

Evidence-Based Strategies for Injury Prevention and Exercise Prescription in Elderly Communities: The Physical Therapist's Perspective

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ABSTRACT

Injury prevention and exercise prescription are critical components of healthcare for older adults. Physical therapists play a critical role in fall risk screening, assessment, and prevention in elderly communities. By incorporating STEADI (Stopping Elderly Accidents, Deaths, and Injuries) and other evidence-based tools and resources, physical therapists can help identify and address fall risk factors, link older adults with community-based programs and resources, and reduce the incidence of falls and related injuries in this population.

Evidence-based interventions for fall prevention include exercise interventions that are tailored and include a combination of exercise types, considering individual abilities and preferences. Exercise programs can reduce falls in older people living in residential aged care facilities, but exercise has little or no lasting effect on falls after the end of a program. Physical therapists should consider the patient's fall risk, functional limitations, and comorbidities when prescribing exercises for balance and falls prevention.

Physical therapists can help elderly communities implement evidence-based strategies for injury prevention and exercise prescription by adopting a person-centered approach, challenging ageist stereotypes, using sound outcome measures, prioritizing physical activity, and collaborating with other healthcare professionals. By doing so, physical therapists can promote the health, independence, and well-being of older adults, and help them lead active, fulfilling lives.

A combination of strength, balance, and functional training exercises, as well as other evidence-based strategies, can significantly reduce the risk of falls in elderly communities. Physical therapists and healthcare providers

should consider these interventions when developing fall prevention programs for older adults. Exercise interventions for preventing falls in elderly communities should be implemented regularly, with a frequency of at least three sessions per week, and for a duration of up to 12 months.

Key Words: Elderly communities, injury prevention, exercise prescription in elderly, falls prevention, aging

INTRODUCTION

Aging is a natural physiological phenomenon that cannot be prevented but injury resulting from falls are preventable. One of the most common and serious problems among the elderly communities is falling [1]. The most common injuries among the elderly occur due to falls. The World Health Organization (WHO) defines a fall as any incident that causes a person to unintentionally come to rest on the ground, floor, or another lower level; this definition does not include intentional changes in position to rest on walls, furniture, or other objects [2]. Falls can cause fatal or non-fatal injuries. Falls are linked to worse life quality and increased medical expenses.

The prevalence of falls in people over 65 is 30% in the USA, 13.7% in Japan, 26.4% in China, and 53% in India [3]. Research has also shown that the prevalence of falls is higher in older women than men [4].

According to the Centers for Disease Control and Prevention (CDC), falls are common and costly, especially among Americans age 65 years and older. Every

second of every day, an older adult (age 65+) suffers a fall in the United States - making falls the leading cause of injury and injury death in the elderly population. About 36 million falls are reported among elderly each year resulting in more than 32,000 deaths in the U.S. while about 3 million older adults are treated every year in emergency departments for a fall injury [5]. Medication, osteoarthritis, depression, dizziness, and abnormalities in balance and gait (caused by damage to the cerebellum or in relation to age-related degenerative changes in the middle and inner ear) are some of the possible causes of the fall. Falls can also result from medication-induced muscle weakness or aging. The use of assistive devices, age over 80 years, postural hypotension and impaired vision (decreased adaptive power, lens opacity), and chronic diseases are among the causes of falls [6,7,8].

Common causes of falls in elderly communities include medication use, cognitive impairment, sensory deficits, environmental hazards, poor lighting, loose rugs or electric cords, visual impairment, failing to notice environmental hazards, obstacles, hypotension, rushing to the bathroom, slippery shoe wares, increasing age, and rushing to answer the telephone [9, 10]. A multidisciplinary approach is required to address these risk factors, as falls in older adults are often multifactorial and can lead to significant morbidity, mortality, and loss of independence [10]. The Morse Fall Scale (MFS) is often used to identify and score fall risk factors, taking into consideration a patient's history of falls, secondary diagnoses, intravenous (IV) access, ambulatory aid, gait type, and mental status.

Recent studies have shown that fall prevention programs can reduce the rate of falls in the elderly. For example, an interactive group had a relative risk of falling of 0.39 compared with the control group when interventions included the modification of environmental hazards and the evaluation and treatment of blood

pressure, vision problems, and mental status changes, including depression.

Injuries related to falls in older adults most commonly include slipping, tripping, and stumbling. Residents have the risk of falling down the stairs, tripping over loose carpets or electrical cords, and being blinded by dim lighting. Nursing home residents are also at risk of falls secondary to wet floors, restraints, bed rails, and other environmental hazards [10]. The older adults most commonly suffer injuries due to falling, with the majority of falls being due to slipping, tripping, and stumbling.

