Literature Review

Reducing Fall Risk in Older Adults Through Balance Exercises: A Literature Review

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Abstract

Auditory The risk of falls is a common health problem among the elderly due to decreased musculoskeletal function and impaired balance. This condition can lead to injury, disability, and even death. One effective non-pharmacological intervention to reduce the risk of falls is balance exercise. This study aims to review studies analyzing the effectiveness of balance exercise in reducing the risk of falls in the elderly based on the results of previous research. This study used a literature review method by searching articles from the Google Scholar and ResearchGate databases. The search was conducted using the PICO format, namely Population (elderly), Intervention (balance exercise), Comparison (-), and Outcome (reduced risk of falls). Inclusion criteria included articles in Indonesian or English published between 2021 and 2025 with elderly subjects. A total of five articles met the criteria and were analyzed descriptively. Of the five articles reviewed, all showed that balance exercise has a significant effect on improving balance and reducing the risk of falls in the elderly. This exercise has also been shown to increase lower extremity muscle strength, motor coordination, and self-confidence in elderly activities. Balance exercise is effective in improving postural balance and reducing the risk of falls in the elderly. This exercise can be part of a fall prevention program that is easy for health workers to implement in the community and health care facilities.

Keywords: Elderly; risk of falls; balance; balance exercise; physical exercise.

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INTRODUCTION

The risk of falling is an unintentional event resulting from sustaining a hard blow, loss of consciousness, sudden paralysis from a stroke, or an epileptic seizure. The risk of falling is also a serious problem for the elderly, which can result in injury, decreased quality of life, and even death (Ramadhani & Retnaningsih, 2025). According to the Indonesian Ministry of Health, an elderly person (Lansia) is an individual aged 60 years and older. The aging process is a natural human phenomenon, characterized by a decline or change in physical, psychological, and social functioning in interactions with others. The risk of falling in the elderly is one of the most common geriatric syndromes in this age group (Rudi & Setyanto, 2019).

Globally, the number of elderly people continues to increase. In 2020, the number of people aged 65 and over reached 727 million worldwide. In Southeast Asia, countries like Vietnam recorded an elderly population percentage of 7.3%. Malaysia's figure is slightly lower, at 6.7% (Pusparisa, 2020). Meanwhile, in Indonesia, the number of elderly people in 2020 was estimated to reach around 80 million. Data from the Central Statistics Agency (2019) shows that Indonesia has entered a phase of structured aging, with the proportion of the population aged 60 and over exceeding 7%. This situation illustrates that health issues in the elderly, including the risk of falls, are becoming an increasingly important issue for healthcare professionals and the government (Dunggio, Andry Ariyanto & Norlinta, 2022).

With the growing elderly population, health issues will emerge that require serious attention from the government and relevant parties. This can lead to slow movement, shorter strides, an inability to plant feet firmly, and impaired balance. The process of muscle and bone decline, especially in the extremities, makes older adults vulnerable to accidental falls (Permana, Supriatin, Nurhayati, Lindayani, 2022).

Balance disorders in the elderly can cause falls and often lead to injury, disability, loss of independence, and a reduced quality of life (Adliah et al., 2022). Falls result in physical limitations, reduced capacity to perform daily activities, respiratory and musculoskeletal system failure, physical damage, fractures of the pelvis, radius, ulna, humerus, legs, and neck, injuries such as bruises, abrasions, and sprains, subdural hematomas, hospitalization, increased healthcare costs, and even mortality (Sholehudin & Elmaghfuroh, 2023).

Factors contributing to falls in the elderly include poor foot alignment, increased wobble, slipping, tripping, and balance problems, which ultimately increase the risk of falls (Dunggio, Andry Ariyanto & Norlinta, 2022). The burden/problems caused by falls in the elderly include increased healthcare costs, requiring inpatient care, and leading to other problems such as pressure ulcers. The consequences of falls can include various physical effects, such as limited ability to perform daily activities, respiratory and muscular problems, physical injuries, fractures in the pelvis, arms, legs, and neck, as well as injuries such as bruises, scrapes, sprains, and subdural hematomas. Furthermore, falls can lead to hospitalization, increased medical costs, and even death (Royani & Siska, 2024).

