



EFFECT OF FALL PREVENTION PROGRAM ON CONFIDENCE IN ELDERLY PATIENT

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Abstract

Background: Falls among elderly individuals are a major public health concern, leading to physical injury, reduced confidence, and decreased functional independence. Fear of falling significantly restricts daily activities and negatively impacts quality of life.

Objective: To evaluate the effect of a structured fall prevention program on confidence in elderly individuals.

Methods: An experimental pre-post study was conducted on 30 elderly participants aged ≥ 60 years selected through convenient sampling. Participants underwent a structured fall prevention program comprising balance training, strengthening exercises, gait training, and functional activities for 6 weeks (5 sessions/week). Outcome measures included Falls Efficacy Scale (FES), Berg Balance Scale (BBS), and Timed Up and Go (TUG) test. Data were analyzed using IBM SPSS version 30. Paired t-test was used to compare pre- and post-intervention scores, with $p < 0.05$ considered statistically significant.

Results: Significant improvements were observed in all outcome measures following the intervention. FES scores improved from 60.20 ± 5.10 to 80.40 ± 4.85 , BBS scores increased from 38.20 ± 4.50 to 49.10 ± 3.90 , and TUG time decreased from 18.50 ± 2.80 seconds to 12.20 ± 2.10 seconds ($p < 0.001$ for all), indicating enhanced confidence, balance, and functional mobility.

Conclusion: The structured fall prevention program was effective in improving both psychological (confidence) and physical (balance and mobility) outcomes in elderly individuals. These findings support the inclusion of multicomponent physiotherapy interventions in fall prevention strategies for geriatric populations.

Keywords: Fall Prevention; Elderly; Confidence; Fear of Falling; Balance; Functional Mobility

INTRODUCTION

A fall is defined as an unexpected event in which an individual comes to rest on the ground or a lower level. Falls are one of the leading causes of injury, disability, and loss of independence among elderly individuals. According to the World Health Organization, falls are a major public health problem, particularly in the geriatric population, with a significant proportion of individuals aged 65 years and above experiencing at least one fall each year.[1,2]

With increasing age, there is a progressive decline in muscle strength, balance, coordination, and reaction time, which significantly increases the risk of falls. Age-related changes such as sarcopenia, reduced joint mobility, impaired proprioception, and delayed neuromuscular responses contribute to decreased postural stability. In addition, sensory impairments such as visual and vestibular dysfunction further compromise balance control. Studies by Stephen R. Lord have demonstrated that these physiological changes are key contributors to fall risk in older adults.[3,4,5]

Apart from physical consequences such as fractures, soft tissue injuries, and hospitalization, falls also lead to significant psychological issues. One of the most important psychological consequences is the development of fear of falling, which reduces confidence and limits participation in daily activities. This fear may persist even without a history of falls and can lead to avoidance behavior, reduced physical activity, and increased dependency. The concept of falls efficacy, introduced by Mary E. Tinetti, emphasizes that reduced confidence in performing activities safely is a major factor affecting functional independence and quality of life in elderly individuals.[6,7,8]

Falls are influenced by a combination of intrinsic and extrinsic risk factors. Intrinsic factors include muscle weakness, balance deficits, chronic medical conditions, and cognitive impairment, while extrinsic factors involve environmental hazards such as poor lighting, uneven surfaces, slippery floors, and inappropriate footwear. The interaction of these factors increases the likelihood of falls, highlighting the importance of comprehensive assessment and intervention.[9,10,11]

Physiotherapy plays a crucial role in fall prevention through structured and evidence-based interventions. These include balance training to improve postural control, strengthening exercises to enhance muscle power, gait training to improve walking ability, and functional exercises to promote independence in activities of daily living. Research by Cathie Sherrington has shown that exercise-based interventions are highly effective in reducing fall risk and improving functional outcomes in elderly populations.[12,13,14]

In addition to improving physical performance, physiotherapy interventions also address psychological aspects by enhancing confidence and reducing fear of falling. Improved confidence encourages greater participation in daily activities, thereby reducing inactivity and promoting independence. Therefore, fall prevention programs are essential not only for reducing the risk of falls but also for improving psychological well-being, functional independence, and overall quality of life in elderly individuals.[15,16]

Risk Factors of Falls in Elderly

Falls in elderly individuals are multifactorial and result from the interaction of various intrinsic and extrinsic risk factors. Intrinsic factors are related to age-associated physiological changes and medical conditions. These include muscle weakness, impaired balance, decreased coordination, reduced proprioception, visual impairment, vestibular dysfunction, and slowed reaction time. Chronic conditions such as arthritis, neurological disorders, and cognitive impairment further increase the risk of falls. According to Stephen R. Lord, deficits in postural control and sensory integration are major contributors to instability in older adults.[3,11]

