PROFESIONAL HEALTH JOURNAL
Volume 6, No. 1, December 2024 (Page. 168-176)
Available Online at https://www.ojsstikesbanyuwangi.com/index.php/PHJ/index
E-ISSN 2715-6249
DOI: https://doi.org/10.54832/phj.v6i1.784

Implementation of Maintaining Mobility to Reduce the Risk Falls in Elderly

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ARTICLE INFORMATION

Article history
Received (07 May 2024)
Revised (10 June 2024)
Accepted (01 July 2024)

Keywords
Elderly, Maintaining mobility, Risk Fall

ABSTRACT

Aging is associated with a decline in the physical and cognitive functions of the human body, which also involves the possibility of age-related diseases. In decreased physiological function, these disorders lead to a higher risk of falls in the elderly. Falls can threaten the safety of the elderly and result in various types of injuries and physical and psychological damage. Shock after a fall and fear of falling again can have many consequences, including anxiety, loss of self-confidence, restrictions in daily activities, and phobia of falling. Maintaining mobility is an effort that can be a preventive measure for falls through physical exercise, meeting nutritional needs, and regular health checks. This study aims to determine the effect of palliative care using a maintaining mobility approach to prevent the risk of falls in older people at PSTW Jember. This research design is pre-experimental, using a pretest-posttest group design approach. The total sample was 30 older people, and the study was carried out from January to April at PSTW Jember, using the Wilcoxon statistical test. The results showed a p-value of 0.0001. This indicates that preventing falls can be done with regular exercise in the form of regular physical activity, which is the basis for maintaining mobility in older people. The implementation of maintaining mobility for older people can affect the Morse Fall Scale score. In conclusion, there is an effect of maintaining mobility interventions to reduce the risk of falls in older people at PSTW Jember.

Introduction

The human body's ability to perform physical and cognitive activities declines with age, and age-related disorders may also become more prevalent. Physical degradation in the aging body results in a loss of muscle strength and lower limb coordination, as well as a drop in gait certainty and balance control. Older adults with these diseases have an increased risk of falls in addition to cognitive deterioration. Over thirty percent of individuals sixty-five years of age or older typically regarded as the age at which one is deemed elderly fall on average once a year. It is essential to lower the risk of falls in this population to stop the effects of such accidents from worsening. Inactivity in mobility can accelerate the decline in body function with negative impacts on balance

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control. It is estimated that 21% of the community-dwelling population over the age of 65 is frail. Frailty independently increases the risk of falls, worsened mobility, impaired function, daily activity disturbances, and even death (Thomas et al., 2019; Treacy et al., 2022).

Falls can threaten the safety of the elderly, leading to various types of injuries and physical and psychological harm. The prevalence of fall risk among the population over 55 years old is 49.4%, and among those over 65 years old, it is 67.1%. The incidence of falls each year among community-dwelling elderly rises from 25% at age 70 to 35% after age 75. Approximately 30% of elderly people aged 65 and older living in the community experience falls, with a portion of these experiencing recurrent falls. The psychological impact is significant: even without physical injury, the shock of falling and the fear of falling again can lead to anxiety, loss of confidence, restriction in daily activities, and a phobia of falling. Several measures can be taken to prevent falls among the elderly, including balanced nutrition, calcium intake, safe use of surrounding facilities, and physical exercise. Structured physical exercise can enhance the fitness of the elderly. Regular physical exercise can increase strength and agility, prevent falls, and improve the elderly's independence in daily activities. Additionally, physical exercise can improve body composition, such as fat and muscle mass, enhance immunity, strengthen muscles, promote heart health, regulate breathing, and reduce anxiety or depression (Fauziah et al., 2019; Shalahuddin et al., 2022).

Therefore, physical activity is required to address this issue. However, which workout regimens work best for this aim still needs to be determined. Increased physical exercise lowers the risk of deterioration and total morbidity and mortality by 30% to 50%. Training for balance and leg strength can effectively reduce the chance of falling. Since balance is the basis for moving and standing erect, balance training should be a major part of fall prevention. It has also been demonstrated that seniors with balance difficulties are more prone to fall than those with standard postural control, stressing the necessity of balance training for older people. Almost all research on fall risk in older people finds that physical activity, including leisure-time exercise, is an effective way to preserve balance control and avoid falls. Research has looked into numerous sorts of exercise, from Pilates and stair climbing to vibration training and dance. These have shown significant increases in balance skills, proving that physical activity can minimize the chance of falling (Ansai et al., 2016; Dunsky et al., 2017; Fernández-Argüelles et al., 2015; Sousa et al., 2017; Treacy et al., 2022; Zhao et al., 2017).

