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| The University of North Carolina at Chapel Hill |
| Fall Prevention Strategies |
| Community and Institution Interventions |
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Abstract

Falls are a leading cause of morbidity and disability among older adults. They have a great impact on the healthcare system and on the lives of the individuals who sustain them. Risk factors include advancing age, mobility problems, history of falls, depression, and use of multiple medications. Much research has been conducted on fall prevention strategies in community-dwelling older adults. The evidence suggests that these interventions need to be individualized and fit the individuals’ needs. Exercise can be used alone or as part of a multifactorial intervention program but the exercise should be specific to the individual. Multifactorial interventions, including medication review, home modifications, vision checks and exercise, may best serve older adults who have already fallen. Fall prevention in hospitals is crucial for patient safety and is highly dependent on compliance from the nursing staff. Some interventions include nonslip footwear, signs to alert staff who is at risk for falling and practicing mobility with patients. All of these interventions for the community or the hospital are evidence based, but tailoring them to fit the needs of the individual is the key component of falls prevention.

Fall Prevention Strategies

Falls are serious events that are becoming more common in the older adult population. More than one third of adults age 65 and older fall each year and about half of these fallers experience multiple falls per year1. Additionally, 20-30% of those that fall sustain moderate to severe injuries that can result in pre-mature death and substantial mobidity1. It is not surprising that falls are the leading cause of injury related deaths in older adults1. The financial cost of falls is quite substantial as well. In 2000, $19 billion was spent on fall related injuries1. This is an astronomical amount that can be drastically reduced with prevention strategies targeted at specific populations of older adults.

Before specific prevention strategies can be discussed, it is important to understand the multitude of risk factors that are involved in falls. Increasing age, itself, is a risk factor for falls. Those over the age of 80 are at a greater risk than the young-old adults1. Other risk factors include use of an assistive device, visual deficits, arthritis, impaired cognition and functional limitiations1. History of falls, use of certain medication and gait and balance impairments are independent prognostic indicators of falls2 and should be noted for all older adults. Additionally, those that have depression, impaired mobility, daytime drowsiness, or use five or more medications have significantly increased falls risk3. The probability that a person will sustain a hip fracture has its own set of risk factors because hip fracture is the most serious injury resulting from falls4. About 40% of nursing home admissions are a result of hip fractures5. These risk factors include age, muscle weakness, sedentary lifestyle, neuromuscular disease and environmental hazards4. Many people who sustain a hip fracture never recover to their previous level of function. It is important to be aware of all the risk factors of falling in order to best establish a prevention intervention.

An important risk factor is medication. The body’s ability to metabolize drugs is decreased as one ages. This increases the drug’s half-life in the body and places the older adult at a higher risk of experiencing adverse drug events3. Common adverse events that are associated with falls include dizziness, postural hypotension and impaired psychomotor performance6. The Beers Criteria is a list of medications that have unfavorable risks associated with them for the older adult population3. Physicians can use this list as a guide to help them choose which medications may best serve their patients’ needs. It has been shown that using medication listed on the Beers Criteria is significantly related to the occurrence of falls3. Falls are more common in older adults taking benzodiazepines, especially long acting benzodiazepines, antidepressants, anticonvulsants and psychoactive drugs6. These are medications on the Beers Criteria. Performing a detailed medication review may be beneficial to reducing falls risk in many older adults. Exploring all of the effects of the medications an older adult is taking is more beneficial than determining the individual effects of the drugs6. That may be the best way to perform a medication review, keeping in mind that medication management requires a very delicate balance between treating individual conditions and treating the whole person.

 Vitamin D supplements may be another area that physicians and pharmacists can talk to their patients about. Many older adults are at risk for a vitamin D deficiency and a supplement may be a safe and effective way to increase muscle strength and function, ultimately leading to fewer falls7. In older adults with a vitamin D deficiency, atrophy of the fast twitch muscle fibers is seen7. Fast twitch muscle fibers are the ones that are recruited first in order to prevent a fall. Atrophy of these fibers predisposes older adults to falls because of the reduced ability to regain balance. Multiple studies have shown that vitamin D supplementation can reduce falls by an average of 14% in specific populations7. These populations include community-dwelling older adults less than 80 years old, when the vitamin D is used in conjunction with calcium therapy, when there has been no previous history of falls and when the supplement has been used for at least 6 months at doses of 800 IU or greater7. The US Preventative Services Task Force (USPSTF) recommends 600 IU per day of vitamin D for adults 51-70 and 800 IU for those older than 70 years in order to receive maximum benefit3. Vitamin D replacement is a viable option for many older adults to reduce falls risk. Older adults should have their vitamin levels checked to determine if taking a vitamin D supplement would be beneficial.

