Fall Prevention Assessment Education in Community Dwelling Older Adults

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Abstract

Background and Significance

Falls are considered a problem of increasing proportion for older adults all over the world. Falls account for a large portion of injuries, hospitalizations, and death for persons over 65 years old. Research shows that risk factors for falls are multifactorial and modifiable. As such, falls should not be recognized as a natural part of aging, but as an increasing characteristic of frailty. Patient and caregiver education about how to identify and modify fall risk factors so that injurious falls and recurrent falls can be avoided.

Methods

Telephone interviews were conducted and recorded with employees and residents of an independent living facility about their history and knowledge of falls within the community. Content analysis was conducted to assess for common themes and concerns related to falls.

Results

Five participants, consisting of three residents living in a large HUD housing complex for older adults and two employees who work at the complex were interviewed. Results of the interview show that there is a generalized fear or awareness of the dangers of falling either in the home or within the community, but a lack of awareness of some of the risk factors.

Discussion

By analyzing gaps in knowledge of this housing complex, fall risk education can be tailored to their fall risk concerns and knowledge gaps and possibly help to reduce future falls for older adults.

Keywords: community dwelling, older adults, fall risk

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Fall Prevention Assessment Education in Community-Dwelling Older Adults

Falls are recognized as a preventable and addressable issue in the United States according to Healthy People 2020 (U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion [HHS ODPHP], 2018). Injuries because of falls are treated in emergency departments every 13 seconds, and death because of falls happens every 20 minutes. Nurse practitioners are in a unique role to not only assess for falls in older adult, but to help educate both patients and families on fall and injury prevention (HHS ODPHP, 2018).

Background and Significance

At the current rate, death from falls is expected to reach seven falls per hour by the year 2030, if the problem is not addressed (HHS ODPHP, 2020). As a result, a national initiative to address falls was created to address the issue and to try to help improve the health, function, and quality of life for older adults in the United States. According to the Special Committee on Aging report (United States Congress Senate Special Committee on Aging, 2019), 1 in 4 older adults fall each year causing injuries ranging from bruises and strains to broken bones and death, resulting in approximately 30 million falls each year. Nationally, 38%, or 7 million of these total falls in those 65 years and older resulted in an injury that required medical attention (CDC, 2019a). In Arizona, falls in those over 65 years of age accounted for approximately 47,553 emergency department visits, 21,278 inpatient hospitalizations and 1,090 deaths in 2018 alone (ADHS, 2018). Data specific for community dwelling older adults is not available due to under reporting of falls, suggests more information is needed to determine the magnitude of the problem.

A report for the U.S. Department of Housing and Urban Development (HHS, 2017) has placed support for policies aimed at fall prevention and fall prevention education that addresses how to overcome obstacles related to developing and implementing falls prevention programs. The toolkit that was ultimately created in conjunction with Healthy Housing Solutions (HHS) aims to bring attention to

funding resources that provide outreach in improving delivery of services to older adults. According to an expert panel put together by HHS, successful and innovative programs aimed at fall prevention provided two key components. First, emergency responders and social services were trained to identify older adults who were at high risk for falls. These services then conducted home inspections and assessments aimed at preventing in home falls. Second, coordinated care models were initiated that aimed to deliver key services to older adults in the home. These services included, but were not limited to social services, home health services, public health services, housing assistance services, and therapy services. Together, these services allowed older adults to remain home and successfully age in place, thereby reducing the overall costs to Medicaid and Medicare and reducing expenditures related to injurious falls in the home.

Purpose and Rationale

As falls continue to plague older adults, assessment tools, exercises and training become increasingly available to help address problems associated with ambulation, transfers, or mobility. Falls have become a preventable epidemic that costs Arizona alone over $1.5 billion dollars in healthcare costs annually (ADHS, 2018). It is important to note that these costs do not include the cost of EMS services, rehabilitation, long-term disability or physician care after hospitalizations (ADHS, 2018). The purpose of this project is to evaluate the knowledge of falls and fall risk factors for community dwelling older adults residing in a low-income housing complex and identify any knowledge gaps among community members. Data will be collected to answer the following evaluation question: What are the experiences of older adult residents, employees, and board members of their knowledge about fall risks, fall prevention and the occurrence of falls in community dwelling older adults?

Epidemiological Data

Americans are living longer and the aging population of those older than 65 years is expected to exceed 23% by 2060 (HHS ODPHP, 2018). Healthy People 2020 initiatives addresses the aging population

and issues that will affect older adults specifically. These problems include identification and management of multiple comorbidities, chronic diseases management such as Diabetes Mellitus, Alzheimer's Disease, Cancer, COPD, and stroke., as well as prevention of injuries and death due to preventable falls. Management of chronic issues, injury prevention and fall prevention have been identified as critical aid for older adults to lead better quality lives as they move through the lifespan. Rates of falls with injury are an issue for several assisted living or residential care facilities. Towne and colleagues (2017) attempted to identify factors that are associated with injuries related to falls in residential care facilities. The researchers found that residents who required more extensive assistance with activities of daily living were more likely to experience injuries related to falls than those who were more independent. As a result, the study recommended that more extensive research was needed to address and identify factors related to increased fall risk in order to provide better care and prevent further injuries.

Internal Evidence

A residential facility located in the west valley of the Phoenix metropolitan area provides affordable housing to adults over the age of 65 with fixed incomes or those over 55 who also qualify for Arizona Long Term Care System (ALTEC or ALTCS) in the state of Arizona. The housing complex is owned and operated by a non-profit organization dedicated to providing housing for older adults and handicapped persons. As they are community-based housing complex, the current facility manager states that they do not keep records on fall rates. Eligibility requirements include evidence that residents show that they can ambulate independently. The complex currently has six full time employees including the apartment manager, the assistant manager, four maintenance employees, housekeeping, and landscaping. The apartment manager states that residents' current concerns involve falls within the home and around the community. Frequent falls with any singular resident can trigger a review of their independent living status and may result in the resident being asked to move from their

community- based housing into a long-term setting . Thus, the employees and residents of the complex are interested in identifying fall risk factors and in fall prevention education.

PICOT Question

Aging is an inevitable process, however frailty and falling is not. Falling is a preventable and manageable issue that should be addressed to help older adults to age in place and help to improve and maintain quality of life. For this project, information regarding fall risk education will be used to help patients self-identify their own fall risk factors. Education will be provided to project participants in the form of written pamphlets designed by the Centers for Disease Control and Prevention (CDC). The Stopping Elderly Accidents, Deaths, and Injuries (STEADI) program is specifically designed for older adults to help educate, identify, and prevent falls within the community and home. Therefore, in community-dwelling older adults, how does fall prevention education improve their ability to identify modifiable fall risk factors over a six-week period?