Self-Administered Balance-Enhancing Exercise Program (BEEP), *Walking Meditation,* and *MultiSystem Physical Exercise* (MPE) are among the most effective physical exercises for addressing the risk of falls in the elderly (Shalahuddin et al., 2022). Thomas et al. (2019) state that increased muscle strength correlates with improved balance. Maintaining mobility with aerobic and anaerobic components can yield positive results along with specific balance exercises integrated with resistance training facilities (Thomas et al., 2019). Based on the above research findings, it can be concluded that maintaining mobility is an alternative that can be used to maintain balance in the elderly. Physical activity combined with maintaining mobility can be performed to improve static balance in the elderly as a way to reduce the risk of falls in the future.

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Methods

This research is a type of quantitative study with a pre-experimental design using a pretest-posttest approach. The population in this study consists of elderly individuals at risk of falling, measured using the Morse Fall Scale assessment instrument. The total population of elderly individuals at risk of falling is 30 in PSTW Jember. By using total sampling, the sample size is 30 elderly individuals at risk of falling. The results of the intervention will be analyzed statistically using the Wilcoxon test with a confidence level of 95%.

Results

1. Respondent Characteristics

   Karakteristik responden pada penelitian ini adalah:

   a. The characteristics of the respondents in this study are as follows:

   Table 5.1 Respondent Characteristics Based on Gender

Characteristic	Number	Percentage (%)
Female	17	56,67
Male	13	43,33
Total	30	100

Source: Primary Data, 2024

Based on Table 5.1, the majority of respondents are female, with 17 respondents (56.67%).

   b. Respondent Characteristics Based on Age

   Table 5.2 Respondent Characteristics Based on Age

Characteristic	Number	Percentage (%)
60-74 years	23	76,67
75-90 years	7	23,33
>90 years	0	0
Total	30	100

Source: Primary Data, 2024

Based on Table 5.2, the majority of respondents are aged 60-74 years, with 23 respondents (76.67%).

   c. Respondent Characteristics Based on Disease History

   Table 5.3 Respondent Characteristics Based on Disease History

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Characteristic	Number	Percentage (%)
None	3	10
Cognitive Impairment	3	10
Musculoskeletal Disorders	10	33,3
Neurological Disorders	2	6,7
Respiratory Disorders	0	0
Visual Impairment	3	10
Cardiovascular Disorders	9	30
Total	30	100

Source: Primary Data, 2024

Based on Table 5.3, the majority of respondents have a history of musculoskeletal disorders, with a total of 10 respondents (33.3%).

d. Fall History

Table 5.4 Respondent Characteristics Based on Fall History

Characteristic	Number	Percentage (%)
None	22	73,33
Present	8	26,67
Total	30	100

Source: Primary Data, 2024

Based on Table 5.4, only 26.67% of the elderly respondents have a history of falls.

2. Risk of Falls in the Elderly

a. Risk of Falls in the Elderly Before the Maintaining Mobility Intervention

Table 5.5 Risk of Falls in the Elderly Before the Maintaining Mobility Intervention

Fall Risk	Number	Percentage (%)
No Risk	0	0
Low Risk	14	46,7
High Risk	16	53,3
Total	30	100

Source: Primary Data, 2024

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Based on Table 5.5, the majority of elderly respondents were at high risk of falls (53.3%) before the maintaining mobility intervention.

b. Risk of Falls in the Elderly After the Maintaining Mobility Intervention

Table 5.6 Risk of Falls in the Elderly After the Maintaining Mobility Intervention

Fall Risk	Number	Percentage (%)
No Risk	12	40
Low Risk	16	53,3
High Risk	2	6,7
Total	30	100

Table 5.6 shows that the majority of elderly respondents were at low risk of falls (53.3%) after the maintaining mobility intervention.

c. Effect of Maintaining Mobility on Fall Risk Prevention in the Elderly

Table 5.7 *Effect of Maintaining Mobility on Fall Risk Prevention in the Elderly*

Measurement	N	Mean	SD	P Value
Pre Test	30	2,47	0,507	0,0001
Post Test	30	1,67	0,606	

Source: Primary Data, 2024

Based on Table 5.7, the mean value obtained from all respondents before the intervention was 2.47, and after the intervention, it was 1.67. The p-value was 0.0001, indicating a significant effect of maintaining mobility on reducing the risk of falls in the elderly.