According to the Centers for Disease Control and Prevention (CDC), one out of five falls causes a serious injury such as broken bones or a head injury, and each year, 3 million elderly patients receive treatment for falls in emergency rooms. [11].

Physical therapists play a crucial role in preventing common injuries among elderly communities. Some of the common injuries that physical therapists help prevent include falls, burns, strains, fractures, chronic pain, and overuse injuries. By working with elderly individuals, physical therapists can address issues related to strength, balance, flexibility, and mobility, which are essential in reducing the risk of falls and injuries in this population. Additionally, physical therapists can provide guidance on proper body mechanics, posture, and exercises tailored to improve strength, flexibility, balance, and stability, all of which are crucial in preventing injuries in older adults. Through personalized exercise programs and rehabilitation plans, physical therapists can help older adults maintain their independence, improve their quality of life, and reduce the risk of common injuries associated with aging.

The importance of injury prevention and exercise prescription in elderly communities cannot be overstated. According to the Centers for Disease Control and Prevention (CDC), falls are a leading cause of injury and death among older adults, with one in four adults aged 65 and older falling each

year [12]. The CDC has created the Stopping Elderly Accidents, Deaths, and Injuries (STEADI) initiative to help healthcare providers, including physical therapists, use fall prevention in routine care for older adults [12]. By incorporating STEADI into the curriculum of the Doctor of Physical Therapy (DPT) program at Mercer University, Dr. David Taylor has trained over 100 students to use STEADI, leading to a reduction in falls and injuries among older adults [12].

Regular physical activity and exercise are also crucial for healthy aging and chronic disease management. Exercise has been shown to improve cognition, lower the risk of dementia, improve the ability to perform activities of daily living, and enhance treatment for chronic diseases such as osteoarthritis, diabetes, and dementia [13]. Despite the well-known benefits of exercise, more than 33% of adults aged 65 and older reported no leisure-time physical activities in 2013, and only 16% met national guideline recommendations for physical activity [13]. Exercise-related barriers include inadequate information, low motivation, and ill health.

Clinical recommendations for older adults include any physical activity being better than being sedentary, reducing sedentary time having cardiovascular, metabolic, and functional benefits, resistance training preserving muscle strength and physical functioning, flexibility exercises improving and maintaining joint range of movement, and balance exercises reducing falls in older adults at risk of falling [13]. The American Physical Therapy Association recommends that underdosed strength training programs should not be prescribed for older adults, and instead, the frequency, intensity, and duration of exercise should be matched to the individual's abilities and goals [13].

The physical therapist's perspective on screening and assessment of fall risk factors in elderly communities emphasizes the importance of identifying and addressing risk factors to prevent falls and related injuries. Physical therapists play a crucial

role in assessing older adults' balance, mobility, strength, and other factors that contribute to falls.

The Centers for Disease Control and Prevention's Stopping Elderly Accidents, Deaths, and Injuries (STEADI) initiative provides tools and resources for healthcare providers, including physical therapists, to screen older adults for fall risk, assess modifiable risk factors, and recommend effective fall prevention approaches [12].

Evidence-based falls prevention programs, such as A Matter of Balance, Stepping On, Tai Chi for Better Balance, and the Otago Exercise Program, have been shown to decrease multiple risk factors for falls, decrease falls and fall-related injuries, and are low-cost or free for older adults.

Physical therapists can help link older adults with community-based programs and resources to increase physical activity, reduce fall risk, or manage chronic diseases. Community organizations supporting older adults would benefit from building relationships with healthcare providers, including physical therapists, to increase screenings and awareness of and referrals to evidence-based programs and locally available resources.

As professionals who diagnose and treat deficiencies in strength, mobility, and balance, physical therapists and physical therapist assistants (PTAs) are essential components of the fall prevention team. Clinical best practice recommendations state that physical therapy providers should routinely screen older adults for fall risk and provide tailored exercise programs to address identified deficits. Community-based fall risk screenings by PTs and PTAs, particularly those using the STEADI toolkit, could expand the reach of fall risk screenings and older adults' engagement in community interventions and resources. However, more research is needed to understand the impact of PTs conducting pro-bono community fall risk screenings in the US, including the reach of these screenings, PTs/PTAs' knowledge and use of the STEADI, and PTs/PTAs' referral of

older adults to support falls prevention after screenings [14].

The STEADI (Stopping Elderly Accidents, Deaths, and Injuries) initiative, developed by the CDC, is a comprehensive program aimed at reducing falls among older adults by providing healthcare providers with tools and resources to integrate fall prevention into routine clinical practice [15, 16, 17]. This initiative is crucial as falls are a significant threat to the health and well-being of older patients, with more than one out of four people aged 65 and older falling each year in the United States [15].