Evidence Synthesis

Literature Review and Search Strategy

An exhaustive search of the following three databases: PubMed, the Cumulative Index of Nursing and Allied Health Literature (CINAHL), and the Cochrane Database using the PICOT question was completed. These databases were selected due to their relevancy to the health care industry and to current clinical studies and trials with regard to fall prevention and fall risk assessment. Filters were placed on each search to focus the search years from 2015 to 2020 to ensure the most current research was available. In addition, these results were further filtered to only include peer reviewed materials.

Search terms of synonyms for key words for older adults included senior, senior citizen, elderly, 65+, and geriatrics. Keywords for community dwelling included independent living and home health care. Keywords for fall rate included injury rate, hospitalization, death, EMS calls, emergency medical services, frequent falls, recurrent falls, injurious falls, and adverse incidents. Keywords for education

included instruction, demonstration, training, evaluation, teaching, discussion, and learning or learning materials. Fall assessment keywords included Hendrich II, Hester Davis, Missouri alliance home care, STEADI, fall risk tools, and fall risk.

Search results of PubMed with the above filters yielded 300 results. Further filters applied included an age filter for 65+ and narrowed results down 55. The initial CINAHL search included the search terms from the table below. This yielded 194 articles. Further filtering for years 2015 to 2020 narrowed the search results down to 13. Initial Cochrane Library searches yielded 21 results and 396 clinical trials. Further filtering for publication years of 2015 to 2020 did not narrow search results further.. Additionally, literature was obtained by reviewing the reference lists of these articles were scanned to identify 10-15 other important studies. Fifty-five relevant studies were attained and reviewed.

Foundation and Evidence

The Melnyk and Fineout-Overholt's (2019) rapid critical appraisal was used to evaluate the quality of the research articles chosen for the literature review. Studies chosen included five randomized control trials (RCTs), two cross sectional quantitative designs, and two meta-analysis of RCTs and systematic reviews (SRs) (See Appendix A). One study was a pilot design for a randomized control trial for which results were not yet available (see Appendix B). All of the articles reported their funding source, with only one study reporting a possible bias for the authors in that Liu-Ambrose (2019) was a Research Chair for the Canadian Institute for Health Research, who provided funding for the project. Sample sizes for nine of the 10 articles were ample for their populations tested; however, Kamei, K., et al. (2015) reported limitations of their sample sizes.

Heterogeneity was observed for all measurement tools in each study. While measurement tools for the studies varied from study to study. However, all studies measured the number of falls as the independent variable and all included comorbidities, medications, and depression screening as part of

their dependent variables. The studies also varied in terms of the type of education or activity given to the participants. These activities and education included education on environmental risk factors, depression screening, exercise levels and gait training.

Eight of the studies identified depression as a major risk factor for predicting the risk of falls or recurrent falls for the study participants. The data regarding the presence of depression as a fall risk was statistically significant in the eight identified studies. In addition, medication use for the treatment of depression was also linked as a risk factor for fall risk, although this was not as statistically significant as the presence of untreated or undertreated depression in the participants. Three of the studies identified modifiable environmental risk factors for the predication of future falls. These included the presence of excess furniture, rugs, or obstacles in walkways. Two studies that provided education on modifiable risk factors and educating the participants on self-identification of risk factors showed clinically significant reduction in injurious falls (see Appendix B). Reliability and validity are strong for many of the studies, including the MAs and SRs and provide statistically significant results that can be applied to this project.

Influence

Falls are a significant source of injury and death for older adults and has been identified in several countries as a preventable cause of death. The CDC has identified falls as a threat to the health of older adults, reducing their ability to remain independent and lead to large economic costs for the United States healthcare system. According to Healthy People 2020 (USDHS, 2018), falling is not a normal part of aging and should not be treated as such. Allowing older adults to age in place, at home surrounded by familiar environments and people, provides for a longer lifespan and better quality of life for everyone, patients and families included. Education can be used successfully to help prevent falls in older adults. The studies of this literature review help to identify factors needed to help aging in place to be successful for older adults.

Theoretical Framework and Implementation Framework

Conceptual Framework

Conceptual models and theories are necessary to provide meaningful understanding of concepts and help to guide evidence-based practice research and interventions (Braithwaite, 2002). These frameworks help to improve interventions and patient outcomes for best practices. The widespread incidence of falls among older adults identifies an area for improvement in theories of aging. Roy's Theory of Adaptation in Figure 1 explains that adaptation occurs when people respond positively to environmental changes (see Appendix C). The use of this model can be used to help guide patients toward a positive view of aging and increasing movement to maintain balance and gait and further prevent falls (Rogers & Keller, 2012). The model describes humans as a system that reacts and responds to both external and internal stimuli or stress to affect behavior and adaptation.

Physiological-Physical stimuli include external needs of the person such as the needs for safety, food, shelter, water and air. Internal stimuli describe overall health, both mental and physical, neurological function, fluid and electrolyte balance, endocrine function, and the overall health of the senses that help a person sense a stress and respond accordingly. The self-concept and group identity mode d how the person views themselves as an individual with positive and negative body image and self-ideals. The more a person views that their role within a community setting is important, the more likely they are to have a sense of purpose in the world. This sense of purpose in the world ties directly into the role function mode of the model. Primary, secondary, and tertiary roles that a person has within society will play a direct role on their sense of purpose as well. For instance, someone who feels important, valued and cared-for in society will feel a stronger sense that their role in society can affect others. Lastly, interdependence focuses on the level of communication of the person with others and their ability to give and receive messages, respect and value with others.

When these roles shift and change and provide stress to the individual, various coping mechanisms within the individual interact to effect behavior both positively and negatively. These

changes are both integrated processes, which are generally longer lasting changes seen in behavior and compensatory, which are physiologic changes in response to environmental stressors such as hyperventilation, fear or grief (Nurselabs, n.d.).

Implementation Framework

The 5-A model for evidence-based practice in Figure 2 (see Appendix C) provides the implementation framework for this project. The 5 A's, or steps, consist of ask, acquire, appraise, apply and finally analyze and adjust. These steps provide the reasoning and explanations for how an evidence-based practice process can proceed to affect long-lasting change and to help evidence-based practice processes evolve as the needs of the patient or customer change over time (Faulkner & Parrish, n.d.).

The first step is to ask, "what are the needs of the customer?" The obvious thing would be to ask the customer directly. However, if they are not able to accurately describe their needs, so look at the environment and ask several questions to lead them to an accurate description of the problem or gap in policy or care.

Step two is to acquire information. This requires a thorough literature search for evidence pertaining to the issue, problem or gap. Is there a practice model that fits with what the customer wants or needs? What is the research that has been done to show that the model works and is the evidence good quality? Is there internal evidence demonstrating the need or problem and how does this fit into the current practices? These questions need to be answered to move forward in the process.