Discussion

Research indicates that the majority of diseases experienced by the elderly are musculoskeletal disorders, accounting for 33.3% with a high risk of falls of 53.3%. Musculoskeletal disorders in the elderly include deformities in the extremities, knee pain, and other musculoskeletal issues that impair the gait of the elderly, making them very susceptible to falls.

Falls are a serious issue faced by many elderly people worldwide. Injuries resulting from falls can have detrimental impacts on the quality of life, mobility, and independence of the elderly. However, with appropriate preventive measures, many falls among the elderly can be prevented. Falls in old age can have severe effects on both the physical and psychological health of the elderly. Several reasons why falls in the elderly are a serious problem include: **Physical Injuries:** Falls can cause serious physical injuries such as fractures, head injuries, bruises, or severe wounds. These injuries can complicate recovery and disrupt the quality of life for the elderly. **Fear and Lack of Confidence**: After experiencing a fall, many elderly people are haunted by fear and a lack of confidence in daily activities, which can lead to reduced mobility and independence. **Social Isolation**: Elderly individuals who fear falling tend to reduce social activities and activities

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outside the home, which can lead to social isolation and a decreased quality of life (Appeadu MK, 2023).

One of the most frequent and significant causes of disability, especially in the elderly, is falls. An unintentional event that results in a person coming to rest on the ground or another lower surface and is not brought on by a major intrinsic event (like a stroke) or a substantial hazard is referred to as a fall. Falls can be caused by a multitude of factors. Older people's vision, hearing, and reflexes are less keen than when they were younger. Diabetes, heart disease, and problems with the thyroid, nerves, foot, or blood arteries can all influence balance and lead to falls. Incontinence is one of the conditions that can make frequent trips to the restroom more likely. Older people who have some or all of a mild cognitive impairment. A substantial drop in blood pressure while rising from a seated or lying down position, age-related muscle mass loss (sarcopenia), problems with balance and gait, and dementia all contribute to the increased risk of falls in older adults with mild cognitive impairment or certain types of dementia. Painful foot conditions and potentially hazardous footwear, including high heels or backless shoes, might raise the risk of falling (Sudiartawan et al., 2017).

Neurological components generate normal walking: the brainstem basal ganglia system, muscle tone regulation, and the functional processing of sensory information such as vision, hearing, and proprioception. The danger of falling increases in older people because (1) these functions deteriorate with age, (2) the possibility of developing medical problems increases with age, and (3) related drugs frequently increase. People typically develop a wider gait as they age and a decline in walking speed, stride length, and lower limb strength. Falls are most frequently caused by an interaction between long-term and short-term environmental predisposing factors, such as adverse drug reactions, acute illness, or traversing uneven surfaces (Cuevas-Trisan, 2019; Park, 2018).

Risk factors for falls include a history of falls, diminished muscle strength, vision issues, walking difficulties, depression, orthostasis or dizziness, functional limitations, age over 80, female gender, incontinence, cognitive challenges, arthritis, diabetes, pain, and cardiovascular disorders. Polypharmacy is defined as taking more than four medications (Ang et al., 2020; Phelan & Ritchey, 2018).

Cardiovascular disorders experienced by the elderly generally include postprandial hypotension, a non-physiological cause of falls in the elderly, possibly due to autonomic system dysfunction or decreased cardiovascular function. Additionally, musculoskeletal disorders in the elderly are another cause associated with increased fall frequency, likely due to decreased muscle mass and neuromuscular function. Osteoporosis can cause femoral neck fractures in older adults, and this occurrence often confuses healthcare providers, especially when patients are uncooperative. Another cause of motor instability and increased fall percentage is the decline in diaphragm muscle strength. Reduced diaphragm strength and function cause instability in the back area, leading to falls (Park, 2018; Phelan & Ritchey, 2018).

Several prospective interventions have shown promise as preventive measures. The best strategy incorporates multidisciplinary cooperation in evaluation and intervention, focusing on exercise, current medical conditions, and lowering environmental risks for older people (Cuevas-Trisan, 2019). With different degrees of success, several studies have looked at how well-rounded intervention programs work to prevent falls in nursing homes. These intervention programs include environmental assessment, assistive device evaluation and modification, medication

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modifications, staff education, gait assessment and training, exercise programs, hip protector use, blood pressure testing, and mobility exercises. (Schoberer et al., 2022).