Extrinsic factors are related to environmental and external conditions that increase the likelihood of falls. These include poor lighting, slippery floors, uneven surfaces, inappropriate footwear, and lack of assistive devices. Home hazards such as loose rugs, cluttered pathways, and absence of handrails are also significant contributors. The World Health Organization emphasizes that environmental modifications are essential in reducing fall risk.[1]

In addition to these, behavioral factors such as physical inactivity, fear of falling, and improper use of assistive devices can further increase the risk. The combination of these intrinsic, extrinsic, and behavioral factors significantly elevates the likelihood of falls, highlighting the need for comprehensive assessment and targeted intervention strategies.[8]

METHODOLOGY

This experimental study was conducted among elderly individuals aged 60 years and above to evaluate the effectiveness of a structured fall prevention program on fear of falling, balance, and functional mobility. A total of 30 participants, including both males and females, were recruited using a convenient sampling

technique. Participants with a history of falls or fear of falling, who were able to walk independently with or without an assistive device and possessed adequate cognitive function to follow instructions, were included in the study. Individuals with severe neurological disorders, severe musculoskeletal deformities, severe visual or vestibular impairments, recent fractures or surgeries within the previous three months, and those who were bedridden or non-ambulatory were excluded. Prior to participation, informed consent was obtained from all eligible participants. Baseline assessments were conducted using standardized outcome measures, and all data were recorded systematically under standardized testing conditions.

PROCEDURE

Following recruitment and screening according to the inclusion and exclusion criteria, demographic details and relevant medical history were collected from all participants. Baseline assessment was performed using the Falls Efficacy Scale (FES), Berg Balance Scale (BBS), and Timed Up and Go Test (TUG) to evaluate fear of falling, balance performance, and functional mobility, respectively.

The Falls Efficacy Scale was used to assess the participants' confidence in performing daily activities without falling. Balance ability was evaluated using the Berg Balance Scale, which consists of 14 functional tasks assessing both static and dynamic balance. Functional mobility was measured using the Timed Up and Go Test by recording the time required to stand from a chair, walk three meters, turn, return, and sit down.

After completion of the baseline assessment, participants underwent the structured fall prevention program. The intervention was administered for six weeks, five days per week, with each session lasting approximately 30–45 minutes. Upon completion of the intervention period, all outcome measures were reassessed using the same standardized procedures. The pre- and post-intervention data were then documented for statistical analysis.

INTERVENTION PROTOCOL

The structured fall prevention program consisted of balance training, strengthening exercises, gait training, and functional task-oriented activities designed to improve balance, mobility, and confidence during daily activities. The intervention was conducted for six weeks, five days per week, with each session lasting approximately 30–45 minutes. Exercises were progressed gradually according to the participant's functional ability and tolerance, moving from supported activities to more challenging independent tasks. All sessions were performed under the supervision of a physiotherapist to ensure safety, proper technique, and adherence to the exercise program. This progressive training approach aimed to reduce fear of falling, improve balance performance, and enhance functional mobility among elderly individuals.

Table 1: Protocol

TYPE	EXERCISE	SESSION/TIME
WARM UP	Marching Gentle joint movements	3 min. 1 set × 5 repetitions
MAIN EXERCISE		
Week 1-2		
BALANCE TRAINING	Standing with wide base Weight shifting (side to side) Tandem standing (with support)	3 sets × 20 sec. hold 3 sets × 10 repetitions (5 each side) 3 sets × 20 sec. hold
STRENGTH TRAINING	Assisted sit-to-stand Calf raises with support Seated knee extension	2 sets × 10 repetitions 2 sets × 10 repetitions 2 sets × 10 repetitions each leg
GAIT TRAINING	Walking with support Straight line walking	5 min. 5 min.
FUNCTIONAL TRAINING	Bed to chair transfer Sit-to-stand practice	10 repetitions 2 sets × 10 repetitions

Week 3-4		
BALANCE TRAINING	Tandem standing with less support Single-leg stance (partial support)	3 sets × 30 sec. hold 3 sets × 20 sec. hold each leg
STRENGTH TRAINING	Sit-to-stand independently Calf raises Hip abduction exercises	3 sets × 10 repetitions 3 sets × 12 repetitions 3 sets × 10 repetitions
GAIT TRAINING	Walking with turns Direction change	5-7min. 5min.
FUNCTIONAL TRAINING	Stair climbing with support Reaching activities	10 repetitions 10 repetitions
Week 5-6		
BALANCE TRAINING	Single-leg stance without support Dynamic balance activities Obstacle walking	3 sets × 30 sec. hold each leg 3 sets × 10 repetitions 5min.
STRENGTH TRAINING	Sit-to-stand with increased repetitions Resistance band exercises	3 sets × 15 repetitions 3 sets × 12 repetitions
GAIT TRAINING	Obstacle walking Dual-task walking	8min. 5min.
FUNCTIONAL TRAINING	Stair climbing independently Advanced ADL activities	10 repetitions 10-12min.
COOL DOWN	Stretching (Hamstring & Calf) Deep breathing	3 repetitions × 30sec. hold 5 repetitions (3mins.)