Step three requires that a thorough appraisal of the learned information. Questioning the theories behind a current evidence-based practice is necessary at this step. Set up meaningful outcomes that are measurable (Faulkner & Parrish, n.d.). Once the outcomes are set, what interventions can be taken to help meet and measure those outcomes? Are the interventions meaningful and is there evidence that the intervention is the best practice?

Step 4 requires an application of the intervention. This requires cooperation and understanding and help of the customer. Describe the resources needed for the intervention, making sure to explain the limitations and expected outcomes. This requires informed consent of all parties and an Institutional Review Board (IRB) review and approval. Informed consent includes all evidence supported and not supported by research in the literature review (Faulkner & Parrish, n.d.). The customer always has the final say in whether or not they choose to participate in the study, regardless of the necessary IRB approval.

Step 5 is to analyze how the intervention worked and adjust the intervention to the current needs, if necessary. These results should be shared with the customer and disseminated to the proper channels. Evaluation and assessment of the outcomes may mean that the intervention is not successful or did not address all the needs of the customer (Faulkner & Parrish, n.d.). If this is the case, adjusting the intervention may be necessary. At this point, begin the 5-A model for evidence-based practice change again and begin at step 1 to assess for any new needs, issues or gaps not addressed by the original intervention

Methods

An exploratory evidenced based project was conducted by employing a gap analysis, using a qualitative approach, to explore the baseline knowledge levels of residents and staff on falls and fall risk factors for older adult living in low-income housing. The project took place over a two-week period. After completion of the project, the results were conveyed to residents, employees, and the board of directors.

Ethical Considerations and IRB approval

The projects' methods and appropriateness were sent for review by the institutional review board for Arizona State University. IRB approval was granted after revisions to clarify confidentiality and methods. Foreseeable risks include possible identification of participants despite confidentiality.

Anonymity was maintained and all documents pertaining to the study destroyed after the study was concluded. Participants were not asked for identifying information such as names or addresses. Interviews were recorded and transcribed and audio files then destroyed. Those having access to the information are the graduate student and principal investigator.

Population and Setting

The study was conducted in a HUD (U. S. Department of Housing and Urban Development) housing complex located in the west valley of the Phoenix Metropolitan area. The housing complex is currently home to 178 residents and has 150 rental units, with three empty units at the time of publishing. The average age of residents is 62 years. Sampling efforts were purposeful and targeted to the participants who represented all of those who live, worked and volunteered at the housing complex, including residents, family members or caregivers, employees and board members and all were recruited for the project. The inclusion criteria for the project required participants to be over the age of 18 and have a relationship with the housing complex or residents of the complex. Those under the age of 18 years were excluded from participation.

Emails were sent to employees and board members describing the study and data collection methods. Flyers were then distributed to the residents and family members by front office employees. Interviews were conducted by the project facilitator and recorded after participant consent was obtained.

Project Description

Interested parties contacted the graduate student indicating interest in the study via a dedicated telephone number. Interviews were scheduled based on participant availability 24-48 hours after contact was initiated. An overview of the project was explained to each participant prior to the interview. Participants were read the verbal consent and asked for permission to record the interview. Initial questions covered demographic information, such as age, identifying gender, employment status,

and highest level of education completed. Telephone interviews were conducted using open ended questions. The interviews lasted anywhere from 10-20 minutes per participant. Data were collected over a two-week period.

Instrumentation, Data Collection and Data Analysis

Open ended questions regarding fall history, concerns and fears of falls or high risk fall areas within the community, fall risk factors and interventions for falls were created. Questions were vetted by three experts within the field of falls, movement disorders, and gerontology for bias and reliability. Ten open-ended questions included information on falls and circumstances around those falls in the last year, recent injuries or therapies required as a result of falls, awareness of environmental factors, information about life-alert devices and who would be notified in the event of a fall, and information about depression. Probing questions were used to further examine any issues that were brought forth by participants (Melnyk and Fineout-Overholt, 203, 2019).

Descriptive statistics were used to describe the participants. Demographic data were stored and managed in Intellectus™ software package (Intellectus Statistics [Online computer software], 2021). Qualitative data analysis was completed using content analysis to examine the participant's experience with falls. Data was stored in a password protected computer in a locked room with deidentifying labels.

Results

Participants included four females, one male, two employees and one resident. Members of the board of directors did not participate. All participants were Caucasian. The average age of the participants is age 67 (SD = 13.40) years old, and the ages ranged from 53 to 81 years of age. The summary statistics can be found in Table 4 (see Appendix E).

Frequencies and percentages were calculated for gender, education, relationship to facility, ethnicity, employment, and marital status. The most frequently observed category of gender was female (n = 4, 80%). The most frequently observed category of education was associates degree (n = 2, 40%).

The most frequently observed category of relationship to facility was resident (n = 3, 60%). The most frequently observed category of ethnicity was Caucasian (n = 5, 100%). The most frequently observed category of employment was retired (n = 3, 60%). The most frequently observed categories of marital status were single and widowed, each with an observed frequency of 2 (40%). Frequencies and percentages are presented in Table 4 (see Appendix F).

Results of the telephone interviews produced the following themes: fear of falling, environmental areas of concern for falls, depression, life-alert device usage and injuries associated with falls. These results suggest that both employees and residents were aware of environmental risk factors as a risk factor for falls, but not aware of other risk factors, such as the presence of depression or lack of a social support system as seen in Table 3 (see Appendix G). For example, when asked about recent , one resident stated, " Well, I do have a lot of concerns because I've had a lot of friends that have fallen. And some were with injury-- with little injuries, and some with severe injuries." Additionally, residents were aware that a basic fear of falls could potentially increase their risk for falls.

With regard to life-alert devices, most residents interviewed stated that they did use them, but that their use was limited to inside their own apartments. One resident expressed interest in the ability of the devices to work in other areas of the community, not only in the apartment; "I wish we had the kind that would work anywhere on our property." Areas of concern within the community that might cause issues with falls included sidewalks and an inclined ramp for use with wheelchairs or motorized scooters.

Of particular concern was the presence of depression or depression symptoms. While those interviewed stated that most did have support symptoms, the recent restrictions caused by COVID-19 had increased some noticeable symptoms in those neighbors they observed. "Yes, there are two that I know of." While these symptoms were noted, residents and employees did not necessarily relate depression with an increased risk for falls.

Statistical Significance and Impact

While this exploratory qualitative study had no statistical significance, the purpose of the study was to explore and reveal knowledge of the residents and employees of an independent living facility for future study. The information revealed by this study can be used to inform future studies within the facility and improve fall risk factors around the community and residents.