 Most research in falls prevention has been done in the community. This is great because the majority of older adults live in the community, however the population is so diverse, that it makes generalization of prevention programs very challenging. Many strategies have been examined and have had varying efficacies and effectiveness. It is generally agreed upon that the key elements in fall prevention include education and skill building to increase knowledge, exercise to improve strength and balance, home modification and medication assessment4. Using these possible interventions alone or in combination is still up for debate among many researchers. Home modification has been significantly studied as a falls prevention intervention and fairly easy for any discipline to complete. Examples of home modification include removing throw rugs, having adequate lighting or grab bars in the shower5. Reviewing the effectiveness of home modification, it is found that they are more beneficial for frequent faller but should never be used as a sole prevention intervention1.

 Exercise has been used as both a singular intervention and part of a multifactorial approach. There is a large body of evidence supporting the use of exercise in either of these two capacities. Inactivity or sedentary lifestyle doubles the risk of disability and triples the risk of mortality8. Regular exercise has the ability prevent the onset of many of the disease or disability that can lead to increased falls risk8. Additionally, exercise can restore function that has been previously lost. Exercise alone is effective in reducing falls by 13% if generalized exercise is used and up to 24% if individualized exercised is used8. Exercise programs should include strength, balance and endurance training for a minimum of 12 weeks1. Furthermore, a 12 month targeted exercise program has the ability to reduce fall risk by 40%. The USPSTF recommends that exercise, physical therapy and vitamin D supplements should be used to prevent falls in community-dwelling older adults who are at increased risk for falls2. Appendix B provides recommendations for healthcare professionals developing and exercise program for older adults at varying levels of risk for falling. Older adults should really be at risk for falls before a prevention strategy is implemented. There is little evidence to support targeted interventions to prevent falls for those older adults who are not currently at risk for falling.

 Much of the recent evidence has focused on multifactorial strategies to reduce falls risk. Multifactorial interventions are more effective with older adults with a history of falling1. In fact, these interventions can reduce falls by as much as 47% when targeted, specific exercise is used as part of the combination8. Components of multifactorial strategies include medication review, exercise, vision correction and home modifications1. These strategies can be used in any number of ways and their efficacy is not well established for the general population. As already mentioned, multifactorial interventions may best serve those who have fallen at least twice in the past year or have fallen only once but have gait or balance impairments2 and may not be as effective for those who have never fallen. These interventions were all designed for community-dwelling older adults and have had varying degrees of effectiveness and the generalizability between programs is lacking. It is clear, however that targeted exercise may be the best option for those who are at risk for falling.

 The community is not the only places where older adults fall. Falls occur in a large percentage of the time in institutions and hospitals. About half of all institutionalized older adults fall each year7 and falls account for 40% of all accidents in the hospital and 42% of those result in injury9. A fall in hospitals accounts for an average of 7.5 day increase in length of stay and $4200 more in hospital bills9 compared to those who do not fall. That is a large burden on the healthcare system and on the individuals and explains why falls in hospitals are so critical to prevent. There are many risk factors that healthcare professionals need to be aware of that predispose an older adult to falling in the hospital. These include mobility problems, confusion, cognitive impairment, visual impairment, incontinence, orthostatic hypotension, certain medications and restraints10. An individual’s previous history of falls is also important to note. A person who has fallen before is 5-6 times more likely to fall in a hospital10 than those who have not previously fallen.

 Interventions in the hospital setting are vital for reducing the incidence of falls. There have been a few studies that highlight some of these interventions, but the efficacy of them is largely in part up to the nursing staff. There has been low compliance of the nursing staff with interventions to reduce falls with the most common reasons being time constraints and that the interventions will not help10. Common fall prevention strategies that have been utilized in hospital and have been found to be effective include signs to alert the nursing staff if a person is at risk for falls, bed or chair alarms, and nonskid footwear9. These are simple strategies to implement and generally have good compliance. Other interventions that require more time and harder to maintain nursing compliance include practicing mobility with the patients, using half the bed rail instead of the full bedrail, developing a toileting schedule and not using restraints10. All of the interventions listed have proven effectiveness if implemented consistently and appropriately.

 It is clear from the evidence that there are multiple strategies that can be used to prevent falls in the older adult population, either in the community or in institutions. Any of these strategies can be effective but the key throughout all of these is to make sure that the intervention is specific to the individual. The best interventions are ones that meet the needs of the individual9. It is not practical to assess all risk factors in determining if a person is at risk for falls. History of falls, mobility of problems and poor results on the Timed-Up-and –Go test may be the most practical way to determine falls risk2. Likewise, it is not feasible to implement all intervention strategies for each individual. Healthcare professions, regardless of disciple, need to accurately determine what the true need of each older adult is and make referrals as appropriate. Additionally, changing behavior, building self-confidence and providing education are key elements8 that everyone can do to help prevent falls. Overall, there is no one intervention that is going to work on everyone. This is what it important for healthcare professionals to remember.

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Appendix A

Rose D. Preventing falls in older adults: No “one-size suits all” intervention strategy. *JRRD*. 2008; 45(8): 1153-1166.