall annually, and the number increases to 50% by the time they are 80 years old (Saccomano, & Ferrara, 2015). According to the Centers for Disease Control and Prevention (2016), 29 million falls led to seven million injuries among the elderly population in 2014, costing $31 billion in annual Medicare costs. In 2014, the number of community-dwelling adults age 65 years and older who fell was 28.7%, and in 2015, 33,000 fall-related deaths were estimated (Guirguis-Blake, Michael, Perdue, Copolla, & Beil, 2018). The National Conference of State Legislatures (2018) stated that 20 to 30 percent of falls by older adults leads to serious injuries, these injuries limit their mobility, decreases their quality of life, and increases their risk for an untimely death.

A high fall rate is a problem for a long-term care facility focused solely on dementia care in Arizona. The Director of Resident Services in this facility reports a high rate of falls and has an interest in instituting a fall risk prevention program to identify those who are at risk for falls and reduce fall events. The facility lacks a fall risk assessment process and a fall prevention program. A recent increased rate of falls in the facility has led to an interest in finding a solution to their

increased fall rate and promoting safety in their dementia population. The facility has an average fall rate of 12.4 falls per 2,010 occupied bed days. The facility accommodates 67 patients/residents. A fall event is recorded when it is witnessed, and when a patient/resident is found on the floor. The fall rate may be lower since a dementia patient may voluntarily lie on the floor. As reported by the charge nurse, those with a witnessed fall tend to do so due to an unsteady gait and loss of balance.

Due to the higher incidence of falls in this geriatric population at the dementia care facility and the need for an evidence-based fall risk reduction program, investigating fall risk assessments and their institution is warranted. In an attempt to research this further, a clinically relevant PICOT question was developed: in elderly adults with dementia who are at risk for falls, how does a fall risk assessment tool compared with standard care affect the fall rate?

Synthesis of Evidence

A literature review was conducted to evaluate the PICOT question utilizing four research databases, including PubMed, Cumulative Index of Nursing and Allied Health Literature (CINAHL), PsycINFO, and Cochrane. Inclusion criteria, while searching through the databases, included interventions to prevent falls and reduce fall rates, and exclusion criteria were directed towards any interventions that do not relate to fall reduction.

PubMed

In the PubMed database, the MESH term used for the initial search was *fall prevention or fall risk assessment or gait and balance exercise*; this database search produced 22,525 results for peer-reviewed articles within 10 years. Additionally, other keywords and Boolean phrases that were searched include *elderly fall and dementia, and risk for falls.* This search produced 2,415 results when the search was limited to peer-reviewed articles within five years. This search

was narrowed down to 1,100 when it was limited to peer-reviewed articles within three years and 750 when the search was narrowed down to within two years, using keywords *elderly fall prevention and fall risk* (Appendix C).

CINAHL

In the CINAHL database, the MESH term used included *elderly dementia patients or fall assessment tool and gait assessment,* and this search yielded 488 results. Additional Boolean phrases searched with this database include *elderly or fall prevention or balance and gait,* which yielded 94,554 results for peer-reviewed articles within five years. When the search was limited to keywords using *elderly patient, and fall prevention,* and *balance and strength,* it yielded nine results. When searched with keywords *elderly population or fall prevention* and *balance and gait,* it yielded 8,224 results. When the search was narrowed down to peer-reviewed articles within five years, it yielded 6,500, and when narrowed down to two years, the results were 1,545 articles (Appendix D).

PsycINFO

The keywords for searching the PsychINFO database were *older adults, and fall risk, or fall prevention,* and this yielded 3,045 results for peer-reviewed articles within five years, and 950 when the search was narrowed down to peer-reviewed articles within two years. Additional keywords used for more results were *older adults and fall risks,* which yielded 727 results, when keywords *elderly population, and falls, and assessment tools* were searched, it produced 34 results for peer-reviewed articles within five years (Appendix E).

Cochrane Database

The Cochrane database was searched, and the keywords used was *fall prevention and intervention,* and this search produced 96 results with articles that were within five years of publication (Appendix F).

After the four-database search, the final yield consisted of 132,108 peer review articles, upon narrowing the yield to articles published within two years 950 remained. After an extensive manual review, 20 studies were retained. These final studies underwent further critical appraisal, and ten of them were chosen based on PICOT relevancy and evidence (Appendix A).

Critical Appraisal and Synthesis of Evidence

Ten high-quality studies between 2014 to 2018 were retained for review. Rapid critical appraisal by Melnyk and Fineout-Overholt (2015) was used to evaluate the strengths and qualities of the ten studies. Of the ten studies chosen, four are randomized control trials, three are systematic reviews, two are longitudinal studies, and the final study is a cross-sectional design. The demographics of the research participants were older adults at least 50 years of age (Appendices A, B). Participants included those who have cognitive impairment (dementia) or intellectual disability, and 90% live in an assisted living or long-term care facility. The major variables of the 10 studies included fall risks, fall prevention, and fall reduction. Two of the studies were conducted in the United States, and the remaining studies were conducted internationally in Germany, Canada, United Kingdom, Sweden, Netherlands, Korea, and Norway, and all interventions were directed towards preventing falls and reducing fall rates (Appendices A, B).

Nine of the 10 high-quality studies utilized different measurement tools to assess falls, and even though their measurement tools were different, collectively, they aimed at assessing patients who are at risk for falls and identifying risk factors that contribute to falls. One out of

the 10 studies did not use a measurement tool, a meta-analysis by Lee and Kim (2017). This study noted a bias, but the other nine studies had no bias reported. Four out of the 10 studies utilized at least one similar measurement tool to assess the risk factors for falls. The mean age of the participants in the 10 studies was between 55 to 83, and the majority of them were females (Appendix B). Four studies had nursing interventions focused on fall prevention utilizing fall risk assessment tools and the institution of exercise programs. Two studies focused on fall prevention in the community, and two other studies addressed interventions for fall risk factors and fall reduction rates (Appendix B).

The data analysis used in the 10 studies included chi-square and independent-samples *t*-tests, Cochran's X^2 test for homogeneity, descriptive and analytic statistics, and a multilevel Poisson Regression model (Appendix A). Fisher's exact test was used in the case of rare outcomes, STATA version 12, t-tests, and Mann–Whitney-U tests, Review Manager, v.5.3, Cochrane Q and *I*2 statistics for evaluation of statistical heterogeneity, and logistic regression analysis was also used (Appendix A). Study strengths included the implementation of effective interventions to reduce fall rates and prevent falls. Weaknesses noted in the studies included smaller sample sizes, and the authors of one study failed to report which variables were used in the final adjusted analysis (Appendix A). The foundation of this pilot project was built from these high-level studies that concluded that assessing the elderly population for fall risk by utilizing a valid and reliable fall scale, will be beneficial in identifying those at risk for falls and then utilizing that data to implement fall prevention measures may reduce fall events (Appendices A and B).

Evidence suggests the assessment of patients who are at risk for falls using an evidence-based fall risk assessment tool and then implementing fall prevention measures for those who are

at high risk. One such tool to assess fall risk, as a first step in reducing falls, is the Morse Fall Scale, a risk assessment tool that identifies those who are at risk for falls (Agency for Healthcare Research and Quality (AHRQ), 2013). This scale is effective due to its ease of use and its consideration of the mental status of patients. Following that assessment of fall risk and identifying those at risk for falls, interventions implemented to prevent falls included the use of four-wheel walkers or wheelchairs, a one-on-one care from a private duty caregiver, and a clutter-free environment. This evidence informed the pilot project through its design.

Theoretical Framework and Implementation Framework

Rosswurm and Larrabee's evidence-based model for change is suitable for the project because it is focused on implementing change (Adom, Hussein, & Agyem, 2018). The structure of this model outlines the steps needed for the institution of a fall prevention program. The implementation framework has six steps, which include assessing the need for change, linking the problem, intervention and outcomes, synthesizing the evidence, designing the change needed in practice, implementation and evaluation of change, and integrating and maintaining the proposed change (Parkosewich, 2013). Additionally, Rosswurm and Larrabee's step by step approach was ideal for the implementation of this project to prevent falls and reduce the fall rate. The project began with the identification of the problem of a high fall rate; the problem was linked to a lack of a fall prevention program, synthesized evidence suggested utilizing a fall risk scale, and then tailoring interventions for those at high risk for falls. A fall prevention program was implemented and evaluated with valid and reliable tools, and lastly, the institution of a quarterly fall risk assessment plan was suggested to maintain the change.

The Health Promotion Model (HPM) is a theoretical framework that is suitable for this project because the goal is to promote good health. Falls lead to injuries, hospitalizations, and

increased costs of over $30 billion yearly (Phelan et al., 2016). This model correlates with the project because it will lead to health promotion by reducing fall rates. The organization desires to reduce the high incidence of fall rates, and this was the targeted goal of the pilot project. This model focuses on individual characteristics and experiences, behavior-specific cognition and affect, and behavioral outcomes (Khoshnood, Rayyani, & Tirgari, 2017). The individual characteristics and experiences which are about prior related behaviors and personal factors are the essential parts of the Health Promotion Model. By assessing prior related behaviors and personal factors that lead to elderly falls, interventions to prevent falls was implemented with the goal of decreasing the fall rate.

Methods

The project was implemented in a long-term care facility that provides care for geriatric patients with dementia. Many are notes to be potentially at risk for falls due to frailty, unsteady gait, and several additional factors that increase fall risk.

Ethics and Human Subject Protection

Nurse participants were recruited during a staff meeting, and oral consent was read to them by this author, after which the nurse participants agreed to participate in the project. Participants IDs were linked via an anonymous reproducible ID in which participants were instructed to pick the first three letters of their mother's name and the last three digits of their telephone number. This anonymous ID was used to collect and analyze the data. Approval by the site champion of the facility where the project was taking place was obtained (Appendix K). An exemption was granted by the Institutional Review Board (Appendix L). To implement the pilot project, data was obtained, accessed, and stored by this author. All written materials were kept in a folder not in plain view when in use and were stored in a secure location in a locked file drawer. All data

will be shredded by this author on June 1, 2020. No foreseeable risks to the participants were noted.

Population and Setting

The setting where the project occurred is a memory care community that provides long-term care for geriatric patients with dementia. Currently, there are 50 geriatric patients in the facility with 67 beds when it is at full capacity, and their age range is from 60 years and older. These geriatric patients have chronic conditions, including dementia, diabetes, hypertension, hyperlipidemia, and cardiac issues.

Project Impact

The project facility does not have a fall risk assessment tool, the implementation of the Morse Fall Scale would enable the nurses to identify patients who are at risk for falls and implement measures to prevent falls, leading to a positive system change. The facility is likely to experience positive change related to reduced fall rates and injury due to the establishment of a fall prevention program. The nurse participants will be likely impacted positively by gaining knowledge on how to assess patients to identify those who are at risk for falls.

Organizational Impact

The short-term impact of the project to the organization is a reduction in fall rates, thereby preventing unwanted injuries. The long-term impact may be the prevention of death, and a decrease in hospital expenditures related to falls. The impact on the body of knowledge would be the use of Morse Fall Scale to assess the dementia population who are at risk for falls, strengthening the use of fall assessments and nursing fall prevention protocols in dementia settings.

Procedures

The pilot project conducted over a three-month timeframe included procedures of fall risk education, implementation of a fall risk tool, and tailored fall prevention measures. Fall risk education was initiated through the recruitment of the facilities nursing staff. All nursing staff that agreed to participate completed a "Participant Demographic Questionnaire" created by the author which includes basic demographic questions and questions regarding prior fall risk education and use of fall risk assessment tools (Appendix M). Then, participants completed the "Fall Prevention Knowledge Pre-test" consisting of seven questions regarding fall prevention knowledge based on the Self-Efficacy to Prevent Falls (SEPFN) tool (Dykes et al., 2011) (Appendix N). The author then conducted an elderly fall prevention education intervention consisting of a 20-minute PowerPoint presentation titled "Elderly Fall Prevention." The presentation included education on fall risk, fall risk prevention, use of the Morse Fall Scale, and integration of the Morse Fall Scale in the dementia care setting.

After the education session, participants completed the "Fall Prevention Knowledge Post-test," the same test as the pre-test (Appendix O). The total time to complete the education and tests was 30 minutes. The following week, the nurse participants performed fall risk assessments in the dementia care setting. They utilized the "Morse Fall Scale" created by Janice Morse (AHRQ, 2013) and conducted a fall risk assessment on every patient in the dementia care facility. Each assessment took less than 5 minutes. The nurse participants calculated each patient's score. Those patients found to be high risk for falls were identified, and the nurse participants instituted a fall prevention measure per agency protocols. At the end of the pilot project, the agency reported the number of falls during the pilot time period and the number of falls last year during that same time frame.