Sustainability

The sustainability of this project is limited due to the nature of the project as an exploratory study. The results of this project may help to inform future studies, education, and fall risk assessments to be used in the community in the future.

Discussion

In conclusion, many residents and employees are not aware of all risk factors for falls as evidenced by the qualitative data collected in this project. Identifying base knowledge of both populations reveals that more education on fall risk factors and assessments may be necessary to help the residents age successfully in place and prevent further falls or injuries and death from falls in the home or community. According to one employee, the areas of concern within the complex have been marked and are to be included in renovations that are to take place in the following months for improvement. Studies have shown that the risk factors for falls in older adults are multifactorial. These risk factors include fear of falling, polypharmacy, depressive symptoms, gait and mobility changes, prefrailty, cognitive changes, hearing and visual changes, and the presence of other comorbidities, such as osteoporosis (Carrasco, 2020; Yoo, 2019; Geng 2017). Results of the study support that fear of falling, depressive symptoms and gait and mobility changes have been observed within the housing complex. Future studies should focus on correlating fall incidents within the housing complex with the presence of these fall risk factors and education on identifying fall risk factors.

Implementing services and policy changes at the local level within this housing complex that have been highlighted by the U.S. Department of Housing and Urban Development (HHS, 2017) could allow the residents of this housing complex to age successfully in their homes. The report suggests that improving education and communication on aging and aging in place could significantly reduce the number of falls experienced by older adults. In addition to increasing education, it is important to actively engage the residents on how to recognize fall risks in their own homes so that they become an active part of the solution. In other words, listening to residents and trying to incorporate their own solutions on fall prevention may actually improve fall risk education and increase participation of in-home renovations. The report also advises that the use of fall-detecting technology be part of the solution. The use of this technology could potentially be used to alert officials of areas where falls outside of the home are more likely to occur so that environmental infrastructures can be identified and improved. While there are other reasons for falls, these are some modifiable risk factors that can be addressed early to prevent injuries related to falls .

Limitations and Barriers

A limitation of the study is the experiences are mainly of Caucasians and women. However, falls occur disproportionately affect Caucasian women (Carrasco, 2020; Geng et al, 2017). Caucasian women are more likely to experience injurious falls due to the presence of other comorbidities, such osteoporosis and more likely to experience multiple falls (Carrasco, 2020). The participants in this project may not be indicative of the diversity of the community at large, so concerns of those interviewed represent those within the same demographic and may not reflect the experiences and concerns for older adults from other ethnic backgrounds. Sampling efforts were purposeful and targeted to the participants who represented all of those within the housing complex , including residents, family members or caregivers, employees, and board members to assess their experiences with falls in general, fall risk and fall prevention activities occurring within the housing complex. However, the study

facilitator was unable to get any representatives from the board. This limits the results of the study to those interviewed and do not represent the potential concerns or knowledge gaps of those within the board of directors who approve all activities that take place within the complex. Length of recruitment time would need to be lengthened to attract participation of this group. In addition, recruitment would need to take place during regularly scheduled board meeting times each month where interviews could take place.

In person interviews could not be conducted due to COVID-19 restrictions at this time. Meanwhile, these restrictions are important to protect the physical health of the residents and employees during the pandemic, this issue has presented some interesting challenges that might not otherwise have been realized. For example, residents were reluctant to participate in telephone interviews over concerns about possible fraud or fishing schemes. Previous studies have shown that there is an inherent bias against telephone interviews, particularly with older adults (Clark et al, 2015). This may be due to inherent distrust at not being able to identify the interviewer or not being able to associate the interviewer to the or the phone number to the flyer that was distributed in the recruitment phase.

COVID-19 restrictions may have resulted in depression within those who relied more heavily on family support if those support systems were restricted from visiting during this time. Additionally, the process of having residents contact the project facilitator may have led to initial interest, but some participants refused to continue participation in the project by not completing the interview after being informed that the interview would need to be recorded or asked about specific instances of falls within the last year. This may be due to a fear of reporting that may affect their current housing status if management of the complex become aware of their responses to the question. During the study, it was uncovered that there have been discussions held with management about family members' concerns of

a resident who has experienced multiple falls seeking guidance about the possibility of placement in a more supervised setting, such as a long-term care or assisted living facility.

Relate Findings and Recommendations for Future Research

Studies have shown that depression independently increases the risk for falls in older adults. This is significant because the risk factors for developing depression increase for community-dwelling older adults, affecting 1 in 6 people (Biggs et al, 2017; Carrasco, 2020). A previous study provided evidence that depression has been found to be a significant risk factor associated with an increased number of falls (Yoo et al, 2019). Content analysis of the data from this study show a gap in knowledge about the risk for falls as related to depression symptoms, meaning that while residents and employees did notice an increase in depressive symptoms among residents during COVID-19, they did not necessarily relate them to the increased risk for falls that presented during the year as well. Appropriate treatment of depressive symptoms has been shown to decrease this fall risk factor (Lohman et al, 2020) to some extent. Future studies can be completed to determine if appropriate education of fall risk factors such as depression in this particular community can decrease falls within the complex.

Residents of this housing complex expressed a general concern about fear of falling, mostly related to previous falls and the implications of possible injury while living alone (see Appendix F). A study involving 393 older adults over 65 years of age showed that the fear of falling occurred in 33.5% of the residents that persisted in 71.3% of those assessed (Drummond et al, 2020). Furthermore, the authors go on to relate that risk factors for persistent fear of falling included polypharmacy, a history of previous falls, gait or mobility changes, cognitive impairment and depressive symptoms. Fear of falling has a detrimental effect on balance performance in older adults (Young & Williams, 2015). Future studies should focus on how this fear of falling affects gait and balance in order to improve movement control in older adults.

A focused-group study with older adults showed that most older adults preferred a personal device to be worn on their wrists, such as a life-alert device, that could automatically detect falls and report their location in the event of a fall (Chaudhuri et al, 2017). While residents of the housing complex did indicate that they wore a life-alert device around their necks, they did indicate that the devices were limited to use within their homes and could not provide support if falls were to occur in other areas of the facility. Future studies may want to consider the use of these devices that have a wider range of transmission.

Future studies involving this community may want to focus on changing interview techniques by using face to face viewing technology as seen in such applications as Zoom to increase participation and trust between study participants and study facilitators. In addition, increasing length of recruitment to adequately focus on capturing opinions of caregivers, families and board members will provide a more well-rounded, diverse and thorough picture of the concerns of everyone in the housing complex.