RESULT

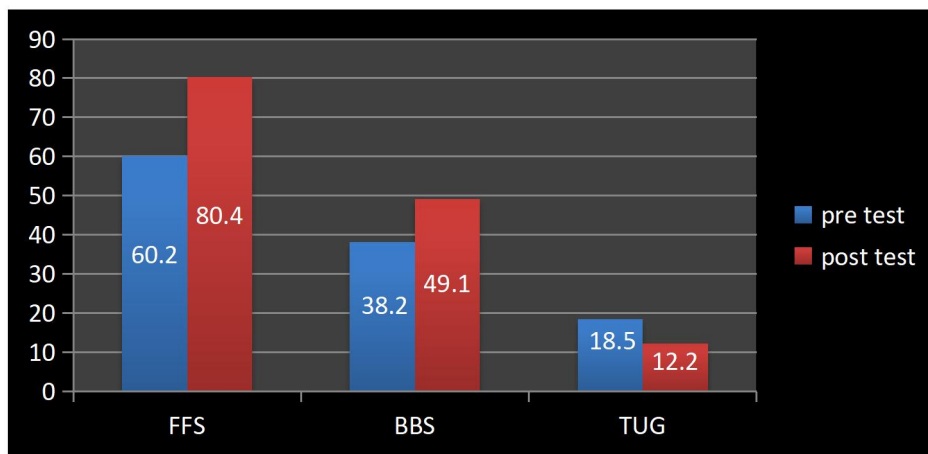
Based on the data collected before and after the intervention, the findings were examined using the Falls Efficacy Scale (FES), Berg Balance Scale (BBS), and Timed Up and Go (TUG) test. Data was analyzed using IBM SPSS software version 30 and Microsoft Excel 2019. Descriptive statistics for all outcome measures were expressed as mean ± standard deviation, and tests of significance, such as the paired “t” test, were performed for comparing the pre- and post-intervention data within the group. For all statistical analyses, $p < 0.05$ was considered as statistically significant. The results were organized and presented in tables and graphical formats to facilitate clear interpretation of the findings

Table 2: Comparison between pre and post data

Scale	Pre test Mean±SD	Post test Mean±SD	P-value	T- value	Inference
FES	60.20±5.10	80.40±4.85	< 0.001	12.45	Significant
BBS	38.20±4.50	49.10±3.90	< 0.001	15.20	Significant
TUG	18.50±2.80	12.20±2.10	< 0.001	14.10	Significant

There was a statistically significant improvement in fear of falling, balance, and functional mobility following the six-week fall prevention program. The FES score increased from 60.20 ± 5.10 to 80.40 ± 4.85 ,
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the BBS score improved from 38.20 ± 4.50 to 49.10 ± 3.90 , and the TUG score decreased from 18.50 ± 2.80 seconds to 12.20 ± 2.10 seconds. All outcome measures demonstrated highly significant changes with $p < 0.001$.



Graph 1: Analysis of mean scores of FFS, BBS, TUG within the Pre-test and Post-test

DISCUSSION

The present study was conducted to evaluate the effect of a structured fall prevention program on confidence in elderly patients. The findings demonstrated that participation in a structured six-week intervention resulted in significant improvements in confidence, balance, and functional mobility among elderly individuals. Significant changes were observed in Falls Efficacy Scale (FES), Berg Balance Scale (BBS), and Timed Up and Go (TUG) scores following completion of the intervention.