The core elements of the STEADI initiative include screening patients for fall risk, assessing modifiable risk factors, and intervening to reduce risk using effective clinical and community strategies [15, 16]. By implementing these elements, healthcare providers can substantially impact falls reduction, improve health outcomes, and decrease healthcare expenditures related to fall injuries [15, 16].

The STEADI toolkit offers a range of resources for healthcare providers, such as falls screening options, information on medications linked to falls, standardized gait and balance assessment tests, online trainings for continuing education, and educational brochures for patients and caregivers specifically designed for fall prevention [17]. These resources empower healthcare providers to identify patients at risk for falls, address modifiable risk factors, and refer patients to community programs or specialists when needed, ultimately reducing the chances of falls and serious injuries like hip fractures [17].

Thus, the STEADI initiative plays a vital role in promoting older adult health and independence through fall prevention by equipping healthcare providers with the necessary tools, knowledge, and strategies to assess, treat, and refer older adult patients based on their fall risk, thereby enhancing patient safety, well-being, and quality of life [18].

Evidence-based interventions for fall prevention and exercise prescription

Evidence-based interventions for fall prevention include exercise interventions, which are recommended by the U.S. Preventive Services Task Force (USPSTF) for community-dwelling adults aged 65 years or older who are at increased risk for falls [19].

The World Health Organization guidelines recommend that all older adults undertake physical activity for fall prevention, which can lead to reduced mortality, improved cardiovascular health, mental and cognitive health, and sleep [20]. In community-dwelling older adults, there is high certainty evidence that exercise reduces falls and that balance and functional exercises, plus resistance and possibly Tai Chi, successfully prevent falls [21].

Evidence-based exercise prescription for balance and falls prevention includes exercises that improve balance, strength, flexibility, and endurance. Physical therapists should consider the patient's fall risk, functional limitations, and comorbidities when prescribing exercises [22].

Collaborative strategies for injury prevention and exercise prescription in elderly communities involve partnerships between healthcare providers, community organizations, and older adults to promote safe behaviors and prevent falls.

One approach is the Stopping Elderly Accidents, Deaths, and Injuries (STEADI) initiative developed by the CDC, which offers training and resources to healthcare providers to incorporate fall prevention strategies into their clinical practice [23]. This includes screening for fall risk, assessing modifiable risk factors, and implementing effective clinical and community strategies to reduce risk.

Another strategy is the use of assistive devices, such as personal mobility devices and body-worn aids, to reduce fall hazards in home, outdoors, and public places [24]. Some assistive devices that can help prevent falls in elderly communities include:

1. Grab bars in the bathroom for support and stability.
2. Raised toilet seats with armrests for easier use.
3. Non-slip mats for the bathtub or shower to prevent slipping.
4. Bath boards to aid in bathing.
5. Sturdy plastic seats for the shower or tub with a hand-held shower nozzle for seated bathing.
6. Walk-in showers for safer bathing.
7. Chair raisers to assist in getting up from low chairs or sofas.
8. Seat lifts to help transition from sitting to standing.
9. Handrails on stairways for support.
10. Stairlifts for homes with split-levels.
11. Walking aids like canes, tripods, walking frames, and rollators for better balance.
12. Reaching aids to safely retrieve items without overstretching.
13. Sensor-activated lights for better visibility.
14. Alarms for fall detection and assistance.

These assistive devices can help older adults maintain their independence and mobility while reducing the risk of falls and injuries. Exercise interventions, particularly those that are multicomponent and include balance training, have been found to be effective in preventing falls in older adults living in the community [25]. A meta-analysis of randomized controlled trials found that exercise significantly reduced the risk of fall-related injuries, including events needing medical care or resulting fractures, especially in older adults at high risk of falling or with osteoporosis [26]. Collaborative efforts between healthcare providers, community organizations, and older adults can help promote safe behaviors, prevent falls, and reduce the risk of injury in elderly communities. Evidence-based strategies for injury prevention and exercise prescription in elderly communities are crucial for promoting the health and well-being of older adults. Physical therapists play a

crucial role in helping elderly communities implement evidence-based strategies for injury prevention and exercise prescription. By adopting a person-centered approach, anti-ageist beliefs, and interprofessional collaborative practice, physical therapists can enhance the care provided to older adults. Some examples of evidence-based strategies for injury prevention and exercise prescription in elderly communities [27, 28, 25]:

1. Exercise Programs for Fall Prevention:

Exercise programs that target both strength and balance and include balance training appear to be particularly effective in preventing falls in older adults. A systematic review of randomized controlled trials (RCTs) found that exercise interventions reduce the rate of falls by 23% in community-dwelling older adults, with balance and functional exercises, programs involving multiple types of exercise, and Tai Chi being particularly effective.