Instrumentation

The nurse participants performed the fall risk assessments utilizing the Morse Fall Scale to identify those who are at risk for falls. The assessment is based on a patient's history of falling, secondary diagnosis, ambulatory aids, IV/Heparin lock, gait, and mental status (Appendix J). A score of 0-24 identifies a patient at no risks for falls, a score of 25-45 identifies a patient low risk for falls, and a score greater than 45 indicates a patient is a high risk for falls (AHRQ, 2013). A case-control study by Baek et al. (2014) tested the Morse Fall Scale's validity by examining the electronic medical records of patients who are at risk for falls during different phases of hospitalization. Validity indicators showed a value of 0.72 for sensitivity, specificity value of 0.91, a positive predictive value of 0.63, and a negative predictive value of 0.94. The authors concluded that there was a high predictive performance by the Morse Fall Scale for determining fall risk in the population studied (Baek et al., 2014).

Participants completed a pre and post-test consisting of seven questions regarding fall prevention knowledge based on the Self-Efficacy to Prevent Falls (SEPFN) tool (Dykes et al., 2011). The SEPFN tool consists of seven questions that measure a nurses' knowledge of fall prevention measures. Dykes et al. (2011) conducted a study on assessing the self-efficacy of nurses in preventing falls, and the authors concluded that the SEPFN tool had an alpha of 0.89 for all the items, and 0.3-0.7 range was the item-total correlation. To interpret the correlation, there was psychometric adequacy among the nurses utilizing the SEPFN tool. The tool is recommended when measuring the self-efficacy of bedside nurses and their ability to prevent patients from falling (Dykes et al., 2011).

Data Collection

Data was collected from the Morse Fall Scale assessment sheets that the nurse participants filled out, and the scores were calculated to identify the rate of fall risk among the

patients/residents. SEPFN pre-test and post-test scores, the demographics of the nurse participants, and prior fall data were collected. After identification of patients/residents' high risk for falls, the author recorded the number of implementation measures to prevent falls set by the Agency policy and protocols for fall risk reduction measures, such as the utilization of four-wheel walkers, wheelchairs, and one-on-one sitters. At the end of the pilot project, the agency reported the number of falls during the pilot time period.

Data Analysis

Data collected by the author included demographic information (age, sex, race/ethnicity) (Appendix M) a Fall Prevention Pre and Post Test, Morse Fall Scale scores, the number and type of fall prevention measures implemented for those high risk for falls, and fall rates for this quarter and last year's same quarter. Data analysis began with reviewing all instruments for missing date. No missing items were noted. All answers were recorded on paper and entered directly into Intellectus Statistics statistical software. After entry, the data were checked two times for accuracy, to prevent any error from occurring when running the data.

Budget

No funding was received during the project rollout. The costs of the project included materials for the stakeholder meeting, the self-education of the author on how to use the fall assessment tool, and a binder to hold all the project materials. The facility allowed the author to print out fall risk assessment tool, the questionnaires for the nurses, the pre-test and post-test self-efficacy knowledge tool, and other materials needed for the implementation of the project.

Project Results

Descriptive Data/Data Analysis Procedures

The pilot project required statistical analysis. Intellectus Statistics software was utilized to store, manage, and analyze the data. Descriptive statistics were used to describe the samples, which included nurse participants and dementia patients, and outcome variables (self-efficacy, fall risk, fall rate). A paired-samples *t* test was used to analyze the outcome variables, a statistical summary was conducted to determine each interval and ratio value, and frequencies and percentages were calculated for nominal data. Finally, additional statistical analysis provided notation of statistical significance regarding pilot interventions.

Demographic Data

A convenience sample of facility nurse participants (n=16) completed the pilot. The mean nurse participant age was 46.88 years, with a range of 31-64 years (*SD* = 10.94). All participants spoke English, and the majority were females (81.25%). The race/ethnicity of the participants included eight African Americans (50%), two Hispanics (12.5%), and six White, non-Hispanics (37.50%). The average number of years as a nurse among participants was 9.03 years, with a range of 2 to 28 years (*SD* = 7.62). On average, participants have been employed for 3.12 years at the facility, with a range of 6 months to 7 years (*SD* = 1.81). The majority of participants (81.25%) have received prior education regarding fall risk assessment tools, seven participants (43.75%) reported using a fall risk assessment tool in the past, and all participants reported “sometimes” or “always” caring for patients who are at risk for falls. Of note, those participants who have utilized a fall risk tool in the past, none reported utilizing the Morse Fall Scale. Appendix P details the participant demographics.

Outcomes

Fall Prevention Education. The SEPFN pre-test scores revealed adequate baseline fall prevention knowledge among the participants (*M* = 4.44, *SD* = 0.96). After the education

intervention, SEPFN post-test scores improved (M = 6.62, SD = 0.50). A paired-samples t test was calculated to compare the mean value of the SEPFN pre-test scores and the mean value of the SEPFN post-test scores. A statistically significant increase in mean scores (SEPFN Tool) was noted among the participants ($t(15) = -9.61$, $p < .001$). These findings suggest the nurse participants' knowledge of fall prevention improved significantly after the education intervention.

Morse Fall Scale Implementation. Fall risk assessments were implemented by the nurse participants. They assessed fall risk in 50 dementia-care patients in the facility utilizing the Morse Fall Scale. Over half of the dementia care patients were noted to be at high risk for falls (56%) (Appendix Q). Individual Morse Fall Scale assessment questions reflected increased risk factors in the dementia-care patients assessed (Appendix Q). All dementia-care patients screened had two or more medical diagnosis, most had a prior history of falls (80%), many use an ambulatory aid such as a nurse assist, cane or walker, or furniture to support gait (78%), and at least 32% overestimate or forget their gait limitations (Appendix Q). As a result of the Morse Fall Scale results, all patients found to be high-risk for falls received tailored fall prevention measures based on the facility's protocol. The majority received a walker (93%), and the remaining received a wheelchair (7%). In addition to the utilization of walkers and wheelchairs, the facility opted to implement one-on-one sitters for those patients who fail to or cannot recognize their gait limitations. These results verified fall risk assessment tool efficacy in identifying fall risk in dementia-care patients.

Facility Fall Rates. Fall events were calculated by using the facility's incident report data log. In 2018, based on the fall log, the facility averaged 300 falls. In 2019, from January through August, the facility recorded approximately 200 falls. During the implementation of the

pilot project, 40 fall events were noted within a three-month time period (September 2019-December 2019), reflecting a significant reduction in falls ($p < .001$) from the previous year. The fall rate for the assessed dementia patients decreased by 50%.

Clinical Significance/Project Impact

Pilot project results showed a positive impact on the nurse participants, dementia-care patients, and the facility. The nurse participants demonstrated improved knowledge in fall prevention and then successfully utilized the Morse Fall Scale to identify fall risk among their facility's entire dementia-care population. As a result, several residents were found to be high risk for falls, and tailored fall prevention measures were implemented. Based on the results of the pilot project, the facility reported a statistically significant reduction in the fall rate among the patients. Due to the project implementation, the facility now has an established fall risk assessment prevention process to continue fall risk monitoring and prevention measures.

Falls among the geriatric population are a global public health issue. Therefore, it is necessary to utilize a fall risk assessment tool to identify those at risk for falls and implement measures to prevent them from falling. This project will impact the lives of the geriatric population in positive ways because with the institution of a fall risk prevention program with use of fall risk assessments, fall rates are likely to reduce and thereby prevent injuries, decrease hospitalizations and costs, and prevent unexpected deaths. For healthcare professionals, it is important to screen the geriatric population when they come in for their routine visits. This will positively impact care by preventing the geriatric population from falling instead of treating them for fall-related injuries. This preventative screening will be beneficial in improving health outcomes while promoting quality of life.

Additionally, screening for fall prevention will reduce fall-related Medicare costs that has affect healthcare system through injuries, hospitalizations, and surgeries. According to Huang and colleagues (2018), the population of older adults globally will continue to increase because of the aging baby boomers and longer life expectancy. In the United States of America, the population of older adults who are 65 years and older will increase to 83.7 million in 2050. These statistics suggest a rising geriatric population is likely to experience more falls, and the impact will be detrimental to their health. Medicare will likely continue to incur increased costs of fall-related injuries.

Policy has an important role to play in geriatric falls and increased Medicare expenditures related to falls. In 2010, the Affordable Care Act (ACA) was created by President Barrack Obama to reduce healthcare costs for those who qualify (Manchikanti et al., 2017). Even with this added coverage, the geriatric population continues to pay out of pocket for their fall-related healthcare costs. The ACA allows for free screening of health-related issues as recommended by the United States Preventive Services Task Force (USPSTF) and the Advisory Committee on Immunization Practices (ACIP) (Fox, & Shaw, 2015). Unfortunately, fall prevention screening is not one of them. Pilot projects and research supporting their efficacy could help drive policy change to mandate coverage for fall screening and prevention.

Sustainability of the Project Intervention

The pilot project took place in a long-term care facility that provides care for the geriatric population with dementia that did not utilize a fall risk assessment tool in the past. The nurses previously identified those at risk for falls from the information they received from patients' families. The integration of the Morse Fall Scale is vital to this facility and will be beneficial in assessing new geriatric patients upon admission to the facility and quarterly assessments of the

geriatric patients that reside in the facility. This author established a program for the facility to sustain the integration of the fall risk assessment tool. New patients will be screened for fall risk upon admission to the facility, and there will be quarterly assessments of all patients in the facility. The project intervention will be sustainable because it produced significant results in reducing falls, was easily integrated, and a long-term plan for continued use was developed. These actions and outcomes are likely to support the sustainability of the fall prevention program into the future as the project site plans to continuously work towards preventing falls.

Discussion

Falls among the geriatric population pose threats to their lives due to their impact on quality of life. Falls lead to unwanted injuries, loss of mobility, dependence on others for assistance, hospitalizations, increased Medicare costs, and unexpected deaths. Some risk factors of falls include frailty, unsteady gait, cognitive impairment, and poor judgment, and the side effects of medications. Evidence has shown that the utilization of an evidence-based fall risk assessment tool is effective in identifying fall risk patients, and through identification of those that are a moderate to high fall risk tailored prevention measure further prevent falls. This pilot project validated the evidence suggesting fall risk assessment tools with tailored fall prevention measures can reduce fall rates.

Recommendations

Falls among the geriatric population also affect their safety and wellbeing. The rate at which the elderly population fall and the injuries they sustain may lead to the fear of falling, which is a psychological consequence resulting from the aftermath of falls (Schoene et al., 2019). To reduce fall rates, falls risk assessments are vital. After identifying fall risk patients, measures should be implemented to prevent further falls while promoting the safety of this

vulnerable population.

Limitations and Barriers/Challenges

There were no limitations, barriers, or challenges noted during the implementation of this pilot project by the author. The participants were cooperative and compliant throughout the duration of rolling out the quality improvement project. They showed a willingness to participate in activities that enhanced their self-efficacy knowledge on the importance of utilizing a fall risk tool to assess the geriatric dementia patients who are at risk for falls.

Related Findings to the Literature

Various evidence supports the need to use fall risk assessment tools to identify fall risk patients. Evidence suggests that implementing measures to prevent falls will decrease falls rate and prevent it from recurring while improving the functionality of this population. Also, it would reduce health care expenditures of fall-related hospitalizations and improve their quality of life. Additionally, because dementia is a progressive cognitive impairment which affects the memory and functional independence (Duong et al., 2017), implementing measures to improve the safety of this population is vital. This can be done by making their environments free of clutter and hazards. Dementia patients do not recognize danger, and the lack the ability to properly judge their gait and ability, therefore, implementing safety measures for this population may prevent them from falling and mitigate the possibility of debilitating injuries.

A multifactorial approach is recommended as an effective beneficial measure to manage the modifiable risk factors in association with the falls of the elderly population (Dellinger 2017). Medications, Vitamin D supplements, home and environmental safety assessments, vision assessment and improvement, strength and balance programs, and footwear are some of the important measures to improve fall prevention among the elderly population (Dellinger, 2017).

Proper assessment of this vulnerable population is significant in identifying patients who are at fall risk and implementing measures that would prevent further falls and improve their safety. The importance of exercise, including balance, strength, and gait training, intake of vitamin D supplements, and modification of home environment management of postural hypotension are important measures to improve falls among the elderly population (Moncada et al., 2017).

Recommendations for further study or Research

Geriatric falls will continue to impact this vulnerable population in negative ways, therefore, continuing research to improve fall prevention measures will be beneficial to the geriatric population and the healthcare system. Further research in prevention measure efficacy in dementia-care populations would be a beneficial next step in fall prevention research.