One preventative measure that can be taken is physical activity to improve and restore muscle function. This type of physical activity includes ankle strategy exercises, balance exercises, core stability exercises, and tandem walking. One form of physical activity to improve balance, both static and dynamic, in older adults includes stretching and strengthening. Therefore, to improve balance in older adults, balance exercise programs are provided (Dunggio, Andry Ariyanto & Norlinta, 2022).

Balance exercises are a collection of movements aimed at improving both static and dynamic balance through stretching and strengthening (Prili, 2022; Riyanto et al., 2021). The goal of these exercises is to improve body balance and vestibular function. Balance exercises are particularly beneficial for helping older adults stay active and maximize their abilities (Riyanto et al., 2021; Sudrajat, 2014). By strengthening weak muscles, stiff joints, and improving muscle coordination, balance exercises can reduce the risk of falls.

RESEARCH METHOD

This study uses a literature review method. Research articles were obtained from two databases, namely Google Scholar and Researchgate. The literature search used

keywords used in article searches using the PICO format, namely P: Population (Elderly), I: Intervention (Balance Exercise), C: Comparison (-), O: Outcome (Reducing the Risk of Falls) with inclusion criteria of publication year 2021 - 2025, articles in Indonesian and English with elderly research subjects.

RESULTS

Based on the five studies reviewed, balance exercise has been shown to have a positive effect on improving balance in the elderly. A study by Amik Muladi, Aulauminar Gurinti Alartha, and Fitriana Eka Resti (2022) on 30 respondents showed significant improvements in postural balance after exercise, with a p-value of 0.001. Similar results were found in a study by Ni Putu Natasya Nadi Sari et al. (2025) on 49 elderly people, which demonstrated improved balance ability after balance exercise. The Wilcoxon Signed Rank Test, with a p-value of 0.00, confirmed the effect of exercise on reducing fall risk.

A study by Evi Royani, Fera Siska, and Zakinah Arlina (2025) on 20 elderly people also showed a significant difference between pre- and post-intervention conditions, with a p-value of 0.000. Similarly, research by Syarifatul Azizah, Yudi Abdul Majid, and Septi Ardiyanti (2025) on 15 elderly people demonstrated that balance exercise significantly impacted their balance levels, as indicated by a p-value of 0.000. Furthermore, research by Nindawi, Endang FS, and Nur Iszakiyah (2024) on 15 elderly people reinforced these findings by demonstrating an improvement in postural balance after exercise, with a Wilcoxon test result of p = 0.001.

In addition to showing statistical improvements in balance, the study's results also indicate that balance exercises have significant practical value in the daily lives of older adults. When balance improves, older adults become more stable when standing, walking, changing positions, and performing routine activities, thereby reducing the risk of falls. Overall, these five studies confirm that balance exercise is an effective non-pharmacological intervention for improving balance and helping reduce the risk of falls in the elderly.text.

Table 1. Research Results Table: Efforts to Reduce the Risk of Falls in the Elderly Through Physical Exercise

No.	Title	Researcher	Results
1	Pengaruh Balance Exercise Terhadap Tingkat Keseimbangan Postural Dalam Menurunkan Resiko Jatuh Pada Lansia	Amik Muladi dkk. (2022)	Balance exercise berpengaruh signifikan terhadap keseimbangan postural lansia (p = 0,001).
2	Pengaruh Balance Exercise Terhadap Tingkat Keseimbangan Dalam Penurunan Risiko Jatuh Pada Lansia	Sari et al. (2025)	Balance exercise meningkatkan keseimbangan lansia dan menurunkan risiko jatuh (p = 0,00).
3	Pengaruh Balance Exercise Terhadap Tingkat Keseimbangan Lansia dengan Resiko Jatuh Tahun 2024	Royani et. Al. (2025)	Terdapat perbedaan signifikan keseimbangan sebelum dan sesudah latihan (p = 0,000).
4	Pengaruh Balance Exercise Terhadap Tingkat Keseimbangan pada Lansia	Syarifatul Azizah et al. (2025)	Balance exercise berpengaruh signifikan terhadap tingkat keseimbangan lansia (p = 0,000).
5	Pengaruh Balance Exercise Terhadap Keseimbangan Postural Lansia di Desa Lemper Pamekasan	Nindawi et al. (2024)	Balance exercise meningkatkan keseimbangan postural lansia secara signifikan (p = 0,001).