2. Home-Based Exercise Programs:

Prescribed home exercise programs should provide a high challenge to balance, offer additional home exercise resources, and be monitored and tracked in order to encourage and support participants in completing the recommended exercise dose.

3. Exercise Dosage: Interventions with a total weekly dose of 3+ hours that include balance and functional exercises have been found to be particularly effective in reducing falls in older adults.

4. Multifactorial Interventions:

Multifactorial interventions that address various risk factors for falls, such as environmental hazards, medication management, and vision assessment, have been shown to have a small benefit in preventing falls in older adults.

5. Vitamin D Supplementation: The USPSTF recommends against vitamin D supplementation to prevent falls in community-dwelling older adults, as it has no benefit in preventing falls in this population.

6. Person-Centered Care: Physical therapists should provide person-centered care, which involves understanding the unique needs, preferences, and goals of each older adult, in order to develop tailored exercise programs that promote safety, independence, and overall well-being.

7. Anti-Ageist Beliefs: Physical therapists should challenge ageist stereotypes and promote the idea that older adults can still lead active, healthy lives. By adopting anti-ageist beliefs, physical therapists can help older adults overcome barriers to exercise and physical activity, such as fear of injury, lack of motivation, or negative self-perceptions.

8. Holistic Assessment and Evaluation: Physical therapists should use sound outcome measures to assess older adults' physical function, health status, and quality of life, in order to identify areas of concern, develop targeted interventions, and monitor progress over time.

9. Interprofessional Collaborative Practice: Physical therapists should collaborate with other healthcare professionals to provide comprehensive care to older adults, in order to ensure that exercise programs are integrated into the individual's overall care plan and that any potential risks or complications are identified and addressed in a timely manner.

By implementing these evidence-based strategies, physical therapists can help elderly communities prevent injuries and maintain their independence and overall well-being.

Some examples of evidence-based exercise interventions for preventing falls in elderly communities include:

1. Balance and Functional Training Interventions: These interventions typically involve exercises that focus on improving balance, gait, and functional abilities. They have been found to reduce falls in older adults living in the community and are often recommended as part of fall prevention programs [29, 25].

2. Tai Chi Programs: Tai Chi interventions have shown effectiveness in reducing falls among older adults. These programs typically involve a series of slow, flowing movements that improve balance, strength, and flexibility, making them a valuable component of fall prevention strategies [29, 25].

3. Multicomponent Exercise Programs: Programs that include multiple types of exercises, such as balance, strength, and functional training, have been successful in reducing the rate of falls in older adults. These comprehensive exercise regimens are tailored to address various aspects of physical function and are recommended for fall prevention [29, 25].

4. Home-Based Exercise Programs: Prescribed home exercise programs that provide a high challenge to balance, offer additional resources, and are monitored and tracked have been effective in encouraging older adults to complete the recommended exercise dose. These programs can be a convenient and sustainable way to prevent falls in elderly communities [27].

5. Ongoing Exercise Programs: Exercise interventions that are offered on an ongoing basis, meeting the duration recommendation, are crucial for sustaining the effects of fall prevention efforts. Consistent participation in exercise programs over time is essential for maintaining physical function and reducing the risk of falls among older adults [27].

By incorporating these evidence-based exercise interventions into fall prevention programs for elderly communities, physical therapists and healthcare providers can effectively reduce the incidence of falls, improve balance and strength, and enhance the overall well-being of older adults.

Exercise interventions have been shown to have a moderate benefit in preventing falls in older adults at increased risk for falls, as demonstrated by a systematic review of randomized controlled trials [28]. Exercise interventions that reduce falls involve primarily balance and functional exercises, while programs that probably reduce falls

include resistance exercises, with a 24% reduction in the rate of falls compared with control [21, 25]. Exercise regimens that decrease falls mostly focus on functional and balancing exercises, but programs that most likely minimize falls also incorporate resistance training [21]. Programs involving multiple types of exercise, such as balance and functional exercises plus resistance exercises, have also been found to reduce falls by 34% [21]. Tai Chi may also reduce falls, with a 19% reduction in the rate of falls compared with control [21]. Exercise interventions that reduce falls involve primarily balance and functional exercises, while programs that probably reduce falls include resistance exercises, with a 24% reduction in the rate of falls compared with control [21, 25]. Greater attention should be given to the widespread implementation of lifelong exercise to maximize physical functioning in older age, as suggested by the WHO [21].