Falls are a global public health issue, and it is most prevalent amongst elderly adults. Risk factors for falls include cognitive impairment and poor judgment, unstable gait, frailty, and the side effects of medications. The impact of falls on this vulnerable population leads to unwanted injuries, dependent on others for assistance, loss of mobility, hospitalizations, and unexpected death. Evidence shows that fall risk assessment tools are effective in identifying the elderly population at risk for falls and that implementing tailored fall prevention measures prevents falls and reduces fall events. Findings from this pilot project confirm this evidence in dementia-care populations. Educating nurses in fall prevention, instituting a fall risk assessment scale, and then implementing measures to prevent falls support fall rate reductions. Fall risk screening in dementia patients is an essential measure; it allows for the initiation of proactive fall prevention measures, which long term is likely to impact health outcomes and quality of life in this population.

References

Adom, D., Hussein, E.K., & Agyem, J.A. (2018). Theoretical and conceptual framework: Mandatory ingredients of a quality research. *International Journal of Scientific Research, 7*(1), 438-441.

Agency for Healthcare Research and Quality. (2013). Preventing falls in hospital. Tool 3H: Morse Fall Scale for identifying fall risk factors. Retrieved from https://www.ahrq.gov/professionals/systems/hospital/fallpxtoolkit/fallpxtk-tool3h.html

Arizona Healthy Aging Plan (2014-2018). A Framework to support healthy living and functional health for older Arizonan residents. Retrieved from https://www.azdhs.gov/documents/prevention/tobacco-chronic-disease/healthy-aging/reports-statistics/az-healthy-aging-plan-2014-2018.pdf

Baek, S., Piao, J., Jin, Y., & Lee, S.M. (2014), Validity of the Morse Fall Scale implemented in an electronic medical record system. *Journal of Clinical Nursing, 23*, 2434-2441. doi:10.1111/jocn.12359

Centers for Disease Control and Prevention. (2016). Falls are leading cause of injury and death in older Americans. Retrieved from https://www.cdc.gov/media/releases/2016/p0922-older-adult-falls.html

Dellinger A. (2017). Older adult falls: Effective approaches to prevention. *Current trauma reports, 3*(2), 118–123. https://doi.org/10.1007/s40719-017-0087-x

Dolatabadi, E., Ooteghem, K.V., & Taati, B. (2018). Quantitative mobility assessment for fall risk prediction in dementia: A systematic review. *Dementia and Geriatric Cognitive Disorders, 45*, 353-357. doi: 10.1159/000490850

Duong, S., Patel, T., & Chang, F. (2017). Dementia: What pharmacists need to know. *Canadian Pharmacists Journal: CPJ 150*(2), 118–129. https://doi.org/10.1177/1715163517690745

Dykes, P.C., Carroll. D., McColgan, K., Hurley, A.C., Lipsitz, S.R., Colombo, L.,…Middleton, B. (2011). Scales for assessing self-efficacy of nurses and assistants for preventing falls. *Journal of Advanced Nursing, 67*(2): 438–449. doi:10.1111/j.1365-2648.2010.05501.x.

Fahlstrom, G., Kamwendo, K., & Bodin, L. (2018). Fall prevention by nursing assistants among community-living Elderly people. A randomised controlled trial. *Scandinavian Journal of Caring Sciences, 32*, 575–585. doi: 10.1111/scs.12481

Fernando, E., Fraiser, M., Hendriksen, J., Kim, C.H., & Muir-Hunter, S.W. (2017). Risk factors associated with falls in older adults with dementia: A systemic review. *Physiotherapy Canada, 69*(2),161–170. doi:10.3138/ptc.2016-14

Fox, J. B., & Shaw, F. E. (2015). Clinical Preventive Services Coverage and the Affordable Care Act. *American journal of public health, 105*(1), e7–e10. https://doi.org/10.2105/AJPH.2014.302289

Guirguis-blake, J. M., Michael, Y. L., Perdue, L. A., Copolla E., & Beil, T.L. (2018). Interventions to prevent falls in older adults; updated evidence report and systematic review for the US preventive services task force. *Clinical Review & Education, US Preventative Services Task Force, 319*(16), 1705-1716. doi:10.1001/jama.2017.21962

Guse, C. E., Peterson, D. J., Christiansen, A. L., Mahoney, J., Purushottam, L., & Peter, M. (2015). Translating a fall prevention intervention into practice: A randomized community trial. *American Journal of Public health, 105*(7), 1475-1481. http://dx.doi.org.ezproxy1.lib.asu.edu/10.2105/AJPH.2014.302315

Huang, L., Turner, J., & Brandt, N.J. (2018). Interdisciplinary collaboration in medication-related falls prevention in older adults. *Journal of Gerontological Nursing, 44*(4), 11-15. https://doi-org.ezproxy1.lib.asu.edu/10.3928/00989134-20180313-04

Jansen, S., Schoe, J., Van Rijn, M., Abu-Hanna, A., Moll Van Charante, E.P., Van Der Velde, N., & De Rooij, S.E. (2015). Factors associated with recognition and prioritization for falling, and the effect on fall incidence in community dwelling older adults. *BMC Geriatrics, 15*(169). https://doi-org.ezproxy1.lib.asu.edu/10.1186/s12877-015-0165-2

Khoshnood, Z., Rayyani, M., & Tirgari, B. (2017). Theory analysis for Pender's health promotion (HPM) by Barnum's criteria: A critical perspective. *International Journal of Adolescent Medicine and Health,* 1-9. doi: 10.1515/ijamh-2017-0160

Kyrdalen, I.L., Thingstad, P., Sandvik, L., & Ormstad, H. (2018). Association between gait speed and well-known fall risk factors among community-dwelling older adults. *Physiotherapy and Occupational Therapy, Physiother Res Int, 24*:e1743. 1-6. https://doi.org/10.1002/pri.1743Copyright

Lee, S.H., & Kim, H.S. (2017). Exercise interventions for preventing falls among older people in care facilities: A meta-analysis. *Worldviews on Evidence-Based Nursing*, *14*(1), 74–80. doi 10.1111/wvn.12193

Luzia, M., Victor, M. A., & Lucena, A. (2014). Nursing diagnosis risk for falls: Prevalence and clinical profile of hospitalized patients. *Revista latino-americana de enfermagem*, *22*(2), 262-268. doi:10.1590/0104-1169.3250.2411

Manchikanti, L., Helm II, S., Benyamin, R.M., & Hirsch, J.A. (2017). Evolution of US health care reform. *Pain Physician, 20*(3), *107-110*

Melnyk, B.M., & Fineout-Overholt, E. (2015). *Evidence-based practice in nursing and healthcare: A guide to best practice* (3rd ed.). Lippincott, Williams and Wilkins.

Moncada, L.V.V., & Mire, L.G. (2017). Preventing falls in older adults. *American Family Physician, 96*(4), 240-247.

National Conference of State Legislatures. (2018). Elderly fall prevention legislation and statues. Retrieved http://www.ncsl.org/research/health/elderly-falls-prevention-legislation-and-statutes.aspx

Parkosewich, J. A. (2013). An infrastructure to advance the scholarly work of staff nurses. *The Yale Journal of Biology and Medicine, 86*(1), 63–77. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3584497/

Phelan, E. A., Aerts, S., Dowler, D., Eckstrom, E., & Casey, C. M. (2016). Adoption of Evidence-Based fall prevention practices in primary care for older adults with a history of falls. *Frontiers in public health, 4*, 1-9. doi:10.3389/fpubh.2016.00190

Rosswurm, M.A., and Larrabee, J.H. (1999). A model for change to evidence-based practice. *Journal of Nursing Scholarship 31(*4), 317-322 http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.473.8994&rep=rep1&type=pdf

Saccomano, S. J., & Ferrara, L. R. (2015). Fall prevention in older adults. *The Nurse Practitioner, 40*(6), 40-47. doi: 10.1097/01.NPR.0000465117.19783.ee.

Salb, J., Finlayson, J., Almutaseb, S., Scharfenberg, B., Becker, C., Sieber, C., & Freiberger, E. (2015). Test-retest reliability and agreement of physical fall risk assessment tools in adults with intellectual disabilities. *Journal of Intellectual Disability Research, 59*(12), 1121-1125. doi: 10.1111/jir.12216

Schoene, D., Heller, C., Aung, Y. N., Sieber, C. C., Kemmler, W., & Freiberger, E. (2019). A systematic review on the influence of fear of falling on quality of life in older people: is there a role for falls? *Clinical Interventions in Aging, 14*, 701–719.

Slade, S. C., Carey, D. L., Hill, A. M., & Morris, M. E. (2017). Effects of falls prevention interventions on falls outcomes for hospitalized adults: Protocol for a systematic review with meta-analysis. *BMJ open, 7*(11), 1-6. doi:10.1136/bmjopen-2017-017864

Walker, G.M., Armstrong S., Gordon, A.L., Gladman, J., Robertson, K., Ward, M.,…Logan, P.A (2015). The falls in care home study: A feasibility randomized controlled trial of the use of a risk assessment and decision support tool to prevent falls in care homes. *Clinical Rehabilitation, 30*(10) 972–983. doi: 10.1177/0269215515604672

Appendix A

Table 1

Evaluation of Quantitative Studies

Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/ Results	Level/Quality of Evidence; Decision for practice/ application to practice
Salb, J., Finlayson, J., Almutaseb, S., Scharfenberg, B., Becker, C., Sieber, C., & Freiberger, E (2015). Test-retest reliability and agreement of physical fall risk assessment tools in adults with intellectual disabilities **Country:** Germany **Funding:**	Health Promotion Model	**Quantitative** **Design** 3 year Exploratory Longitudinal Study Test-retest design **Method** Residents of a German residential facility for people with ID took part in the study	N=43 people based on inclusion criteria. **Demographics:** Older adults with ID living in Residential Facility **Total Drop out=6** **T1 drop out:** n=5(did not want to take part) n=1(hospital admission) **T2: No drop out** Mean Age =44yrs for 23-58yrs; 73 for 60-87yrs N=2 (Participants were tested twice)	**IV 1**- Fall risk assessment tools with adults with ID **IV 2** - Strength, Balance, and gait assessment tools **DV 1** - Strength, balance, and gait improvement **DV 2** – Decreased fall rates	SEM **Instrumentation:** TUG CST HG ROMB	Descriptive Statistics Statistical Package of Social Sciences (SPSS) software, version 22.0	**Results** ICC values >0.75 were considered excellent, 0.6–0.75 good, 0.4–0.59 moderate, and <0.4 poor Majority of participant (23. 62%) had mild to moderate ID P=<0.05 Strength, balance and gait assessment tools are reliable to use in people with ID	**LOE**=I **Strengths** The use of heterogeneous sample **Weakness:** The use of heterogeneity and the higher intersubject variance, due to the potential overestimation of the SEM values. **Feasibility** Strength, balance and gait assessment tools, were reliable for use with people with ID.

