COMMENTARY

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Fear of Falling: Significant Barrier in Fall Prevention Approaches

Abstract: *Fear of falling is a critical component in fall prevention approaches; however, it is often overlooked in the majority of fall prevention exercises. Alternative fall prevention approaches that take fear of falling into account are necessary. This article discusses fall prevention activities that are feasible for individuals with limited mobility who have an increased fear of falling. Health care providers should consider the degree to which a patient has a fear of falling and recommend activities that fit most to their patient's comfort level.*

Keywords: older adults; exercises; low intensity; upper limbs

The Need for Alternative Approaches in Fall Prevention

A majority of people view falls as unavoidable events in the natural aging process. However, multiple factors can impact the likelihood of falling. One way of understanding the variables that may impact the occurrence of falls is through a three-factor cycle: functional, psychological, and behavioral. Gait quantity and quality declines through aging (functional).[1] These declines aggravate the risk of fall which, in turn, heightens fear of falling (psychological). The fear of falling then reduces physical and social activities (behavioral) and further decreases gait quantity and quality (functional). These three changes are tightly intertwined and increase the likelihood of falling as the cycle accelerates. Preventing older adults from initiating such a cycle or intervening into the ongoing cycle is the ultimate goal of fall prevention approaches.

> Low-intensity exercises and increased arm usage are excellent alternative approaches

As discussed by Bergen,[2] functional characteristics of older adults have a strong link with fall and fall-related injury; improving functionality is a primary fall prevention strategy. Because functionality declines with age, a variety of exercise interventions for functional improvement has been introduced.[3,4] Certain exercise interventions, such as cardiovascular exercise and balance training, improve functionality in older adults, suggesting considerable scope for functional improvement in older adults through daily exercise. However, many adults who have reduced capability for movement may be unable to perform these exercises. Those with reduced mobility are likely to have a heightened fear of falling that reduces the likelihood of engaging in treatment to improve function.

Management of fear of falling is critical in fall prevention approaches. Individuals with high fear of falling are less likely to engage in exercise, particularly of moderate- to high-intensity forms.[5] From a behavioral perspective, anxiety (or fear) is typically followed by avoiding potential threats.[6,7] Mobility-regaining interventions that do not take fear of falling into account are likely to have low adherence rates. As fear of falling increases, the likelihood that an individual will engage in an avoidant

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coping strategy also increases. In this instance, the avoidant coping strategy would decrease overall movement. In order to stop the cycle of falls, alternative fall prevention approaches addressing fear of falling are necessary.

Alternative Approaches to Improve Lower-Limb Function in Fall Prevention

Exercise intensity and the type of postural control required (static vs dynamic) are two important factors to be considered when recommending exercise interventions for older adults with a high risk and high fear of falling. According to Bergen,[2] older adults with health characteristics such as depression, stroke, arthritis, and diabetes reported higher percentages of falls. Many fall prevention strategies include high-intensity and cardio-intensive exercises; however, older adults with mobility impairments that are associated with disease often cannot perform these types of activities. Lower-intensity interventions must be available for these individuals. Dynamic postural control is also extremely important to consider for older adults. Indeed, the majority of falls that led to emergency department visits occur at home—specifically in the bedroom, stairs, and bathroom.[8] Each of these places in the home requires considerable dynamic postural control, such as getting up from a bed, climbing stairs, or getting into a bathtub. Interventions that emphasize both the necessary intensity levels of activity and dynamic postural control are the most suitable fall prevention approaches.

Tai-Chi and Yoga

Tai-chi is comprised of slow, low-intensity, and dance-like movements that emphasize dynamic postural control such as trunk rotation, balance, and body segmental coordination.[9,10] It has been used as a training activity with community-dwelling older adults to reduce the risk of falls and fear of falling.[11,12] Similar results were noted in a Tai-chi intervention in older adults with osteoarthritis, indicating that Tai-chi is also suitable for individuals with comorbidities.[13] Yoga is another low-intensity activity that is commonly known to have similar benefits of Tai-chi.[14,15] Tai-chi and yoga improve gait measures such as hip extension, stride length, flexibility, range of motion, and functional balance—mitigating the risk of falling in older adults.[11,13,15] Improvement in gait measures further enhances confidence and helps to combat fear of falling. Increasing balance and coordination through these activities will likely translate into better performance of everyday activities and reduction of falls in places like the bedroom, bathroom, or stairs.