The primary outcome of the present study was confidence, which was assessed using the Falls Efficacy Scale (FES). The post-intervention increases in FES scores (Pre: 60.20 ± 5.10 ; Post: 80.40 ± 4.85 ; $p < 0.001$) suggests a reduction in fear of falling and an improvement in participants' confidence during daily functional activities. Fear of falling is considered a major psychological consequence among elderly individuals and often results in activity restriction, decreased social participation, and reduced independence. Similar findings were reported by Tinetti et al. (1990) who introduced the concept of falls efficacy and demonstrated that higher confidence levels contribute to greater functional independence and improved quality of life.[6] Likewise, Delbaere et al. (2010) reported that fear of falling is strongly associated with reduced physical performance and daily activity participation among older adults.[8] Zijlstra et al. (2007) further concluded that interventions targeting confidence and fear reduction significantly improve psychological outcomes in elderly populations.[18]

The improvement in confidence observed in the present study may also be explained by the progressive nature of the intervention program. Functional activities, repeated successful performance, and supervised exercise sessions likely enhanced self-efficacy and encouraged participants to perform activities with less apprehension. Similar findings were observed by Liu-Ambrose et al. (2004) who reported that resistance and agility training improved balance confidence and reduced fear of falling in elderly women.[19]

Balance performance measured using the Berg Balance Scale showed statistically significant improvement after intervention (Pre: 38.20 ± 4.50 ; Post: 49.10 ± 3.90 ; $p < 0.001$). Improvement in balance may be attributed to exercises such as weight shifting, tandem standing, single-leg stance, and dynamic balance training included in the protocol. These interventions improve neuromuscular coordination, postural reactions, and sensory integration required for maintaining stability. The findings are supported by Berg et al. (1992) who validated the use of the Berg Balance Scale in assessing balance and identifying fall risk among elderly individuals.[9] Similar improvements were demonstrated by Howe et al. (2011) who concluded that exercise interventions significantly improve balance abilities and reduce fall risk.[14]

The results are also consistent with the work of Tiedemann et al. (2010) who emphasized that balance-focused exercise interventions are among the most effective approaches for improving postural control and preventing falls in older adults.[20] Additionally, Skelton and Dinan (1999) reported that exercise programs aimed at improving postural stability significantly reduce instability and improve functional outcomes.[21]

Functional mobility assessed using the Timed Up and Go (TUG) test showed significant improvement after completion of the program (Pre: 18.50 ± 2.80 sec; Post: 12.20 ± 2.10 sec; $p < 0.001$). Reduced TUG duration reflects enhanced mobility, improved gait performance, and increased lower limb function. These improvements may be attributed to progressive gait training, obstacle negotiation, stair climbing, and transfer

activities included in the intervention. Similar findings were reported by Podsiadlo and Richardson (1991) who established the TUG test as a reliable indicator of functional mobility and fall risk.[17] Verghese et al. (2009) further reported that gait parameters are important predictors of fall occurrence and mobility limitations in older adults.[5]

The strengthening component of the intervention may also have contributed to improved outcomes. Lower limb strengthening improves muscular endurance and the ability to recover from balance disturbances. Supporting this explanation, Pijnappels et al. (2008) demonstrated that reduced lower limb strength is strongly associated with increased fall risk in elderly populations.[4]

The overall findings of the present study support previous systematic reviews emphasizing the effectiveness of exercise-based fall prevention programs. Sherrington et al. (2008) reported that exercise interventions including balance and functional training significantly reduce falls and improve physical performance.[12] An updated review by Sherrington et al. (2017) further confirmed that multicomponent exercise programs remain highly effective in preventing falls among community-dwelling elderly individuals.[13] Similarly, Gillespie et al. (2012) concluded that multifactorial fall prevention strategies improve physical function and reduce fall-related disability.[15]

Furthermore, Clemson et al. (2004) demonstrated that structured fall prevention programs effectively reduce fall incidence and enhance confidence among elderly individuals.[22] Campbell and Robertson (2007) also emphasized that multicomponent interventions provide greater improvements compared to isolated interventions.[23] Environmental modifications and functional training strategies have also shown additional benefits in reducing fear of falling and improving independence as reported by Cumming et al. (1999).[24]

Despite the positive findings, the present study had certain limitations including a relatively small sample size and absence of a control group, which may limit generalizability of the results. Future studies should include larger samples and randomized controlled designs with long-term follow-up.

Overall, the findings suggest that a structured physiotherapy-based fall prevention program is effective in improving confidence, reducing fear of falling, enhancing balance performance, and increasing functional mobility among elderly individuals. These improvements contribute to better functional independence and overall quality of life.

CONCLUSION

The present study concludes that a structured fall prevention program is effective in improving confidence, balance, and functional mobility in elderly individuals. Significant improvements were observed in Falls Efficacy Scale (FES), Berg Balance Scale (BBS), and Timed Up and Go (TUG) test scores following the six-week intervention. The reduction in fear of falling and enhancement of confidence indicate that the program positively influenced psychological aspects, while improvements in balance and mobility reflect enhanced physical performance. Therefore, it can be concluded that a multicomponent physiotherapy-based fall prevention program plays a vital role in reducing fall risk and improving overall functional independence and quality of life among elderly individuals.

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