Study funded by Regens-Wagner-Stiftung Lauterhofen Materials were Funded by AOK Bayern **Bias**: None			n= 37 **Setting:** German Residential Facility				Good to excellent test–retest reliability completed with all participant with IDs living in a residential facility. Approved fall risk assessment tools are feasible and reliable in adults with ID living in a residential facility and even in those with more SP levels of ID.	The information in the article will be effective for fall reduction or prevention interventions for people with ID.
Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/ Results	Level/Quality of Evidence; Decision for practice/ application to practice
Phelan, E.A., Aerts, S., Dowler, D., & Eckstrom,	Health Promotion Model	Systematic Review **Design**	N=256 participants	**IV 1 –** Fall risk assessment and	**Measurement** TUG	Chi-square and independent-samples *t*-	Results were statistically significant at p=<0.05	**LOE**= Level I

Key: **DV**-dependent variable; **IV**- independent variable; **N**-Initial number of studies/Initial number of participants; **n**- Final number of participants. **ID** Intellectual Disability; **DSM -5** - Diagnostic and Statistical Manual of Mental Disorders; **SEM**-Standard error of the measurement; **NINCDS-ADRDA**-National Institute of Neurological and Communicative Disorders and Stroke–Alzheimer's Disease and Related Disorder Association criteria; **MDDAS**-Multi-Dimensional Dementia Assessment Scale; **TUG**-Timed up and go; **CST**-30 second Chair Stand Test; **HG**-Hand Grip; **ROMB**-Modified Romberg Balance Test; **T1**-First testing days; **T2**-Second testing days; **SP**-Severe/Profound; ICC-Intraclass Correlation Coefficients; **LOE**-Level of Evidence**; EHR**- Electronic Health Records; **TUG**-Timed up and go; **ED-** Emergency Department; **LOE**-Level of Evidence; **CD**-Community dwelling;; **MMSE**; Mini-Mental State Examination; **ACE-R**; Addenbrooke's Cognitive Examination Revised; **FES**-Fall Efficacy Scale; **SF-36**- Short Form 36 Health Survey; **CGA**-Comprehensive Geriatric Assessment; **BBS**- Berg Balance Score; **PPT**-Physical Performance Test; **POMA**-Performance Oriented Mobility Assessment; **GDS-15**-15 item Geriatric Depression Scale; **TMT-B**- Trail Making Test Part B; **NA**- Nursing Assistant; **LS-**Longitudinal Study; **CSCS**-Cross-Sectional Cohort Study

E., Case, C.M. (2016). Adoption of Evidence-Based fall prevention practices in primary care for older adults with a history of falls. **Country** United States of America **Funding** None **Bias** None		3-month time frame of primary care office visits was chosen for consistency Additionally, all primary care office visits from 4-12 months were also abstracted. **Method** EHR Abstraction method	256 participants fell during the study period, 140 were ineligible (99 patients had no clinic visit within 3 months after their fall, 4 were non-ambulatory, and 37 had documented dementia). n=116 68% were female, 10% were non-white 42 primary care providers included in the study 35 general internists, and 7 were geriatrics specialists General internist subgroup(n=86)	interventions abstracted from the EHR **IV 2 -** Primary care visits **IV 3 -** Comorbidities **DV 1-** Decreased fall rates **DV 2 -** Effective fall reduction through structured visit note template	Romberg Test Monofilament examination for feet/footwear assessment	tests were used Statistical Package of Social Sciences (SPSS) software, version 22.0	There may be ongoing opportunities aimed at improving the primary care of older adults with a history of falls. 249 falls were recorded in a 12-month abstraction period 186 (75%) reported during a primary care office visit 45 (18%) resulted in ED care 18 (7%) required hospitalization. 80% of patients had 1 or 2 falls, 16% had 3 to 6 falls, and 4% had	

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			Geriatric specialists(n=30) **Demographics:** 65-95-year-old outpatient. **Setting** outpatient primary care clinic **Exclusion** nearly half of the initial sample of patients with a fall				more than 10 falls.	**Strength** None mentioned **Weakness** Data were collected using medical record data on fall-risk factor assessment and management was not abstracted before the index fall, it was only abstracted after. n=116 convenience sample was generated using administrative data for probable falls Providers who were examined had a smaller practice

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								Findings may not be generalized to non-academic findings **Feasibility** EHR was effective in keeping track of fall rates. Structured visit notes template, home safety evaluations, STEADI program, and the evaluation of high-risk medications are ways to prevent and reduce falls. This will be beneficial for implementation of fall risk intervention while working on my project to implement plans

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								for fall prevention.
Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/ Results	Level/Quality of Evidence; Decision for practice/ application to practice
Fernando, E., Fraiser, M., Hendriksen, J., Kim, C.H., & Muir-Hunter, S.W. (2017). Risk factors associated with falls in older adults with dementia: A systemic review. **Country** Canada **Funding** **Bias** None	Health Promotion Model	**Design** A systematic review: prospective cohort study **Method** A detailed literature search, without language restriction was used and articles published between January	N=215 unique abstracts n=38 full-text articles retrieved for eligibility and kept for detailed analysis **Electronic database search** is N=130(CINAHL 30; PubMed 48; EMBASE 43; PsychINFO 9) Additional records identified through other sources is N=250	**IV 1** – Risk factors **DV 1**- Falls	**Instruments** Downs and Black Scale Tooth Scale MMSE ACE–R DSM-5 MDDAS NINCDS-ADRDA	Cochran's X^2 test for homogeneity All studies used multi-variable regression analysis to identify and quantify the magnitude of the association between risk factors and falls.	By using the tooth Scale, the average quality of reporting score was 19.4 (range 13–27) which indicated fair to good reporting. Regardless of gender, ambulation with mobility aid was associated with an increased fall risk, with a summary risk estimate of OR=2.4343 (95% CI: 1.43, 4.14; χ^2_1=10.71, p=0.001; I^2=0.0 %)	**LOE=** Level I **Strengths** Four electronic databases were searched Broad search strategy, including all types of dementia, allowed the authors to provide large numbers of articles that contributed to the synthesis of information. Rigorous inclusion criteria

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		1, 1988, and October 16, 2014, were identified A hand searched bibliographic references was performed in the extracted articles and existing reviews to identify any studies not captured in the electronic searches.	**Demographics** participants in the studies were aged 55 years or older with dementia **Setting** Long term care facility/Residential facility Outpatient Primary Care Clinic **Inclusion** Qualitative and Quantitative syntheses are N=17 **Exclusion** N=177				In five of the studies it weren't clear which variables were entered in the regression analysis Some studies had specific priority risk factors of interest, which had been analyzed with a confounding control Others used the statistical significance of falls in univariate analysis to determine which variables would be evaluated in multi-variable regression.	ensured the risk estimates were reported and adjusted for confounding variables to reduce possible false/fake associations **Weaknesses** Several articles were identified, and they presented only adjusted risk estimates that were statistically significant Sometimes, the authors did not report which variables were used in the final adjusted analysis to at

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							Various intrinsic and extrinsic factors contributed to the fall risk in people with dementia, although the evidence for several standard fall risk factors, such as age and gender, are conflicting.	least identify insignificant factors. A couple of summary risk estimates were calculated from the available data **Feasibility** The information in this article emphasized the importance of considering different factors when assessing patients for falls. This will be beneficial in my project because it is important to consider the intrinsic and extrinsic factors of falls while implementing a fall risk assessment tool.

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Walker, G.M., Armstrong S., Gordon, A.L., Gladman, J., Robertson, K., Ward, M.,…Logan, P.A (2015). The falls in care home study: A feasibility randomized controlled trial of the use of a risk assessment and decision support tool to prevent falls in care homes.	Health Promotion Model	Randomized Control Trial **Method** Two-center, cluster feasibility randomized controlled trial, and process evaluation.	**Sample** N= 198 Residents in six care homes, 63(32%) screened for eligibility n= 52(82%) participated **Demographics** Residents over 50years, fallen at least once in the past year and not bed-bound, hoist-dependent or terminally ill **Setting** Long stay care homes	**IV 1** - Fall prevention intervention training **IV 2** – The Guide to Action Care Homes fall risk factor checklist **IV 3** – Standard/Usual Care **DV 1** – Decrease in fall rate	Guide to Action Care Home Barthel Index	Counts and proportions were calculated for categorical variables Descriptive statistics were calculated for continuous variables. Statistical analysis includes, the difference in means/medians 95% confidence intervals	145 homes contacted by post, 22 (15%) expressed an interest in taking part Additional 59 (48%) homes indicated by telephone that they would have shown interest if they were initially contacted by telephone Adherence to the Guide to Action Care Home program was difficult in the home for people with learning disabilities	**LOE=** Level I **Strength** Attrition and missing data rates, which were lower than other published research performed in care home settings **Weakness** The number of institutional variables that might influence the success of a subsequent randomized controlled trial may have been

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Country United Kingdom **Funding** National Institute of Health Research (NIHR) Research for Patient Benefit grant funding stream The Collaboration for Leadership in Applied Health Research and Care East Midlands (CLAHRC EM)) **Bias** None			**Exclusion** 146 participants Intervention group (n= 3) received the Guide to Action Care Home intervention training Controlled group (n=3) **Attrition** Data could not be determined from 10/52 (19%) participants at six months: seven had died and three had moved outside the region			pretest/posttest Within and between group comparisons.	The Guide to Action Care Home is implementable under trial conditions. Recruitment and follow-up rates indicate that a definitive trial can be completed. Falls (primary outcome) can be ascertained reliably from care records.	missed due to the small number of homes recruited Less than our expected resident participant sample size (76%) were recruited, but the participants had higher falls rate **Feasibility** This will be feasible for the project. Keeping records of the numbers of falls in a week, month, and/or year will provide accurate information in analyzing the validity of the fall assessment tools that will be implemented for

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								fall prevention and reduction of fall rates.
Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/ Results	Level/Quality of Evidence; Decision for practice/ application to practice
Fahlstrom, G., Kamwendo, K., Bodin, L. (2018). Fall prevention by nursing assistants among community-living elderly people. A randomized controlled trial. **Country** Sweden **Funding**	Health Promotion Model	A randomized control trial from 2007-2009	**Sample** N=214 n=148(72 Controlled group; 76 intervention group) **Demographics** Community-living persons 65 years or older have experienced at least one fall during the last 12 months **Setting** Participants' homes **Inclusion**	**IV 1** – Exercise program/Daily Physical exercise **IV 2** - PT assessment and data collection in participants' homes **IV 3** - Daily physical exercise including walks **DV 1 -** Individually designed program	**Instruments** FES SF-36 Berg Balance Scale TUG CST	Descriptive and analytic statistics A multilevel Poisson regression model chi-square tests for group comparison Fisher's exact test in the case of rare outcomes Statistical Package for Social Science	P=<0.05 To summarize variables, Mean values with standard deviation and proportion of individuals were used. 214 elderly persons were assessed for eligibility, 69% were enrolled in the study resulting in inadequate statistical power.	**LOE=** Level I **Strength** None **Weaknesses** Assessors were not blinded to participants allocation **Feasibility** Utilizing NAs in a fall prevention program like the one in the study will be beneficial in this program. Older adults with dementia require assistance due to

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The Swedish Research Council The National Board of Health and Welfare, Sweden The County Council of Orebro, Sweden. **Bias** None			Community living persons 65 years or older(65years-94years) Able to walk independently with or without walking device(s) Experienced at least one fall during the last 12 months; and Able to communicate and cooperate. **Exclusion** N=45 (n=43 refused; n=2 did not meet the criteria) Ongoing physiotherapy treatment	supported by NA		(SPSS) version 20.0 STATA version 12	64 staff from three professional groups in care of elderly participated in the study. 27 nursing assistants (NA) and 17 occupational therapists (OT) worked for social services and 20 physiotherapists (PT) worked in primary health care. A home-based 5-month intervention with individually designed exercise program, which is supervised by trained NAs, failed in preventing falls in elderly persons	their cognitive impairments, so the help of care staff will be efficient in reducing fall rates.

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			Ongoing participation in exercise or activity including balance and strength enhancing components A diagnosis of dementia A mental disorder that affects the ability to communicate and/or cooperate Other medical reason making study participation inappropriate				who have history of falling.	
Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/ Results	Level/Quality of Evidence; Decision for practice/ application to practice

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Guse, C.E., Peterson, D.J., Christiansen, A.L., Mahoney, J., Purushottam, L., & Peter, M. (2015). Translating a fall prevention intervention into practice: A randomized community trial. **Country** United States of America **Funding** By the State of Wisconsin **Bias** None	Health Promotion Model	**Method** Longitudinal Study	**Sample** N=24 n=20 **Demographics** Adults aged 65 years and older **Setting** 10 controlled communities, 5 standard support communities, and 5 enhanced support communities **Exclusion** n=4 (n=2 not meeting inclusion criteria, n=2 nit selected in randomization process) Deaths and admissions from acute care facilities	**IV 1 -** Stepping On fall prevention program **IV 2** - 5 standard support communities receiving modest funding to implement 5 enhanced support communities receiving funding and technical support. **DV**- Significant population-level reduction in discharges for fall injuries	**Instruments** The Stepping On program	A mixed-effects Poisson regression model was used	Standard and enhanced support communities showed a significant higher community wide reduction in fall injuries 9% reductions in fall injuries for standard support arm 8% reductions in fall injuries for enhanced support system arm Standard and enhanced support system arms showed a significant reduction in inpatient and emergency department discharges for falls compared with the control arm	**LOE=** Level II **Strength** None **Weaknesses** Stepping On was not originally intended as a population-based approach to reducing inpatient and emergency department fall injury discharges. A limited number of older adults in each community (< 20%) participated in the workshops. The effect of the program was diluted by older adults who did not participate.