DISCUSSION

Balance is a crucial skill for maintaining body stability in various positions and activities. Decreased balance in older adults can increase the likelihood of falls, which can result in serious injury and reduce independence. The main factors contributing to balance problems in older adults include age, decreased muscle strength, and decreased physical activity levels. With age, changes in muscle structure occur, leading to reduced strength and elasticity, as well as decreased muscle contraction speed. Environmental factors such as slippery floors, inadequate lighting, and the use of inappropriate assistive devices also impact balance. This information highlights the need for effective

measures to improve balance in older adults to reduce the risk of falls and improve their quality of life. One such approach is balance training (Majid & Ardiyanti, 2025).

Regular balance training activities performed by older adults can strengthen their independence, particularly in improving body functions that tend to decline (Mujiadi et al., 2019), explaining that this exercise aims to strengthen the muscles in the lower body and improve the function of the vestibular system, which plays a role in maintaining balance. Another study by Nindawi et al. (2024) also indicated that regular balance training can have similar positive effects in increasing muscle strength and maintaining balance in the elderly.

To train the muscles and balance of elderly people at risk of falls, one intervention that can be implemented is balance training. Balance exercise is a physical exercise that can improve balance (Aprilia, Jihad & Aisah, 2023).

Balance training is a type of exercise that utilizes the hands and feet and is performed effectively for 3-4 weeks, three times a week, for 15-30 minutes (American College of Sports Medicine). Research by Ramdan, Hidayatullah & Purnama (2023) showed that the intervention group who performed balance training experienced a significant reduction in fall risk. The increase in the number of elderly with balance levels indicates that balance exercise is not only effective in improving balance but also increasing the number of elderly who achieve optimal balance.

Balance exercise focuses on strengthening the lower body muscles and improving the overall balance system. Balance exercises also have other benefits, such as improving blood circulation, reducing stress, improving digestive function, enhancing brain fitness, and increasing appetite (Majid & Ardiyanti, 2025). The ability to maintain balance is crucial because various physical activities often involve changing body positions. The uprighting function of balance control allows individuals to move from one position to another while maintaining both static and dynamic stability (Hasibuan, Fusfitasari & Shinta, 2021).

Balance exercises are designed to help increase muscle strength in the lower body and also improve the body's balance or vestibular system. Balance training is crucial for the elderly because it helps maintain body stability, thus preventing falls, which are common among the elderly (Sari, Martini, Triana & Sari, 2025). Balance training performed for patients includes a series of body movements divided into warm-up, core, and cool-down (Hariati, 2023).

The movements in these balance exercises can send signals to the brain through nervous system receptors due to changes in the joints. In the somatosensory system, motor responses are generated through muscle contractions that function as sensory input (Aprilia et al., 2023). Therefore, balance training can strengthen muscles to maintain body stability and prevent shifts in the center of gravity, thus maintaining balance (Fakhriansyah M, Ekadinata N, 2025).

Research conducted by (Riyanto et al., 2021) revealed that daily activities can actually strengthen various muscles in the body. However, to focus more on strengthening the muscles and joints in the lower body, balance training is necessary, given that most movements are centered on the legs. This way, muscle contractions can be directed and muscle strength in the lower extremities can be increased. Balance training is highly recommended to reduce the risk of falls in the elderly. Training balance through this exercise is crucial for the elderly, as it can improve their ability to move.

CONCLUSION

Based on the results of the review of five research articles, it can be concluded that balance exercise is consistently effective in

improving postural balance and reducing the risk of falls in the elderly. All studies showed statistically significant results ($p < 0.05$), indicating an increase in body stability, lower extremity muscle strength, and motor coordination after balance training. In addition to the physical benefits, this exercise also contributes to increased self-confidence and independence in the elderly in carrying out daily activities. Thus, balance exercise is a simple, safe, non-pharmacological intervention that can be routinely implemented in fall prevention programs, both in healthcare facilities and senior communities.

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