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Appendix A

Table 1

Synthesis Table

Author Year	**Barker 2016**	**Carrasco 2020**	**Dipietro 2019**	**Kamei 2015**	**Liu-Ambrose 2019**	**Nithman 2019**	**Stubbs 2015**	**Umegaki 2020**	**Wong 2015**	**Yoo 2019**
Study Design:										
RCT	x			x	x			x	x	
MA			x				x			
SR			x				x			
CSS		x	x			x	x			
Descriptive										x
Bias					x					

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Appendix B

Table 2

Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major variables & Definitions	Measurement	Data Analysis	Findings	Decision for use
Barker, A., et al. (2016). **Funding:** Faculty of Medicine, Nursing and Health Sciences Strategic Grant Scheme [ECD044] **Bias:** none declared **Country:** Melbourne, Australia	Self-Care	**Design:** Pilot RCT **Purpose:** To evaluate the feasibility of Pilates Exercise in older people to decrease falls risk.	**N:** 53 n: 31 control group n: 23 intervention group **Setting:** community physiotherapy clinic **Sample Demographics :** community-dwelling people over age 60 years of age. Age range 61-84 years;	**IV:** 60 min Pilates class over 12 weeks **DV:** adverse events = falls and injurious falls; standing balance, lower limb strength, flexibility measured at 12 and 24 weeks.	Baseline measurement of flexibility, lower body strength and balance at baseline, 12 week and 24-week intervals for both control and intervention group using mCTSIB.	Independent sample t-tests	20 participants completed treatment, 23% drop out rate. Rate of injurious falls at 24 weeks 64% lower than the control group p = 0.136. Rate of falls was 42% than the control group p = 0.347. Standing balance, lower limb strength	**LOE:** II **Strength:** high willingness of participants to continue and participate in study. **Weaknesses:** low participation, low retention; pilot study and is prone to random error and large uncertainty **Conclusions:** although statistical significance was low, clinical significance was high in reducing falls and preventing injury with falls.

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Table 2

Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major variables & Definitions	Measurement	Data Analysis	Findings	Decision for use
			mean age 69.3 years				and flexibility $p < 0.05$	**Feasibility/applicability to patient population:** Improves balance, lower body strength and flexibility and shows that exercise is important in fall prevention with clinically significant findings.
Carrasco, C., et al. (2020). **Funding:** AlenteJo2020 Programme, Portugal 2020 and the EU through the European Regional	Wear and Tear theory of Aging	**Design:** cross-sectional study quantitative **Purpose:** Identification of risk factors associated with falls in community-dwelling older adults	**N:** 508 **n:** 290 (no falls) **n:** 218 (falls) **Setting:** community-dwelling 65+ adults of Evora **Sample Demographics:**	**DV1:** lower body flexibility **DV2:** Drug Class **DV3:** lower body flexibility **DV4: number of falls**	Health status variables and existence of comorbidities or chronic disease	Enter method Hosmer-Lemeshow test AOR CI	Significant risk factors include gender, women had more falls possibly related to bone fragility or osteoporosis; lower body strength and dynamic balance were	**LOE:** IV **Strength:** Cross-sectional case study **Weaknesses:** Lowest level of evidence as it measures one point of evidence only once at one point in time. Questionnaire for participants to measure the number of falls within one

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Table 2

Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major variables & Definitions	Measurement	Data Analysis	Findings	Decision for use
Development Fund **Bias:** None identified **Country:** Portugal			395 females, 113 male Median age of 73.4, 316 married, 478 finished high school or less, 417 BMI of 25 or higher,				significant for increased fall risk; Existence of arthrosis, arthritis, and poliomyelitis, depression, fibromyalgia significantly increased risk for falls.	year along with specific dependent variables. **Conclusions:** study showed a statistically significant link between depression, osteoporosis and number of falls; shows women have more falls than men possibly related to bone fragility. **Feasibility/applicability to patient population:** Shows the importance of chronic illness to fall recurrence in older adult populations in community dwellings.

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Table 2

Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major variables & Definitions	Measurement	Data Analysis	Findings	Decision for use
Dipietro, L., at al. (2019). **Funding:** US Department of Health and Human Services **Bias:** None declared; authors were reimbursed for travel. **Country:** United States	Wear and tear and theory of self-care	**Design:** Duplicate Independent Screenings of SR and MA from 2006 to 2016 **Purpose:** To review and update the evidence of the relationship between physical activity, risk of fall-related injury, and physical function in community-dwelling older people	**N:** 1415 articles reviewed **n:** 165 articles appropriate for review. **Setting:** Community-dwelling older adults **Sample Demographics:** articles published between 2006 and 2018,	**DV1:** TUG **DV2:** Type of physical activity **DV3: number of falls**	Evidence was graded as strong, moderate, limited, or "not assignable" based on several grading criteria, including applicability, generalizability, risk of bias/study limitations, quantity and consistency of results across studies, and magnitude and precision of effect	2018 PAGAC report was compared to study result findings from reviewed MA and SR from 2006 till 2018	Strong evidence exists in the study to show that physical activity helps reduce risk of falls and injurious falls from 32-40%.	**LOE:** II **Strength:** **Weaknesses:** **Conclusions:** Regular physical activity helps older adults improve or delay the loss of physical function and mobility while reducing the risk of falls **Feasibility/applicability to patient population:** Provides support for fall risk education and awareness in maintaining and improving physical function/mobility to help reduce fall risk.

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Table 2

Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major variables & Definitions	Measurement	Data Analysis	Findings	Decision for use
Kamei, K., et al. (2015). **Funding:** St. Luke's and TERUMO collaborative fund (2008–2011), Japan. **Bias:** None Identified. **Country:** Japan	Aging	**Design:** RCT **Purpose:** evaluate the potential improvement of fall prevention awareness and home modification behaviors and to decrease indoor falls using HHMP	**N:** 136 adults **n:** 63 control group **n:** 67 HHMP group **Setting:** Community-dwelling older adults **Sample Demographics:** age: 65 years and older, average age 75.7; patients could walk without assistance of another person	**IV:** Number of falls over 1 year **DV:** HHMP	Baseline data taken at time of intake to include previous number of falls, home safety self-assessment. Additional measurements and self-assessment taken at 12 weeks and at 52 weeks.	Log rank t-test	The HHMP group showed a 10.9% reduction in overall falls (p = 0.116) and falls indoors showed an 11.7% reduction at 52 weeks p = 0.052.	**LOE:** I **Strength:** RCT **Weaknesses:** Few participants in the study which has potential for increased risk of random error. **Conclusions**: HHMP has the potential to improve fall prevention awareness and home modification behaviors, and specifically decreased overall and indoor falls in 12 weeks in those aged 75 years and older in

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								community-dwelling older adults **Feasibility/applicability to patient population:** The results show that HHMP was statistically significant for decreasing falls inside the home at 52 weeks. However, the number of overall falls was not significantly reduced. However, the clinical significance shows that by reducing falls overall, patients experienced less injuries and were able to stay in the home longer with HHMP.