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				requiring hospitalization			No significant difference was found between the enhanced support system and the standard support arms.	Challenges bringing key stakeholders together to form a coalition, Staff turnover competing for priorities Varying levels of commitment to the program by agencies and staff. **Feasibility** The information in the study will be beneficial to reduce the rates of falls among older adults who are 65 years and older.
Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/ Results	Level/Quality of Evidence; Decision for practice/

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								application to practice
Jansen, S., Schoe, J., Van Rijn, M., Abu-Hanna, A., Moll Van Charante, E.P., Van Der Velde, N., De Rooij, S.E. (2015). Factors associated with recognition and prioritization for falling, and the effect on fall incidence in community dwelling older adults **Country** Netherlands **Funding**	Health Promotion Model	Cluster Randomized Control Trial **Purpose** The effect of preventive interventions for geriatric problems in older community-dwellers at risk of functional decline.	N=10670 n=6668 n=3430 for intervention group n= 3238 for controlled group **Demographics** Participants were community dwellers, 70years and older, in whom falling was identified as a condition. **Setting** General practices in the Netherlands. **Inclusion** Participants were eligible if they were at risk of functional decline and thus underwent	**IV**-A comprehensive geriatric assessment (CGA) performed by a registered community care nurse. **DV**-Identification of community-dwelling that benefited from fall-preventive interventions.	Comprehensive Geriatric Assessment (CGA)	Conventional statistics were used to compare differences from both group Categorical variables compared using Chi-squared tests. Independent sample was used for continuous variables T-tests and Mann–Whitney-U tests Statistical package for the social sciences (SPSS)	Among 380 participants (41 % of those at risk of functional decline), falling was identified as a condition 16 % ($n = 62$) patients recognized the risk 10 % ($n = 37$) of participants prioritized for treatment and/or prevention for falling 78 % ($n = 29$) received an intervention for falling.	**LOE=** Level I **Strength** **Weaknesses** The number of participants that recognized and prioritized for falls as a problem was small, and it resulted in a small sample available for the current analyses. Information on falls was collected retrospectively at six-month intervals, which is likely to have resulted in underreport **Feasibility** The study was aimed at fall prevention

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The study is funded by the Netherlands Organization for Health Research and development **Bias** None			comprehensive geriatric assessment **Exclusion** There was loss of participants in the intervention group arm due to postponed inform consent procedure			computer software for statistical analyses		interventions, and this is going to be effective in the project because the goal is to decrease fall rates and prevent falls.
Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/ Results	Level/Quality of Evidence; Decision for practice/ application to practice
Lee, S.H., & Kim, H.S. (2017.). Exercise interventions for preventing falls among older people in care facilities: A	Health Promotion Model	A meta-analysis of a randomized control trial **Purpose** To evaluate the effectiveness of exercise interventions on the	N=21 studies from eight databases (Ovid-Medline, Embase, CINAHL, Cochrane Library, KoreaMed, KMbase, KISS, and KisTi).	**IV** - Preventive interventions for falling, derived from the toolkit fall and fracture risk **DV** - Fall prevention	No instruments were used for measurements Balance and strength training were the common exercise intervention	Statistical analyses were performed using SPSS (version 20) Review Manager, v. 5.3 two-tailed tests of	Meta-analysis showed that exercise had a preventive effect on the rate of falls (risk ratio [RR] 0.81, 95% CI 0.68–0.97). There was a stronger effect when exercise was combined	**LOE=** Level I **Strength** Exercise intervention effectively reduce falls **Weaknesses** Inability to avoid the

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meta-analysis **Country** Korea **Funding** **Bias** The quality of the studies was independently assessed by using the Cochrane risk of bias (RoB) for randomized controlled trials. 5 studies had the potential risk of bias		rates of falls and the number of fallers in care facilities. **Method** Literature from different databases	n=5540 participants **Demographics** older people over 65 years living in care facilities **Settings** Care facilities **Inclusion** All studies that were randomized trials including quasi-randomized trials Participants living in care facilities older than 65 years Exercise interventions designed to reduce falls compared with any other intervention, usual care, or placebo			significance ($p < .05$). Dichotomous variables were pooled using relative risk (RR) Continuous variables were pooled using mean difference (MD). Cochrane Q and *I*2 statistics for evaluation of statistical heterogeneity fixed effects model was used for studies with low or moderate statistical heterogeneity (*I*2 <	with other fall interventions on the rate of falls (RR 0.61, 95% CI 0.52– 0.72) and the numbers of fallers (RR 0.85, 95% CI 0.77–0.95).	methodological limitations inherent to meta-analyses There were limitations in heterogeneousness regarding the amount and intensity of exercise, sample size, gender, participant condition, level of care facilities, indicating cautious interpretation pf the results Inability to access participants data, and the effects of exercise interventions on individual participants could not be estimated because of this

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			Rates of falls, or number of participants sustaining at least one fall during follow-up Care facilities which include assisted living, nursing home, skilled nursing facility, long-term facility. **Exclusion** Studies that were not original Preclinical studies Studies not written in English or Korean Studies that lacked a placebo or controlled group			25, 25–50%) A random effects model was used for studies with high statistical heterogeneity ($I2$ >50%).		**Feasibility** The limitations in the study made the feasibility questionable, but because the study addressed fall prevention it might be beneficial in reducing fall rate and preventing falls.

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			Studies that recruited participants from the community, hospital, home, or clinic.					
Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/ Results	Level/Quality of Evidence; Decision for practice/ application to practice
Dolatabadi, E., Ooteghem, K.V., & Taati, B. (2018). Quantitative mobility assessment for fall risk prediction in dementia: A systematic review **Country** Canada **Funding**	Health Promotion Model	**Design** Cross sectional **Method** Literature search from different databases	N=3081 (Identified through database searching n=61 (articles selected for full-text review) **Demographics** Older adults with mild to moderate dementia **Setting** Long Term Care **Inclusion**	**IV** – Assessment of gait and balance as predictors of falls among older adults with dementia **DV** - Older adults with dementia.	TUG BBS 6 minutes-walk Tandem gait Romberg Test Functional reach Grip strength 4 step-balance	None	It is important to understand the relationship between gait, balance, and fall risks Individuals with dementia have a high risk for fall	**LOE=** I **Strength** **Weaknesses** Many of the studies were cross-sectional Involved short follow-up after a single assessment Heterogeneity of the disease, its progressive and deteriorating course affected the ability of the single cross-sectional

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Partially funded by the Alzheimer's Association, Brain Canada, and AGE-WELL Canada's technology and aging network **Bias** None			**Exclusion**					assessment to identify those most at risk of falling. Statistical analysis for identifying fall predictors in humans raises concerns because human movement episodes exhibit inter-trial, temporal dependency as well as intra-trial correlation. **Feasibility** This study has information that will be beneficial in preventing falls among older adults with dementia. Assessment of gait and balance is important when ruling out

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								the possible causes of falls.
Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/ Results	Level/Quality of Evidence; Decision for practice/ application to practice
Kyrdalen, I.L., Thingstad, P., Sandvik, L., & Ormstad, H. (2018). Association between gait speed and well-known fall risk factors among community-dwelling older adults. **Country** Norway **Funding**	Health Promotion Model	**Method** Cross-sectional cohort study	N=108 people n=93 women and 64 men **Demographics** Older adults **Setting** Community, Municipality of Sande	IV – Gait speed measured over short distance DV- gait speed with cut-off 1.0 m/s a useful tool for identifying individuals who could benefit from fall-preventive exercise.	GDS-15 TMT-B Self-reported standardized questionnaire	SPSS (version 22 Chi-square test Logistic regression analysis	Statistical significance of $p<0.05$ The gait speed was 0.98 ± 0.28 m/s for women and 1.01 ± 0.25 m/s for men ($p= 0.162$). The nonlinear relationship between fall risk and gait speed findings indicate a gait-speed cut-off of 1.0 m/s captures several additional risk	**LOE=**Level I **Strength** None **Weaknesses** Small sample resulting in low statistical power The cross-sectional study did not provide information on how well gait speed predicts information **Feasibility** This study will be beneficial for

Key: **DV**-dependent variable; **IV**- independent variable; **N**-Initial number of studies/Initial number of participants; **n**- Final number of participants. **ID** Intellectual Disability; **DSM -5** - Diagnostic and Statistical Manual of Mental Disorders; **SEM**-Standard error of the measurement; **NINCDS-ADRDA**-National Institute of Neurological and Communicative Disorders and Stroke–Alzheimer's Disease and Related Disorder Association criteria; **MDDAS**-Multi-Dimensional Dementia Assessment Scale; **TUG**-Timed up and go; **CST**-30 second Chair Stand Test; **HG**-Hand Grip; **ROMB**-Modified Romberg Balance Test; **T1**-First testing days; **T2**-Second testing days; **SP**-Severe/Profound; ICC-Intraclass Correlation Coefficients; **LOE**-Level of Evidence**; EHR**- Electronic Health Records; **TUG**-Timed up and go; **ED-** Emergency Department; **LOE**-Level of Evidence; **CD**-Community dwelling;; **MMSE**; Mini-Mental State Examination; **ACE-R**; Addenbrooke's Cognitive Examination Revised; **FES**-Fall Efficacy Scale; **SF-36**- Short Form 36 Health Survey; **CGA**-Comprehensive Geriatric Assessment; **BBS**- Berg Balance Score; **PPT**-Physical Performance Test; **POMA**-Performance Oriented Mobility Assessment; **GDS-15**-15 item Geriatric Depression Scale; **TMT-B**- Trail Making Test Part B; **NA**- Nursing Assistant; **LS-**Longitudinal Study; **CSCS**-Cross-Sectional Cohort Study

None **Bias** None							factors for falls among community-dwelling elderly Findings could represent a useful tool for identifying vulnerable individuals who are not disabled and could benefit from exercise interventions aimed at preventing falls.	the project because it emphasizes fall prevention.

Key: **DV**-dependent variable; **IV**- independent variable; **N**-Initial number of studies/Initial number of participants; **n**- Final number of participants. **ID** Intellectual Disability; **DSM -5** - Diagnostic and Statistical Manual of Mental Disorders; **SEM**-Standard error of the measurement; **NINCDS-ADRDA**-National Institute of Neurological and Communicative Disorders and Stroke–Alzheimer's Disease and Related Disorder Association criteria; **MDDAS**-Multi-Dimensional Dementia Assessment Scale; **TUG**-Timed up and go; **CST**-30 second Chair Stand Test; **HG**-Hand Grip; **ROMB**-Modified Romberg Balance Test; **T1**-First testing days; **T2**-Second testing days; **SP**-Severe/Profound; ICC-Intraclass Correlation Coefficients; **LOE**-Level of Evidence**; EHR**- Electronic Health Records; **TUG**-Timed up and go; **ED-** Emergency Department; **LOE**-Level of Evidence; **CD**-Community dwelling;; **MMSE**; Mini-Mental State Examination; **ACE-R**; Addenbrooke's Cognitive Examination Revised; **FES**-Fall Efficacy Scale; **SF-36**- Short Form 36 Health Survey; **CGA**-Comprehensive Geriatric Assessment; **BBS**- Berg Balance Score; **PPT**-Physical Performance Test; **POMA**-Performance Oriented Mobility Assessment; **GDS-15**-15 item Geriatric Depression Scale; **TMT-B**- Trail Making Test Part B; **NA**- Nursing Assistant; **LS-**Longitudinal Study; **CSCS**-Cross-Sectional Cohort Study

Appendix B

Table 2

Synthesis Table

Author	Salb et.al.	Phelan et. al.	Fernando et. al.	Walker et al.	Fahlstrom et. al.	Guse et. al	Janse et. al.	Lee et. al.	Dolatabi et al.	Kyrdalen et. al.
Year	2015	2016	2017	2015	2018	2015	2015	2014	2018	2018
Country	Germany	USA	Canada	UK	Sweden	USA	Netherlands	Korea	Canada	Norway
Design/LOE	ESL/I	SR/I	SR/I	RCT/I	RCT/I	LS/II	RCT/I	RCT II	SR/I	CSCH/I
Sample size/# of Studies included	37	116	38 articles	52	72 -CG, 76 – IG	20	6668	21 studies, 5540 participants	61 articles; 20-358 participants	108
			Study Characteristics							
Demographics										
Age(mean)	59.3	79	55 years	83	81- CG, 82- IG	65 years	70 years	65 years		
% Male	9									
% Female	28	68		67			78.4% PF, 69.7% NPF			59.2%
Dementia/Intellectual disabilities	X		X						X	
Setting										
Outpatient Primary Care Clinic		X								
Long Term Care facility	X			X				X	X	