Research conducted over a period of 4 months with a frequency of 3 times a week shows that maintaining mobility is effective in preventing fall risks in the elderly. The maintaining mobility intervention given to 30 elderly individuals at risk of falling proved effective in reducing fall risks in the elderly with a p-value of 0.0001.

Consistent with previous research, mobility is crucial for maintaining independence and well-being, especially for the elderly. This is evident from the many interventions developed for the elderly with the aim of maintaining mobility. Three main types of interventions were identified: cognitive training, educational interventions, and exercise interventions. Detailed summaries and evaluations of each type of intervention, and current evidence regarding their effectiveness in maintaining mobility (Ross et al., 2013). Maintaining mobility as an effort to preserve mobility in old age includes several activities, namely: Regular physical activity is the foundation for maintaining mobility with age. Exercise helps strengthen muscles, improve balance, and increase flexibility. Aim to combine aerobic exercises, strength training, and stretching to keep the elderly body in good condition. Activities like walking, gardening, and yoga are excellent choices for the elderly. Proper Nutrition: A balanced diet is essential for overall health and mobility. A diet consisting of fruits, vegetables, whole grains, lean proteins, and healthy fats. Nutrients such as calcium and vitamin D are important for bone health, and getting enough protein is essential for muscle maintenance. Additionally, maintaining hydration is important in fulfilling nutrition in the elderly to support mobility (Chittrakul et al., 2020; Ross et al., 2013).

Fall Prevention Efforts are also important activities for the elderly as falls are a major concern for them, often causing injuries and loss of mobility. To prevent falls, provide a safe environment for the elderly by eliminating tripping hazards, adding grab bars in the bathroom, and ensuring adequate lighting. Wearing comfortable footwear and using assistive devices if needed, such as canes or walkers, can add stability. Another activity to maintain mobility in the elderly is Regular Health Check-ups at healthcare providers to monitor the overall health of the elderly and identify potential problems early. Conditions like osteoporosis, arthritis, and cardiovascular disease can affect mobility, and early detection and treatment can help manage these conditions effectively. Healthcare providers can also review medications to ensure they do not contribute to mobility problems and can adjust them if necessary (Chittrakul et al., 2020; Ross et al., 2013; Schoberer et al., 2022; Thomas et al., 2019; Vu et al., 2004).

Various exercise interventions have been studied, using both aerobic and non-aerobic approaches to target mobility in the elderly. Due to the variety of exercise interventions studied (and the large differences in definitions of aerobic and non-aerobic), interventions are divided into the following subcategories: walking, walking and cognitive, dancing, balance, flexibility and strength, combinations, and whole-body movements. Compared to maintaining regular activity, elderly individuals who regularly participate in walking programs show maintained or improved mobility or mobility-related function. The aforementioned walking interventions offer a straightforward, generally accessible, and effective form of exercise to the elderly. Additionally, there is evidence that some walking approaches involving additional cognitive or sensory components can provide greater physical benefits than walking alone. Moreover, balance and flexibility exercises have been proven to reduce fall risk in the elderly as they can increase muscle strength, enabling the elderly to maintain their range of motion and mobility (Chittrakul et al., 2020; Dunsky et al., 2017; Thomas et al., 2019).

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Interventions involving balance, strength, and flexibility elements are frequently implemented by researchers and practitioners who care for the elderly. Although the available information still makes it difficult to compare results between studies, considering their varying focuses. Despite the demonstrated beneficial impact of exercise on mobility maintenance, it remains unclear whether the elderly can independently adopt and consistently execute these programs.

Conclusions

The research results show that the implementation of maintaining mobility influences preventing the risk of falls in older people. It is hoped that the results of this research can be carried out sustainably by PSTW Jember and carried out consistently and periodically for older people and implemented not only for the elderly who have a high risk of falling but also for the elderly as a whole and maintaining a maintaining mobility program for older people to increase and strengthen mobility thereby minimizing the incidence of falls.

Ethics approval

The Health Research Ethics Committee of the Faculty of Health Sciences at Universitas Muhammadiyah Jember has certified that this research has passed its ethical examination, with the number 0022/KEPK/FIKES/XII/2024.

Acknowledgments

Researchers acknowledge to various parties who have assisted in the implementation of this research, especially to the Research and Community Service Institute of Muhammadiyah University of Jember, which provided internal research grants to the research team, enabling this research to proceed smoothly. Further thanks are extended to PSTW Jember and the East Java Social Affairs Office, which have provided facilities and support to us for conducting this research.

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