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Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major variables & Definitions	Measurement	Data Analysis	Findings	Decision for use
Liu-Ambrose, T., et al. (2019). **Funding:** This study was funded by the Canadian Institutes for Health Research **Bias:** Liu-Ambrose Research Chair Tier 2 **Country:** Canada	Continuity theory of aging	**Design:** Single blind RCT **Purpose:** To assess the effect of a home-based exercise program as a fall prevention strategy in older adults who were referred to a fall prevention clinic after an index fall.	**N:** 345 **n:** 172 control group **n:** 173 intervention group **Setting:** Community-dwelling adults **Sample Demographics :** Age 70 years or older with a history of falls.	**DV:** Otago home-based exercise program	Measurements at baseline, 6-months and 12 months follow up. Measurement includes Physical Activity Scale for Elderly and adherence to the program.	Over-dispersed Poisson Model (negative binomial regression model).	86% completion rate over 1 year. mean follow-up of 338 (SD, 81) days: 236 falls occurred among 172 participants in the exercise group, p = .009 366 falls among 172 participants in the control group.	**LOE:** I **Strength:** Large sample size; RCT **Weaknesses:** Single blind study, study needs to be replicated. Results are based on self-reporting. **Conclusions:** Significant reduction of falls among the intervention group that was both statistically and clinically significant. **Feasibility/applicability to patient population:** Study shows that falls are significantly reduced

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Table 2

Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major variables & Definitions	Measurement	Data Analysis	Findings	Decision for use
								by implementation of exercise program
Nithman, R. W., & Vincenzo, J. L. (2019). **Funding:** Geriatric workforce Enhancement Award, University of Arkansas for Medical Science **Bias:** None declared **Country:** United States	Continuity theory of aging	**Design:** cross sectional cohort design **Purpose:** analyze the STEADI algorithm for strengths and weaknesses	**N:** 77 **Setting:** community-dwelling older age 65 and older from Phoenix, AZ and Fayetteville, AR **Sample Demographics:** Mean age 78.2 years; 74% reported fall in the previous year; 44 females; 33 males	**DV1:** Predicted falls **DV2:** predicted fall risk **DV3:** Number of falls	STEADI risk as compared to: SIB, 3KQ, 4MWT, and TUG Comparison of prospective falls risk in a 6 month and retrospective 12-month period.	T-test; Descriptive statistics	Indicates that fall risk does not necessarily increase with increased age; Large number of false negatives associated with low-risk individuals according to STEADI assessment.	**LOE:** IV **Strength:** cross-sectional case study; compared the use of STEADI to other assessment tools such as TUG, SIB, 4MWT, and Tandem, 30STS, 3KQ **Weakness:** low number of participants with only 77 total. Questionnaire for participants to measure the number of falls within one year along with specific dependent variables. Follow up was a phone interview

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Table 2

Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major variables & Definitions	Measurement	Data Analysis	Findings	Decision for use
								at 6 month after initial assessment, with 68 of the 77 participants available for follow up interview at that time. **Conclusions:** STEADI was better at predicting fall risk for community dwellers rather than retirement community dwellers but had more false negatives rates among those classified as low risk for falls. More balance tests are needed for **Feasibility/applicability to patient population:** Compares the use of STEADI as a fall

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Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major variables & Definitions	Measurement	Data Analysis	Findings	Decision for use
								predicter tool compared to other tools available. Is a better measurement tool for community-dwellers as compared to retirement community-dwellers.
Stubbs, B., et al. (2015). **Funding:** Not declared **Bias:** None declared **Country:** America	None identified	**Design:** MA of RCTs **Purpose:**	**N:** 16 **Setting:** Community-dwelling older adults **Sample Demographic:** Any RCT interventional study using participants over 60 years of age that sought to prevent falls.	**DV:** Interventions to prevent falls	MA of RCTs that investigated any intervention that sought to reduce falls in community-dwelling older adults were included.	PROSPERO CRD42014010715	evidence that exercise reduces falls (including the rate, risk, and odds of falling), with 13/14 pooled analyses (93%) from 7 meta-analyses demonstrating a significant reduction. Multifactorial fall	**LOE:** V **Strength:** Umbrella review of RCTs to identify characteristics aimed at reducing or preventing falls **Weaknesses:** MA umbrella review. Hard to control for DV and publication bias. Small sample size of articles used for MA. Inclusion criteria was broad.

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Table 2

Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major variables & Definitions	Measurement	Data Analysis	Findings	Decision for use
							preventions reduced falls by between 10%25,27 and 35%,	**Conclusions:** Exercise and individually tailored multifactorial interventions are effective at reducing falls in older adults. **Feasibility/applicability to patient population:** The study itself provides further evidence that multifactorial interventions are necessary to help reduce falls. The study itself is limited by the studies it used to provide this data. Sources discovered in the study may be more specific and more useful.
Umegaki, H., at al. (2020).	Wear and Tear	**Design**: baseline data	**N:** 447 **n:** 264 robust	**IV:**	Kihon checklist self-	Chi-square test	Prefrailty p = 0.012	**LOE:** II

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Table 2

Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major variables & Definitions	Measurement	Data Analysis	Findings	Decision for use
Funding: Center of Innovation Program (COI STREAM); Japan Science and Technology Agency; Ministry of Education, Culture, Sports, Science and Technology **Bias**: None declared **Country**: Japan	theory of Aging	analysis of an RCT **Purpose**: to evaluate the characteristic of frailty and its relationship to falls. Help identify frailty in older adults.	**n:** 183 prefrail **Setting:** Community-dwelling adults **Sample Demographics:** Residents age 85-85 years in Toyota City, Aichi, Japan.	**DV1:** body composition **DV2:** Physical Activity/Function **DV3:** Fall Assessment **DV4:** Frailty assessment	administered questionnaire for frailty		Exhaustion p = 0.03 Depression scale p = 0.047 All statistically significant for fall prediction.	**Strength:** Large sample size. Analyzes several risk factors using few tools. **Weaknesses:** Requires participants to self-report honestly. It only measures data once in a specific time period rather than over a timeframe. **Conclusions:** We found that prefrailty was associated with fall history. Depressed mood was also significantly associated with fall history. Among the five frailty criteria, exhaustion was significantly

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Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major variables & Definitions	Measurement	Data Analysis	Findings	Decision for use
								associated with falls. Prefrailty, especially the criteria of exhaustion, and depressed mood were associated with fall history. **Feasibility/Applicability to Patient Population:** The study identifies and defines prefrailty and is consistent with other studies that show depression as a risk factor for falls. Additionally, it identifies exhaustion as a significant fall risk.
Wong, K. C., et al. (2015).	Wear and Tear theory of Aging	**Design:** RCT **Purpose:** determine the	**N:** unknown **Setting:** Community-	**IV:**. **DV:** Risk factors for frailty	Not identified.	Power analysis to determine the number of participants	The study is ongoing and results have	**LOE:** I **Strength:** RCT; large sample size.