Key: **DV**-dependent variable; **IV**- independent variable; **N**-Initial number of studies/Initial number of participants; **n**- Final number of participants. **ID** Intellectual Disability; **DSM -5** - Diagnostic and Statistical Manual of Mental Disorders; **SEM**-Standard error of the measurement; **NINCDS-ADRDA**-National Institute of Neurological and Communicative Disorders and Stroke–Alzheimer's Disease and Related Disorder Association criteria; **MDDAS**-Multi-Dimensional Dementia Assessment Scale; **TUG**-Timed up and go; **CST**-30 second Chair Stand Test; **HG**-Hand Grip; **ROMB**-Modified Romberg Balance Test; **T1**-First testing days; **T2**-Second testing days; **SP**-Severe/Profound; ICC-Intraclass Correlation Coefficients; **LOE**-Level of Evidence**; EHR**- Electronic Health Records; **TUG**-Timed up and go; **ED-** Emergency Department; **LOE**-Level of Evidence; **CD**-Community dwelling;; **MMSE**; Mini-Mental State Examination; **ACE-R**; Addenbrooke's Cognitive Examination Revised; **FES**-Fall Efficacy Scale; **SF-36**- Short Form 36 Health Survey; **CGA**-Comprehensive Geriatric Assessment; **BBS**- Berg Balance Score; **PPT**-Physical Performance Test; **POMA**-Performance Oriented Mobility Assessment; **GDS-15**-15 item Geriatric Depression Scale; **TMT-B**- Trail Making Test Part B; **NA**- Nursing Assistant; **LS**-Longitudinal Study; **CSCS**-Cross-Sectional Cohort Study

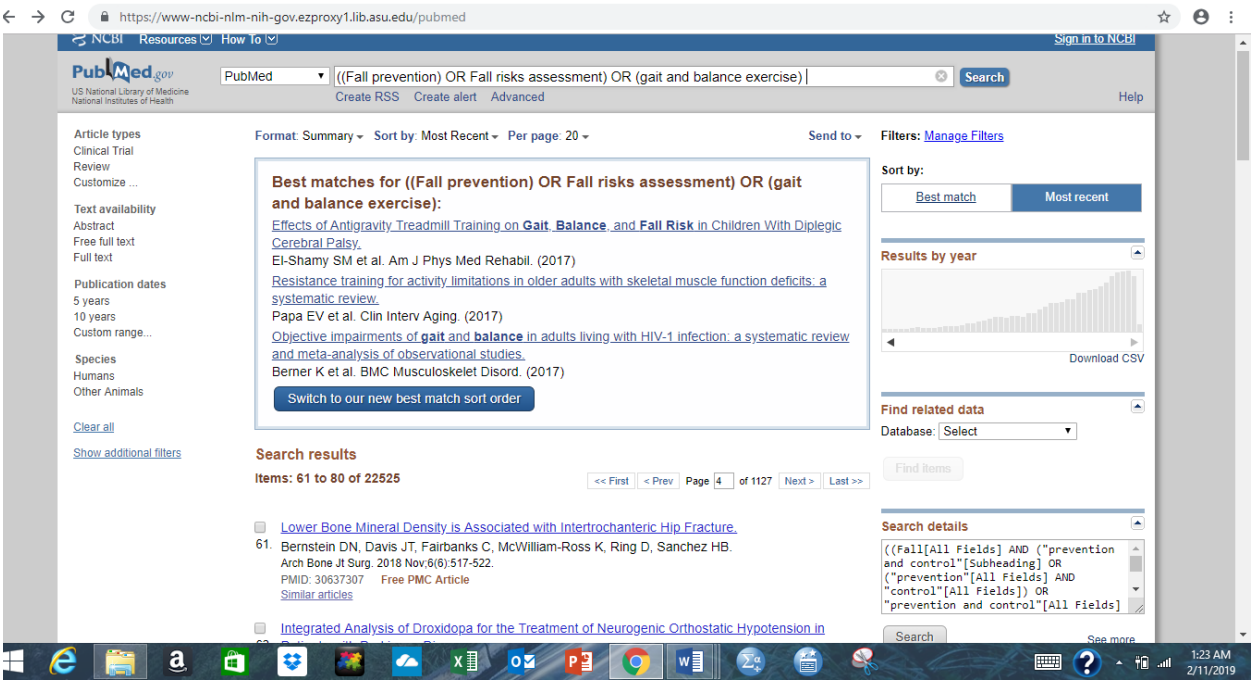
Community Dwellers					X	X	X		X	X
Measurements Tools	TUG, CST, HG, ROMB	TUG, Romberg Test, Monofilament examination for feet/foot wear	Downs and Black Scale, Tooth Scale, MMSE, ACE–R. DSM-5, MDDAS, NINCDS-ADRDA	Guide to Action Care Home Reference Manual, Barthel Index	FES, SF-36 Berg Balance Scale, TUG, CST	Stepping On Program	CGA	None	TUG, BBS, 6 minutes-walk, Tandem gait, Romberg Test, Functional reach, grip strength,4 step-balance	GDS-15, TMT-B, Self-reported standardized questionnaire
Interventions										
Fall prevention		X		X		X		X	X	
Standard Care				X		X				
Exercise Program				X	X					X
Assessment/Fall risk assessment tools	X				X		X			
Outcomes										
Gait improvement	X									
Fall prevention Interventions	X	X	X	X		X	X	X	X	X
Findings										
Significant	X	X		X		X	X	X	X	X
Non-Significant			X		X					

Key: **DV**-dependent variable; **IV**- independent variable; **N**-Initial number of studies/Initial number of participants; **n**- Final number of participants. **ID** Intellectual Disability; **DSM -5** - Diagnostic and Statistical Manual of Mental Disorders; **SEM**-Standard error of the measurement; **NINCDS-ADRDA**-National Institute of Neurological and Communicative Disorders and Stroke–Alzheimer's Disease and Related Disorder Association criteria; **MDDAS**-Multi-Dimensional Dementia Assessment Scale; **TUG**-Timed up and go; **CST**-30 second Chair Stand Test; **HG**-Hand Grip; **ROMB**-Modified Romberg Balance Test; **T1**-First testing days; **T2**-Second testing days; **SP**-Severe/Profound; ICC-Intraclass Correlation Coefficients; **LOE**-Level of Evidence**; EHR**- Electronic Health Records; **TUG**-Timed up and go; **ED-** Emergency Department; **LOE**-Level of Evidence; **CD**-Community dwelling;; **MMSE**; Mini-Mental State Examination; **ACE-R**; Addenbrooke's Cognitive Examination Revised; **FES**-Fall Efficacy Scale; **SF-36**- Short Form 36 Health Survey; **CGA**-Comprehensive Geriatric Assessment; **BBS**- Berg Balance Score; **PPT**-Physical Performance Test; **POMA**-Performance Oriented Mobility Assessment; **GDS-15**-15 item Geriatric Depression Scale; **TMT-B**- Trail Making Test Part B; **NA**- Nursing Assistant; **LS**-Longitudinal Study; **CSCS**-Cross-Sectional Cohort Study