The most effective exercise interventions for preventing falls in elderly communities involve a combination of strength, balance, and functional training [25, 29]. These interventions have been shown to reduce falls by up to 50% in community-dwelling older adults, with gains that may last as long as the training is maintained [25, 29]. The World Health Organization recommends that older adults adopt an active lifestyle that includes physical activity and fall prevention exercises, as this moderate amount of physical activity has been shown to reduce the risk factors associated with falls by up to 50% and eventually reduce the risk of falls [25, 29].

In addition to exercise interventions, other evidence-based strategies for fall prevention in elderly communities include home modifications, medication management, and vision assessment [25, 29]. These interventions can address various risk factors for falls and should be integrated into a comprehensive fall prevention program for older adults.

Exercise interventions for preventing falls in elderly communities should be implemented

regularly, with a frequency of at least three sessions per week, and for a duration of up to 12 months [28]. These interventions should target both strength and balance, and be tailored to the individual needs and abilities of the elderly community members. Additionally, the use of a multifactorial intervention has also been found to be effective in reducing falls among older adults living in the community.

Challenges and future directions for injury prevention and exercise prescription in elderly communities from the physical therapist's perspective involve addressing awareness gaps, misconceptions, and barriers to accessing preventive services [28].

1. Awareness Gap: One challenge is the lack of awareness among older adults regarding the role of physical therapists in falls prevention. Many older adults perceive physical therapy as a treatment for specific problems or injuries, rather than a preventive measure. Future directions should focus on educating older adults about the preventive role of physical therapists throughout their care episodes.

2. Misconceptions and Underutilization: Older adults often underutilize physical therapists for falls prevention, believing they should only seek treatment after a fall or for a specific problem. Addressing these misconceptions and promoting the proactive role of physical therapists in preventing falls is crucial for improving access to preventive services.

3. Barriers to Access: Barriers such as concerns about costs, time, convenience, and the perception that a doctor's prescription is required to see a physical therapist hinder older adults from seeking preventive care. Overcoming these barriers through improved access, education, and awareness can enhance the utilization of physical therapy services for falls prevention.

4. Future Directions: Future efforts should focus on integrating standards and guidelines for fall prevention into physical

therapy practice, developing specific clinical guidance statements, and enhancing the role of physical therapists in managing fall risk in older adults. Collaboration between diverse entities, investment in guideline development processes, and the creation of physical therapy-specific guidelines are essential for improving the quality of care and reducing fall-related injuries in elderly communities.

By addressing these challenges and focusing on future directions that promote awareness, combat misconceptions, and improve access to preventive services, physical therapists can play a vital role in enhancing injury prevention and exercise prescription in elderly communities.

The sources provided highlight the critical role of physical therapy in injury prevention and exercise prescription for elderly communities. The implications for physical therapy practice and policy in this context include:

1. Integration of Standards and Guidelines: Physical therapists should work towards integrating standards and guideline development processes to minimize confusion, improve quality of care, and enhance the management of fall risk in older adults. This involves careful deliberation, investment, and the development of physical therapy-specific clinical practice guidelines to provide precise exercise parameters and delivery models [30].

2. Screening and Assessment: Physical therapists should prioritize screening older adults for fall risk factors, balance impairments, and mobility issues. Following positive screenings, targeted multifactorial assessments and interventions should be implemented to address individual needs effectively. This approach ensures a comprehensive evaluation and tailored intervention plan for each older adult to reduce the risk of falls [31].

3. Exercise Prescription and Management: Physical therapists play a crucial role in prescribing appropriate exercise programs for older adults to

improve strength, balance, and mobility. These exercise interventions are essential for preventing falls, reducing the risk of fractures, and enhancing overall physical function and quality of life in elderly populations. Tailoring exercise programs to individual abilities and goals is key to maximizing the benefits of physical activity in older adults [13].

4. Collaboration and Advocacy: Physical therapists should collaborate with healthcare providers, community organizations, and policymakers to advocate for policies that support fall prevention initiatives and promote access to evidence-based exercise programs for older adults. By working together across sectors, physical therapists can contribute to creating a supportive environment that prioritizes injury prevention and exercise prescription in elderly communities [30, 13].

CONCLUSION

Injury prevention and exercise prescription are critical components of promoting healthy aging in elderly communities. Physical therapists are well-positioned to provide evidence-based strategies to prevent injuries and promote safe and effective physical activity for older adults. By conducting comprehensive assessments, identifying individual fall risk factors, and providing individualized exercise prescriptions, physical therapists can help older adults maintain functional independence and improve their quality of life.

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