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Table 2

Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major variables & Definitions	Measurement	Data Analysis	Findings	Decision for use
Funding: School of Nursing of the Hong Kong Polytechnic University. **Bias:** None declared **Country:** China		effectiveness of a health-social partnership intervention program among community-dwelling older adult	dwelling older adults in Hong Kong **Sample Demographics:**			needed for the study. Study to last 3 months.	not been published yet.	**Weaknesses:** Protocol study design; no results yet; relies on participants to self-report. **Conclusions:** The results of this research are expected to enable older adults to stay in the community with optimal health and well-being. Health and social sciences are integrated into the practice in this research protocol. The scarce literature on this topic means that this study can also provide an opportunity to bridge

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Table 2

Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major variables & Definitions	Measurement	Data Analysis	Findings	Decision for use
								the caring gap among older adults **Feasibility/applicability to patient population:**
Yoo, J. S., et al. (2019). **Funding**: intramural research grant of Chungbuk National University in 2015 **Bias**: None declared **Country**: Korea	Wear and tear PASEKorean version of physical activity scale for the elderly Theory of Aging	**Design:** Descriptive Survey Study **Purpose:** analyze risk factors for recurrent falls in community dwelling older adults	**N:** 157 **n:** 112 (one time fall) **n:** 45 (repeated falls) **Setting:** community-dwelling older adults 65 years or older who experienced a fall within the previous year	**IV:** **DV:** Number of fall risk factors	K-PASE	SPSS	Identified depression and the use of antidepressants as a major risk factor for falls;	**LOE:** V **Strengths:** Measures fear of falling and depression with incidence of falls. **Weaknesses:** assumes older adults are at higher risk for falls **Conclusions:** risk for falls **Feasibility/Applicability to Patient Population:** Population of the

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Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major variables & Definitions	Measurement	Data Analysis	Findings	Decision for use
			Sample Demographics: median age 78.19 years; 138 females; 19 males;					study is the same demographic as the population for this project. Might be feasible to replicate the study findings.

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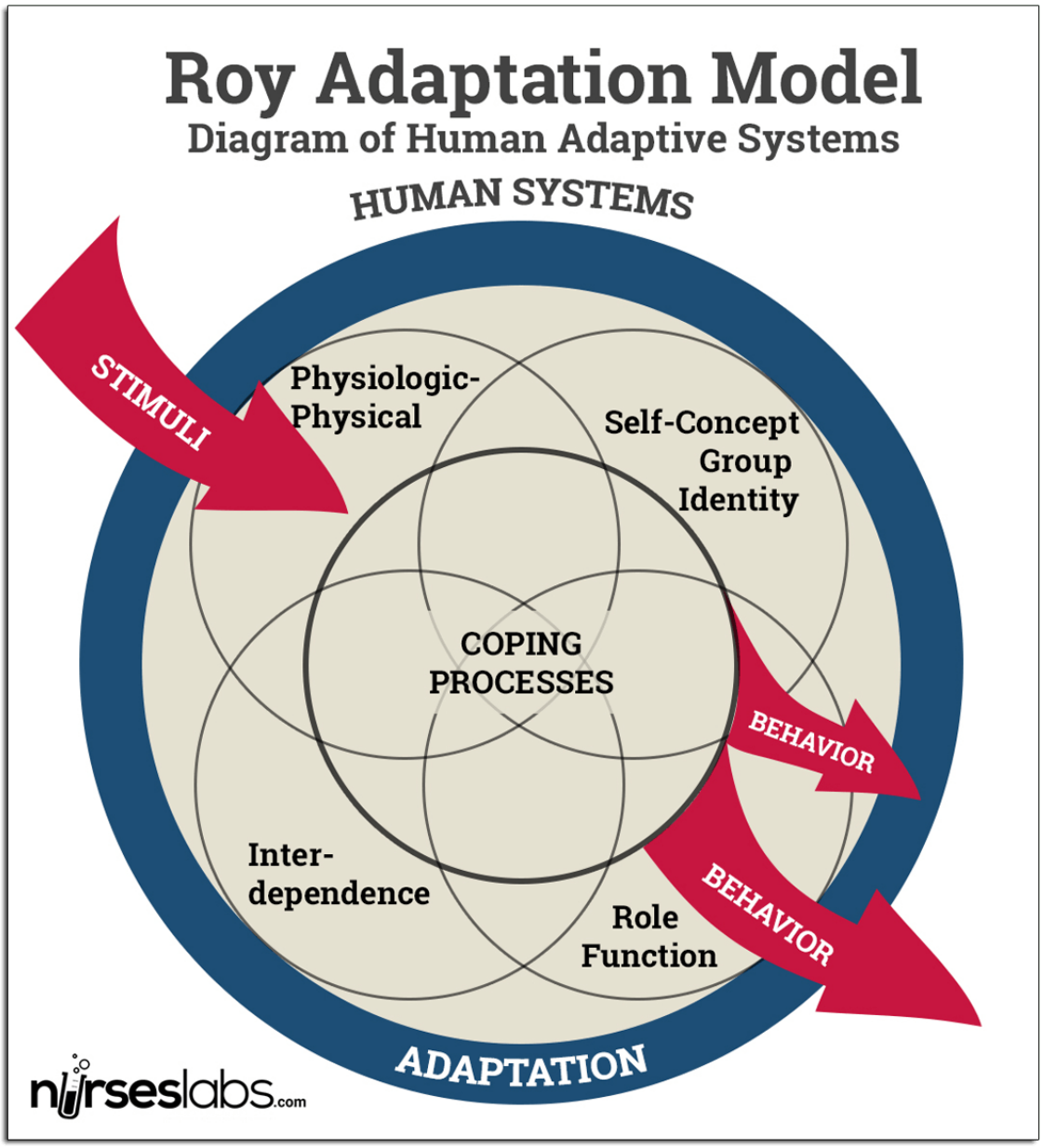
Appendix C