Appendix C

Search Strategy 1

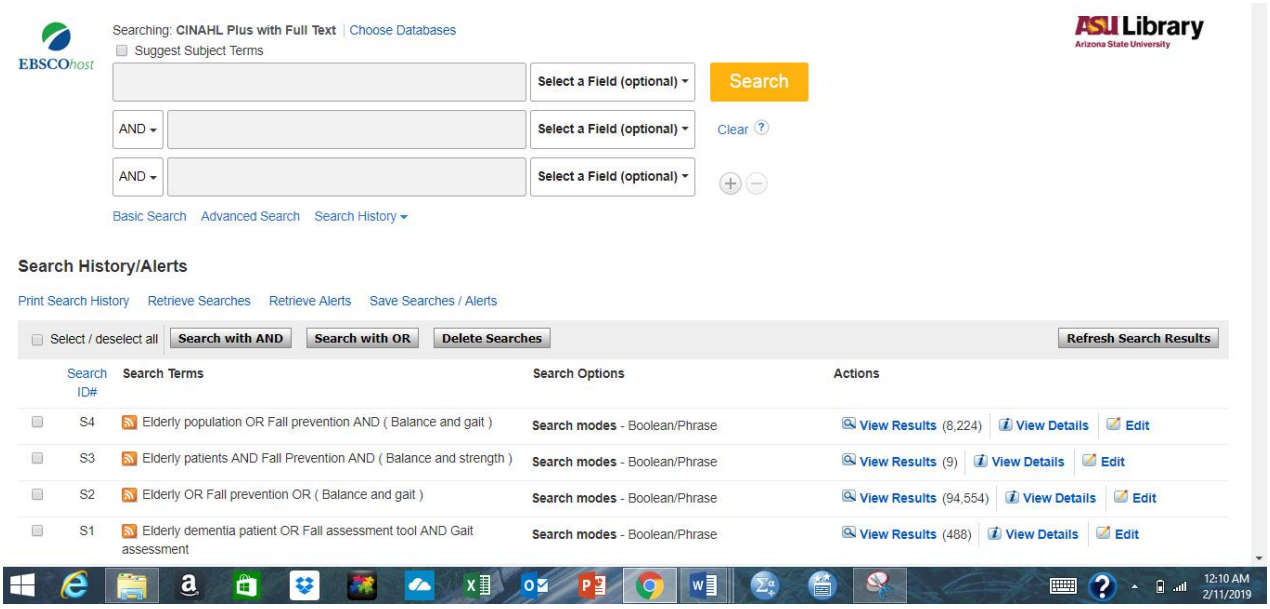
PubMed



Appendix D

Search Strategy 2

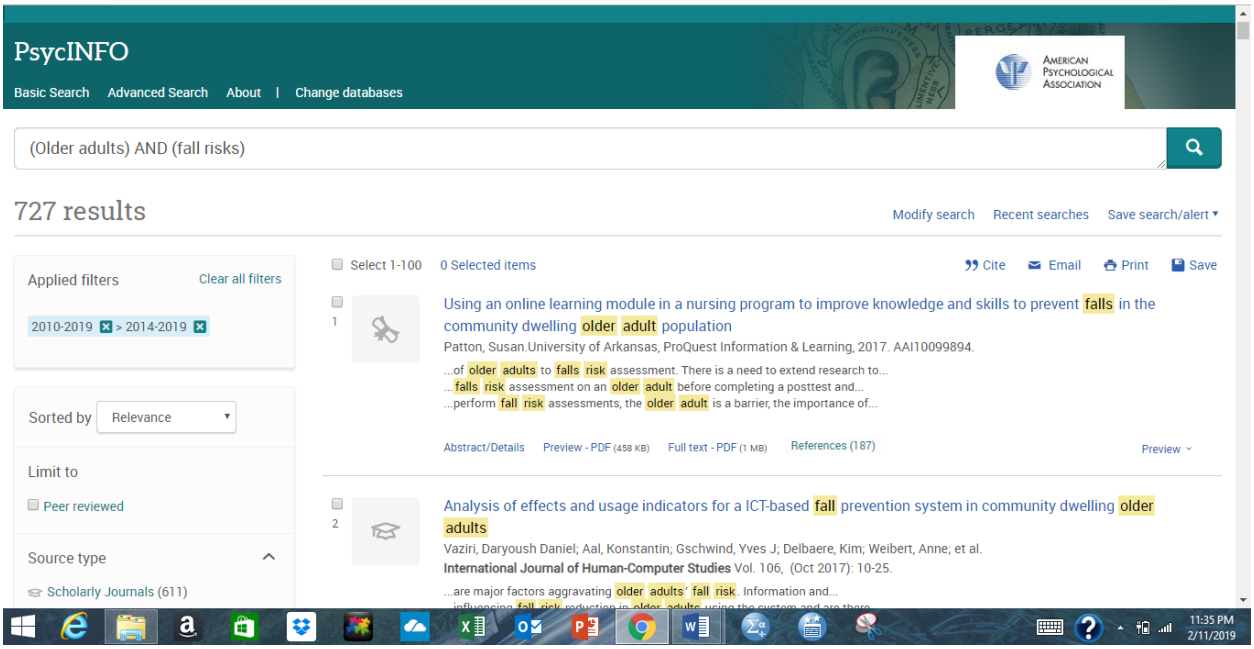
CINAHL



Appendix E

Search Strategy 3

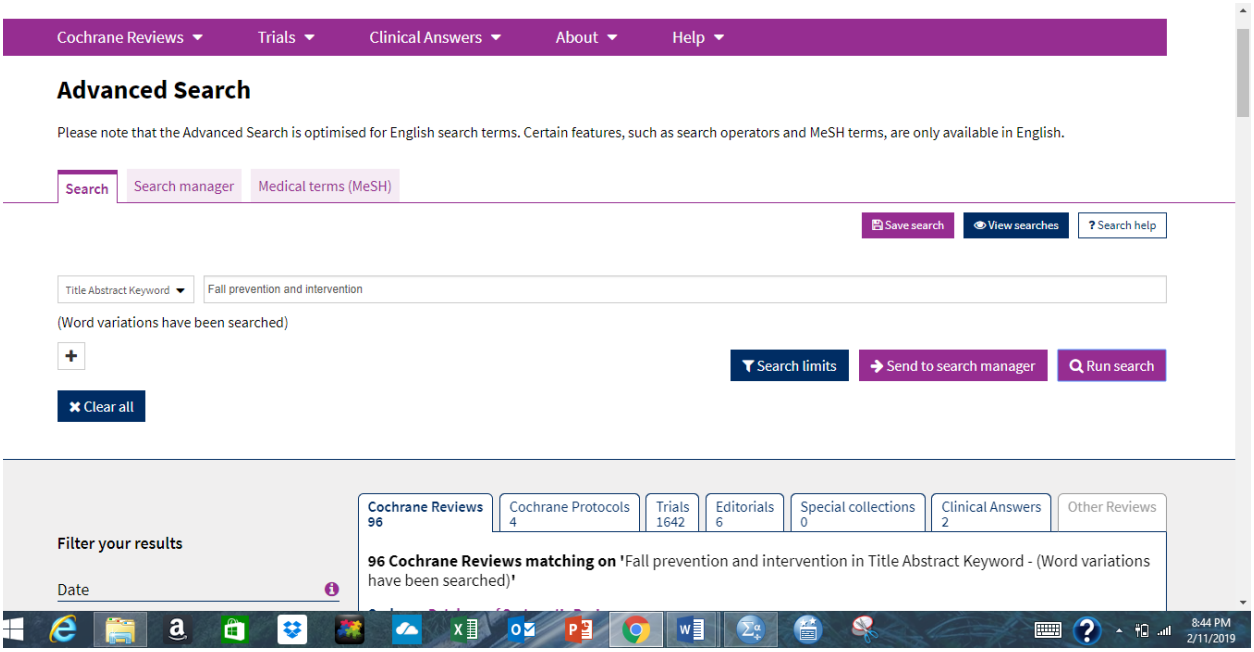
PsycINFO



Appendix F

Search Strategy 4

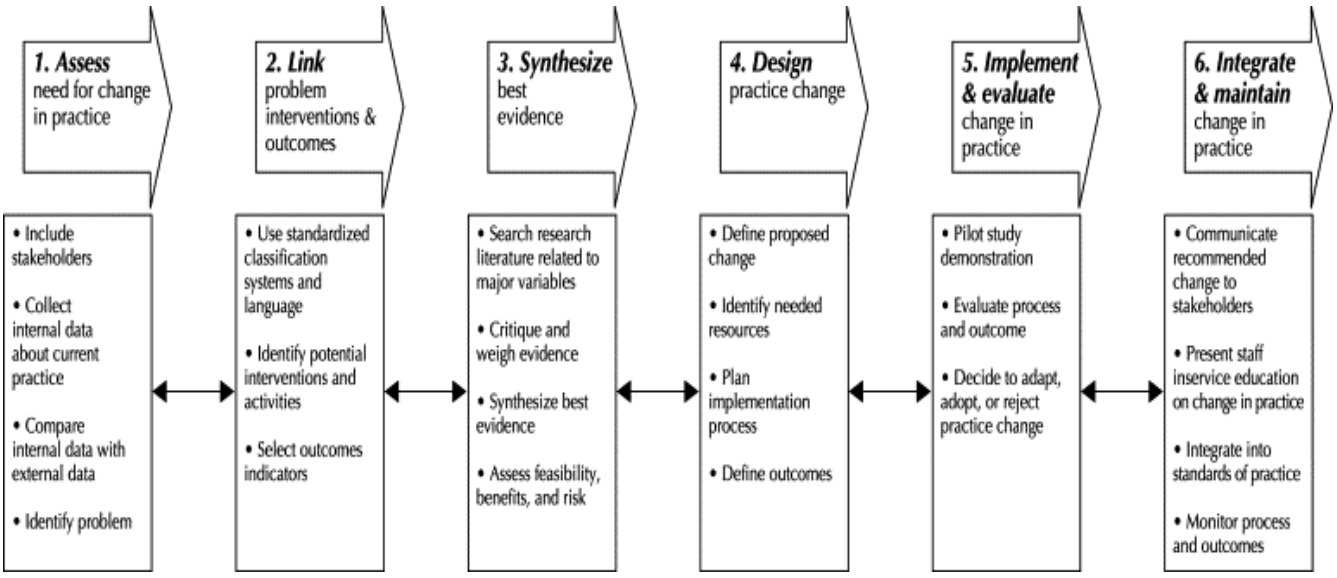
Cochrane



Appendix G

Evidence Based Practice Model

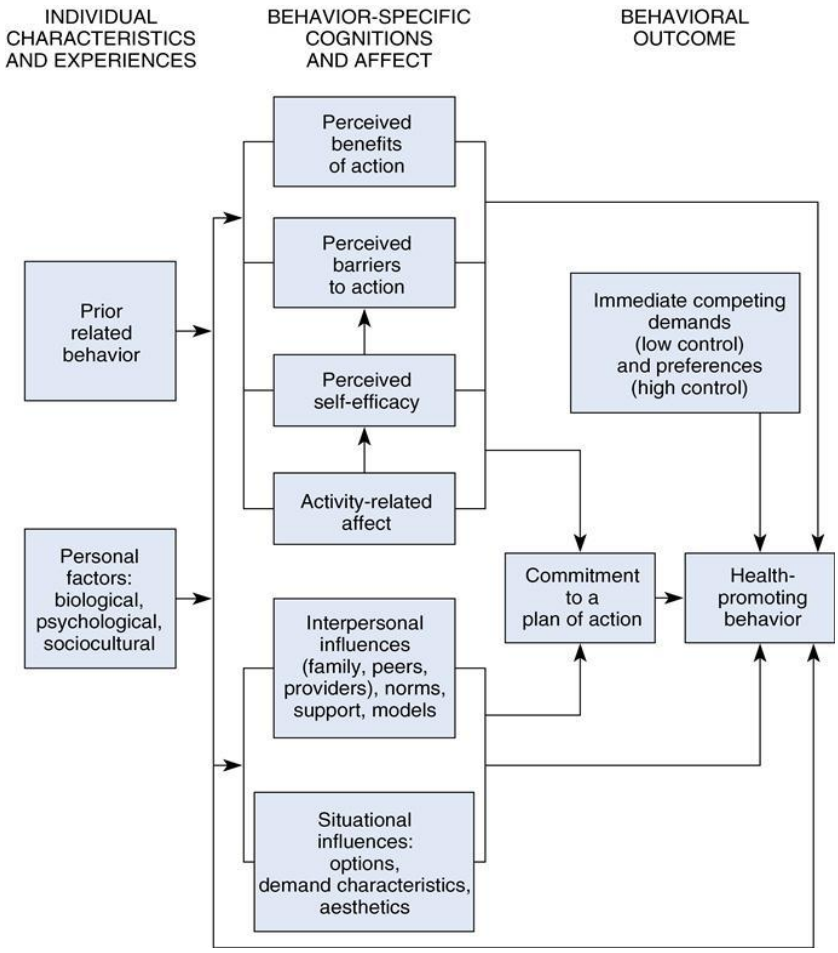
Model for Evidence-Based Practice Change (Rosswurm & Larrabee, 1999)



Appendix H

Theoretical Framework

Pender's Health Promotion Model (Khoshnood et al., 2017)



Appendix I

Budget

PHASE	ACTIVITIES	COST	DIRECT OR IDIRECT COST	NOTES
Preparation	Stakeholder's meeting	$0.00	Direct cost	Notes by DNP student regarding project
	Evaluation of evidence for presentation of DNP project	$0.00	Indirect cost	PowerPoints of DNP project
	Printing of assessment tool/handouts	$0.00	Indirect cost	Utilization of project sites printer
	Self-education of DNP student on how to use the fall assessment tool	$0.00	Direct cost	YouTube videos and links
	Binder to hold all DNP project	$20	Direct cost	Walmart
Delivery	Present information on fall to staff of the project site on how to use the assessment tool	$0.00	Direct cost	Time provided by DNP student, printouts of handouts from site facility
	Presentation on DNP project topic	$0.00	Direct cost	PowerPoints of DNP project
	Refreshments for staff after presentation	$100	Direct cost	Time and financial resources volunteered by project site
	Project poster for DNP project	$100	Direct cost	DNP student out of pocket cost
Funding	DNP student's time	$0.00	Indirect cost	Hours spent to prepare for presentation
	Donation by project site	$0.00	Indirect cost	Printouts of handouts
Potential Revenue/Cost Savings	Invitation of a nurse educator to present on elderly fall prevention	$100 if educator is local $500 for out of state accommodations	Direct cost Direct cost	Receipts of payments Receipts of payments

Appendix J

Morse Fall Scale (AHRQ, 2013)

Morse Fall Scale

Item	Item Score	Patient Score
1. History of falling (immediate or previous)	No 0 Yes 25	_____
2. Secondary diagnosis (≥ 2 medical diagnoses in chart)	No 0 Yes 15	_____
3. Ambulatory aid None/bedrest/nurse assist Crutches/cane/walker Furniture	 0 15 30	_____
4. Intravenous therapy/heparin lock	No 0 Yes 20	_____
5. Gait Normal/bedrest/wheelchair Weak* Impaired†	 0 10 20	_____
6. Mental status Oriented to own ability Overestimates/forgets limitations	 0 15	_____
Total Score‡: Tally the patient score and record. <25: Low risk 25-45: Moderate risk >45: High risk		_____

* Weak gait: Short steps (may shuffle), stooped but able to lift head while walking, may seek support from furniture while walking, but with light touch (for reassurance).

† Impaired gait: Short steps with shuffle; may have difficulty arising from chair; head down; significantly impaired balance, requiring furniture, support person, or walking aid to walk.

‡ Suggested scoring based on Morse JM, Black C, Oberle K, et al. A prospective study to identify the fall-prone patient. Soc Sci Med 1989; 28(1):81-6. However, note that Morse herself said that the appropriate cut-points to distinguish risk should be determined by each institution based on the risk profile of its patients. For details, see Morse JM, Morse RM, Tylko SJ. Development of a scale to identify the fall-prone patient. Can J Aging 1989;8;366-7.

Appendix K

Letter of Approval from Project Site

COPPER CREEK INN
MEMORY CARE COMMUNITY

Date: 07/10/19

To Whom It May Concern:

On behalf of Copper Creek Inn Memory Care Community, a part of Koelsch Communities, I am pleased to support the quality improvement project titled *"Fall prevention in dementia care: The integration of an evidence-based fall scale to identify fall risk and reduce fall events"* as proposed by Dr. Erin Tharalson, and Kate Odigwe, RN, BSN, graduate student.

Our organization agrees to serve as the quality improvement project site for data collection, education session regarding how to use the assessment tool, and the analysis of data regarding elderly falls.

Thank you for providing the opportunity for Copper Creek Inn Memory Care Community to be a part of this important project, I look forward to working with you.

Sincerely,

Roshel Gottron RN

Roshel Gottron, RN.

Director of Residents Services

(480)389-8097

Email Address: coppercreekDRS@koelschsenior.com

2200 W. Fairview Street • Chandler, AZ 85224
(480) 634-4191 • Fax (480) 634-4192 • www.coppercreekinnarizona.com
Koelsch Senior Communities
SERVING SENIORS SINCE 1958

Appendix L

IRB Approval

EXEMPTION GRANTED

Erin Tharalson
EDSON: DNP
-
Erin.Tharalson@asu.edu

Dear Erin Tharalson:

On 9/10/2019 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Fall prevention in dementia care: The integration of an evidence-based fall scale to identify fall risk and reduce fall events
Investigator:	Erin Tharalson
IRB ID:	STUDY00010618
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• Morse Fall Scale.pdf, Category: Screening forms; • Fall Prevention.pdf, Category: Other (to reflect anything not captured above); • IRB Modification Response Letter.pdf, Category: Other (to reflect anything not captured above); • Morse Fall Scale Approval.pdf, Category: Other (to reflect anything not captured above); • Participant Demographic Questionnaire.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Recruitment Script.pdf, Category: Recruitment Materials; • CITI Training Tharalson.pdf, Category: Other (to reflect anything not captured above); • Fall Prevention Knowledge Pre Test.pdf, Category: Other (to reflect anything not captured above); • IRB Form-Social-Behavioral-Protocol.docx, Category: IRB Protocol;

	• Fall Prevention Knowledge Post Test.pdf, Category: Other (to reflect anything not captured above); • Implied Informed Consent.pdf, Category: Consent Form; • Fall Prevention Knowledge Test Tool Approval .pdf, Category: Other (to reflect anything not captured above); • Site Approval Letter.pdf, Category: Off-site authorizations (school permission, other IRB approvals, Tribal permission etc); • CITI Training Odigwe.pdf, Category: Other (to reflect anything not captured above);

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (1) Educational settings, (2) Tests, surveys, interviews, or observation on 9/6/2019.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Kate Odigwe
Erin Tharalson
Kate Odigwe

Appendix M

Fall Prevention Education Participant Questionnaire

ID _____ Date _____

Fall Prevention Education Participant Questionnaire

Instructions: Mark your answer with an "X" in the box or write in the space provided.