For individuals with an especially high fear of falling, chair-based exercises are recommended. Chair-based exercises have been proposed as acceptable alternative activities for older adults with mobility limitations.[16] These exercises can be performed with the support of a chair or even in a seated position. Chair-based aerobic and chair-based strength training exercises have shown to be functionally beneficial, with the chair-based aerobic exercise significantly decreases fear of falling.[17] These chair-based exercises not only improve the self-perceived risks of falling but also mobility and independence in activities of daily living. As patients report a decline in fear of falling through these activities, health care providers should recommend advancing to Tai-chi and yoga from chair-based exercises.

Importance of Upper-Limb Function in Fall Prevention

Age-related declines in upper-limb function are often overlooked in fall prevention approaches due to the nature of falls.[18,19] As discussed in the issue by Bergen,[2] reduced upper-limb function, such as declined bathing and dressing abilities, is associated with falls. Upper-limb function, particularly reach-to-grasp movements, plays a critical role in the event of fall. For instance, a compensatory reaching reaction to guide an arm and grasp a supporting object is performed when a fall begins.[20] The rapid reach-to-grasp movement can "brake" fall; however, the accuracy of such rapid reaching movement is more variable in older adults, which may attribute to declines in an awareness of one's limb position in the space.[21,22] Less consistency in reaching accuracy may lead to a lack of confidence in such rapid movements and, ultimately, contribute to a heightened fear of falling. Together, maintaining or improving upper-limb function may also contribute to breaking the cycle of falls in older adults. In the light of this, a wide range of exercises—including cardiovascular, motor-coordinative, and resistance training—has been used in upper-limb function training.[3] Much of the work done in this area is with high-intensity interventions. However, as discussed above, high-intensity exercises are not feasible in older adults with a heightened fear of falling, and novel approaches for maintaining or improving upper-limb function are necessary.

The benefit of high-frequency upper-limb usage in the awareness of limb position in the space has been demonstrated. For instance, older adults who are involved in upper-limb activities for longer periods have a better awareness of their limb position.[23] This suggests that maintaining or improving upper-limb function is possible through extensive arm usage in daily life. Activities introducing a variety of movements may be the most suitable for upper-limb training as individuals may be able to

generalize trained movements to compensatory reaching reactions.[24] Performing reaching and grasping movements with different object shapes or putting obstacles that impede direct reaching may improve reach-to-grasp movements. The simplest activity could be a card game, in which individuals have to coordinate their arm and hand to reach and grasp cards. These activities can be performed from a seated position, which provides a support for older adults with fear of falling. The difficulty of reach-to-grasp movements should increase as one becomes comfortable with the concurrent movements. Such increase in the movement difficulty can be accomplished by increasing the weight of objects. Transitioning the body position from a seated position to a standing position, with or without a supporting surface, also increases the difficulty. Collectively, movement around the kitchen is a well-suited environment for reach-to-grasp movements since there is a wide range of objects and obstacles.

Performing these activities frequently may improve upper-limb function and rebuild confidence in rapid compensatory reaching response in case of fall. Such favorable changes may ultimately contribute to fall prevention since the changes attenuate fear of falling and encourage older adults to engage in other activities showing further functional improvements.

Conclusion

Fear of falling is a significant barrier in breaking the cycle of falls because it discourages individuals from engaging in overall activity.[5,6] Cardiovascular and motor-coordination exercises are typically recommended in older adults given their promising outcomes in functional improvements;[3,4] however, such "typical" activities are not feasible for many older adults with a fear of falling. Low-intensity exercises and increased arm usage are excellent alternative approaches for fall prevention in older adults with a fear of falling.[11,23] These activities not only reduce fear of falling but also improve function in this high-risk population.[2] Therefore, fall prevention approaches should be tailored based on individual's fear of falling and comfort level.

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