Figure 1

Roy's Theory of Adaptation

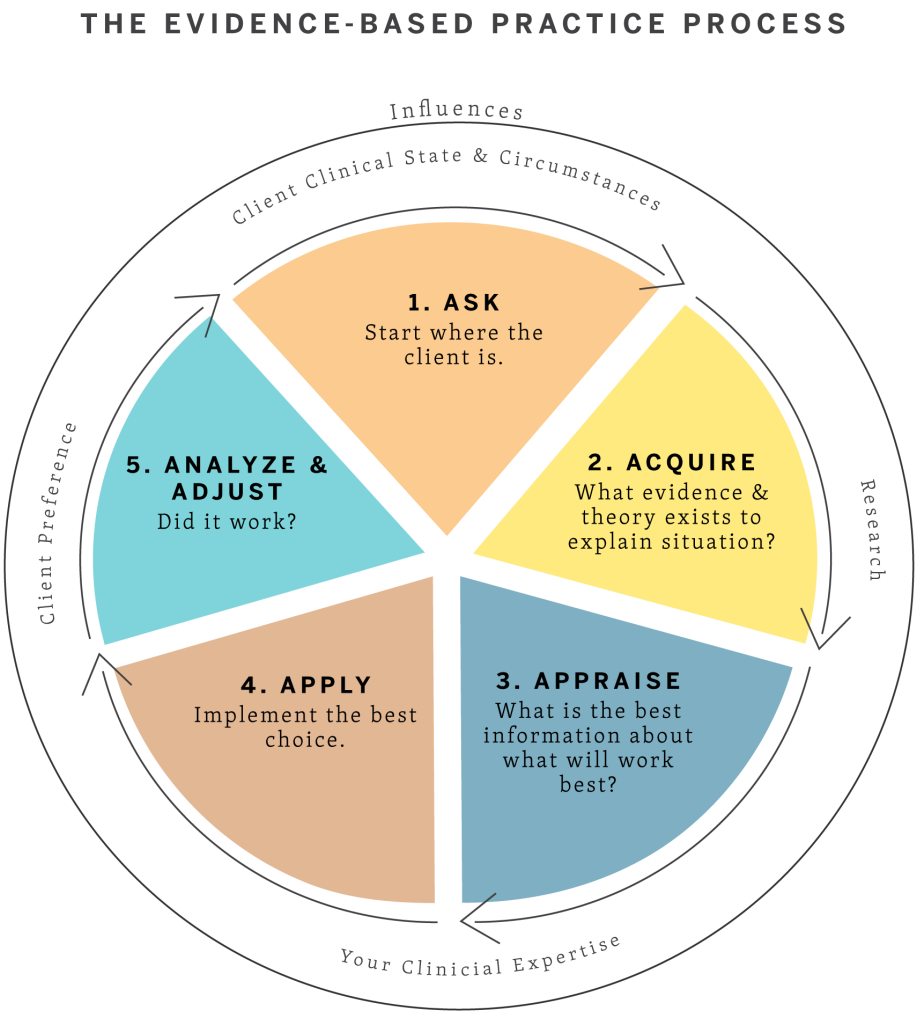


Nurselabs, (n.d.)

Appendix D

Figure 2

5-A Model for Evidence-Based Practice



Faulkner & Parrish, n.d.

Appendix E

Table 3

Age (n=5)

Variable	*M*	*SD*	Min	Max
Age	67.00	13.40	53.00	81.00

Appendix F

Table 4

Frequency Table for Demographic Data

Variable	*n*	*%*
Gender		
Male	1	20
Female	4	80
Education		
Some High School	1	20
High School	1	20
Associates Degree	2	40
Graduate School	1	20
Relationship to Facility		
Employee	2	40
Resident	3	60
Ethnicity		
Caucasian	5	100
Employment		
Full-time	2	40
Retired	3	60
Marital Status		
Single	2	40
Widowed	2	40
Divorced	1	20

Appendix G

Table 5

Qualitative Data

Concerns or fears about falls	Recent falls and injuries	Medical care or treatment	Life-Alert Devices	Areas of concern	Depression symptoms or lack support systems
. . .always a concern. I live alone, so there's always that concern of falling, of no one knowing that I have fallen. I do have one of the emergency pendants that I wear, and I've got that on now. So, I do have that, and that was provided by the facility.	*Yes. Yes. I couldn't give you an exact number, but I would venture to say it probably happens maybe once a week.*	*Yes. Yes, they did. I think, I believe ER.*	*Yes. I wear it around my neck. I guess it adds that extra layer of security. So, it works just in the apartment. I wish we had the kind that would work anywhere on our property.*	*Just the sidewalk area I was on when I had my fall.*	*I would say a couple of them.*
Not really any concerns. Once in a while, you have to watch the sidewalk because there might be a lifted block on one of the pathways or something. But other than watching where you put your feet, I'm fine.	*Yes. I fell outside. . . I fell and injured my ribs and my shoulder.*	*Yes. Both of them, if I remember correctly, required surgery, a stay in the hospital, and then some rehab following. We did have another resident who had fallen and . . . was not able to return home. . .*	*I do not. I am aware they are available should I need one or want one.*	*I don't think any certain areas in here would make somebody fall. I just think it's not cautious sometimes and people don't take the cautionary measures . . .*	*No. I think pretty much every-- I'm trying to say, there have been residents in the past. But right now, I think that most everyone has at least someone that they could reach out to. . .*
Well, I do have a lot of concerns because I've had a lot of friends	*It was last March. I fell*	*No. The fall I did have, I went to the*	*Yes, on my neck. It's connected to the*	*I know that we have an area out*	*No. I'm sure there are after being stuck*

that have fallen. And some were with injury-- with little injuries, and some with severe injuries. . .	*outside of my home but not at the housing complex.*	*doctor the next day and had nothing broken.*	*housing complex security system. So, it only works inside my apartment.*	*front where the asphalt meets the handicap ramp, and that has some deterioration of material on the asphalt side of it.*	*inside for a year, but not personally. No.*
We have had quite a few residents fall on the property, and, I mean, most of them-- they were all senior citizens but ranging anywhere from 60 to mid-90s. They do lose their balance a lot. It happens quite a bit here.	*Yes. I was up on a two-step ladder trying to get into one of my closets. . . And it just collapsed. I went down, I think I might have been knocked out for a few minutes because I don't remember hitting the floor.*	*Yes. Last March. I did not need to visit the ER or need therapy.*	*Some of them do have their own life alert devices. . . We also offer a device that is a pendant that is worn around their neck. It is totally optional for them. . . However, that pendant only works while the resident is within their unit and in range.*	*There are a couple sidewalks that are a little higher than normal. There's one side that's-- one of the sidewalks are a little higher than the sidewalk that's next to it is kind of low. So sometimes they'll trip over that, and sometimes when they go down a handicap ramp, they tend to lose their balance.*	*Oh, probably. Yes. Yes, there are two that I do know. Yeah.*
. . . my main concern would be the age group that's here. They are more at risk for falling and losing their balance.		*I broke a tooth and skinned up my face, but I'm very lucky I didn't break a bone. And that was the only time I have fallen near the last few years.*	*Yeah, I'd say half of them have a device around their neck.*		*Yes, I have come across a few of them.*