Age: _____

Sex: ☐ Male
☐ Female

Language preference:

☐ English
☐ Spanish

Race/Ethnicity:

☐ White, non-Hispanic
☐ Hispanic
☐ Black or African American
☐ Asian
☐ Other

How long have you been a nurse? _____

How long have you worked at your current facility? _____

Have you ever received education regarding fall risk assessment tools?

☐ Yes
☐ No

Have you ever used a fall risk assessment tool?

☐ Yes
☐ No

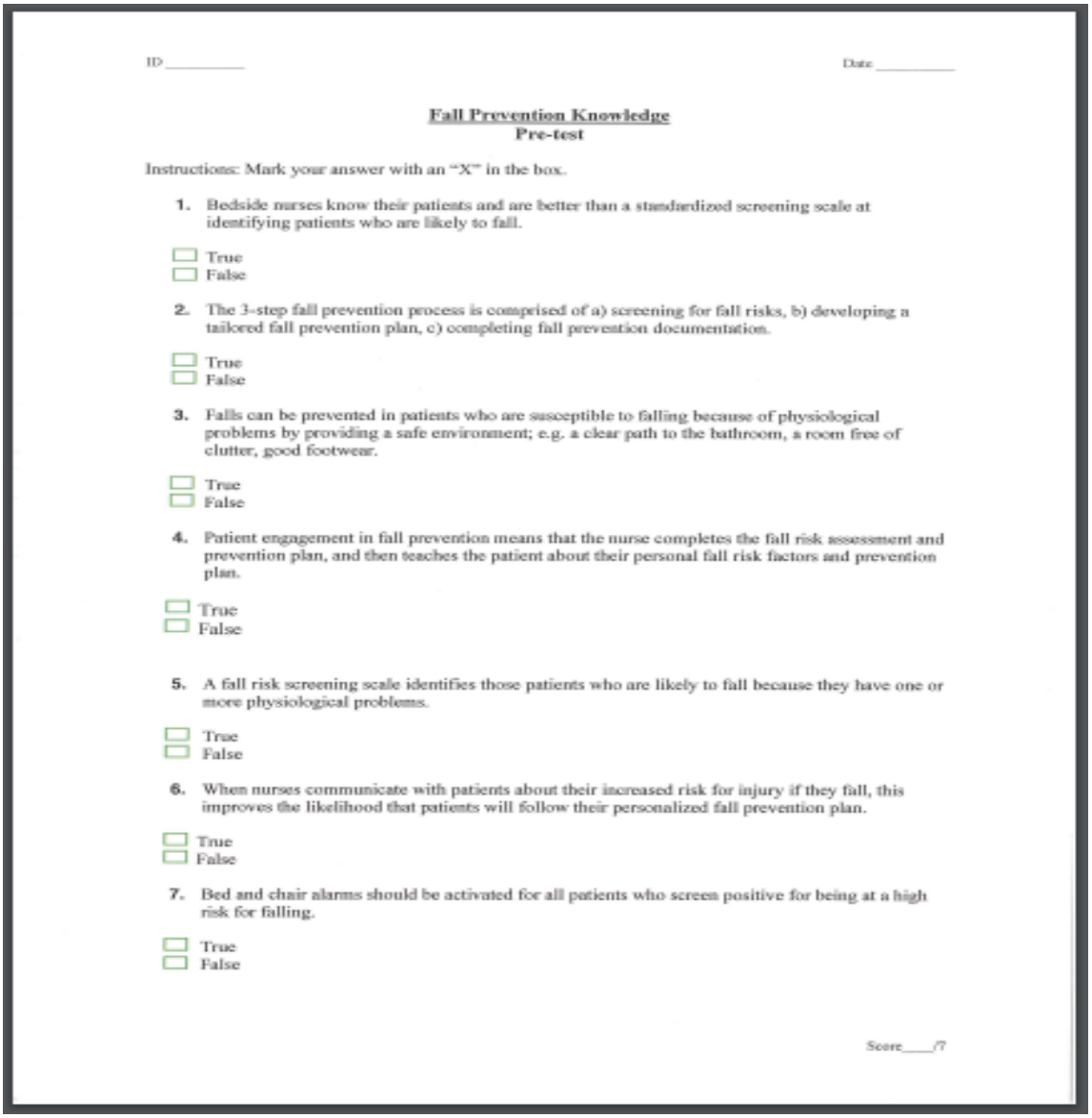
If yes, which tool have you used? _____

How often do you provide care for patients who are at risk for falls?

☐ Always
☐ Sometimes
☐ Rarely
☐ Never

Appendix N

Fall Prevention Knowledge Pre-test



ID _____ Date _____

Fall Prevention Knowledge
Pre-test

Instructions: Mark your answer with an "X" in the box.

1. Bedside nurses know their patients and are better than a standardized screening scale at identifying patients who are likely to fall.

☐ True
☐ False

2. The 3-step fall prevention process is comprised of a) screening for fall risks, b) developing a tailored fall prevention plan, c) completing fall prevention documentation.

☐ True
☐ False

3. Falls can be prevented in patients who are susceptible to falling because of physiological problems by providing a safe environment; e.g. a clear path to the bathroom, a room free of clutter, good footwear.

☐ True
☐ False

4. Patient engagement in fall prevention means that the nurse completes the fall risk assessment and prevention plan, and then teaches the patient about their personal fall risk factors and prevention plan.

☐ True
☐ False

5. A fall risk screening scale identifies those patients who are likely to fall because they have one or more physiological problems.

☐ True
☐ False

6. When nurses communicate with patients about their increased risk for injury if they fall, this improves the likelihood that patients will follow their personalized fall prevention plan.

☐ True
☐ False

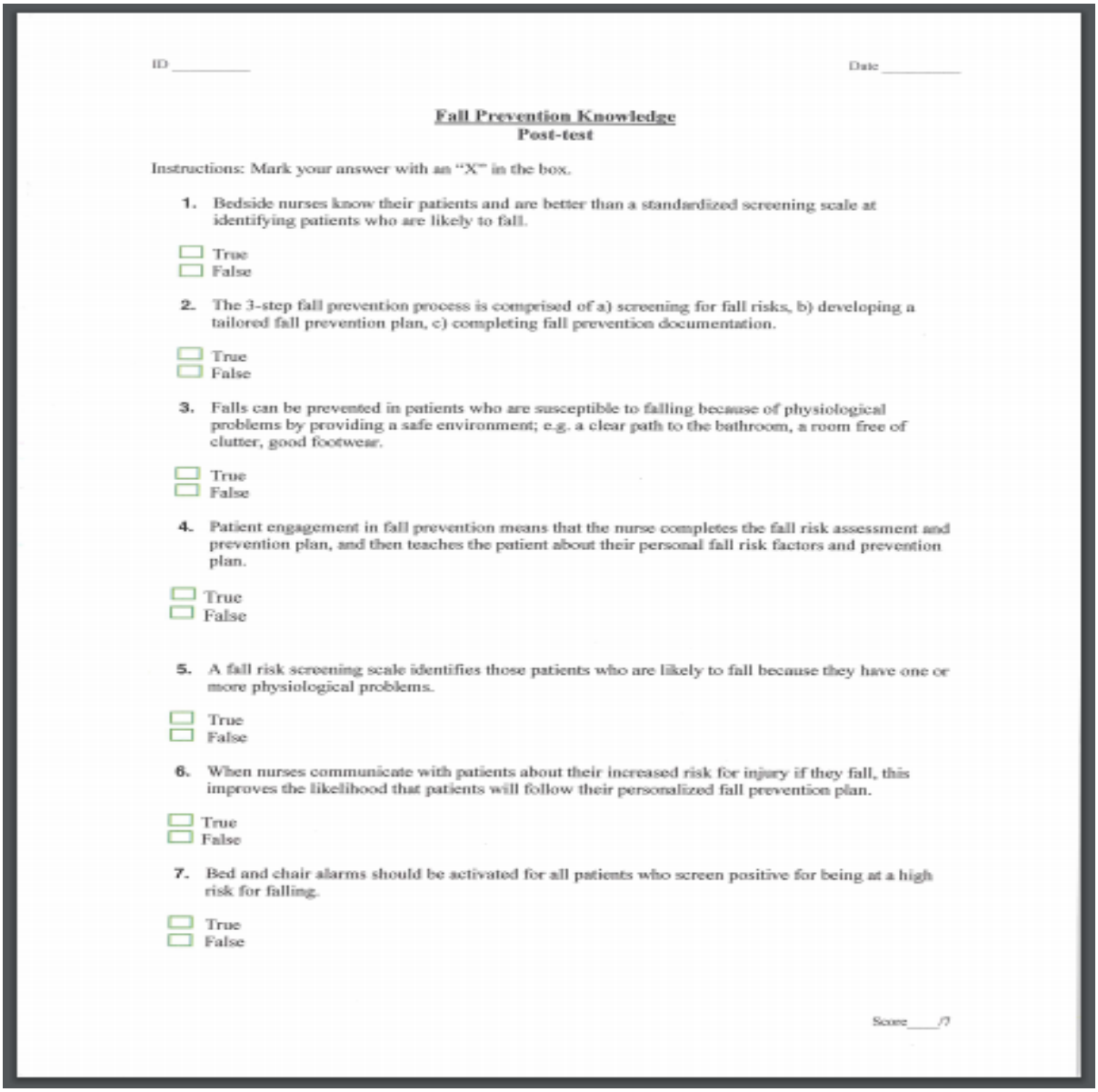
7. Bed and chair alarms should be activated for all patients who screen positive for being at a high risk for falling.

☐ True
☐ False

Score____/7

Appendix O

Fall Prevention Knowledge Post-Test



ID _____ Date _____

Fall Prevention Knowledge
Post-test

Instructions: Mark your answer with an "X" in the box.

1. Bedside nurses know their patients and are better than a standardized screening scale at identifying patients who are likely to fall.

☐ True
☐ False

2. The 3-step fall prevention process is comprised of a) screening for fall risks, b) developing a tailored fall prevention plan, c) completing fall prevention documentation.

☐ True
☐ False

3. Falls can be prevented in patients who are susceptible to falling because of physiological problems by providing a safe environment; e.g. a clear path to the bathroom, a room free of clutter, good footwear.

☐ True
☐ False

4. Patient engagement in fall prevention means that the nurse completes the fall risk assessment and prevention plan, and then teaches the patient about their personal fall risk factors and prevention plan.

☐ True
☐ False

5. A fall risk screening scale identifies those patients who are likely to fall because they have one or more physiological problems.

☐ True
☐ False

6. When nurses communicate with patients about their increased risk for injury if they fall, this improves the likelihood that patients will follow their personalized fall prevention plan.

☐ True
☐ False

7. Bed and chair alarms should be activated for all patients who screen positive for being at a high risk for falling.

☐ True
☐ False

Score ____/7

Appendix P

Table 3

Nurse Participant Demographic Nominal Data

Variable	*n*	*%*
Gender		
Female	13	81.25
Male	3	18.75
Language Preference		
English Language	16	100
Race Ethnicity		
Black/African American	8	50
Hispanic	2	12.50
White, non-Hispanic	6	37.50
Previous Fall Risk Tool education		
No	3	18.75
Yes	13	81.25
Previously utilized a Fall Risk Tool		
No	9	56.25
Yes	7	43.75
Type of Fall Risk Tool utilized		
Falls risk assessment for detox patients	1	6.25
LOC Assessment	2	12.50
On Point Click Care	1	6.25
Schmid	1	6.25
Stratify Scale	2	12.50
Care of patients at risk for falls		
Always	13	81.25
Sometimes	3	18.75
Never	0	0

Appendix Q

Table 4

Dementia-care Patient Morse Fall Scale Results

Variable	*n*	*%*
Morse Fall Scale result		
High risk	28	56
Moderate risk	15	30
Low risk	7	14
History of falling (immediate or previous)		
No	10	20
Yes	40	80
Secondary diagnosis (≥ 2 medical diagnoses in chart)		
No	0	0
Yes	50	100
Ambulatory Aid		
None	12	24
Bedrest/Nurse Assist	5	10
Cane/walker	21	42
Furniture	12	24
Intravenous therapy/heparin lock		
No	50	100
Yes	0	0
Gait		
Normal/bedrest/wheelchair	36	72
Weak	14	28
Impaired	0	0
Mental status		
Oriented to own ability	34	68
Overestimates/forgets limitations	16	32