Featured Falls Research – April

Effects of exercise programmes delivered using video technology on physical performance and falls in people aged 60 years and over living in the community: a systematic review and meta-analysis

Adliah F, Hall AJ, Goodwin V, Lamb S. BMJ Open. 2025 Apr 30;15(4):e092775

DOI: 10.1136/bmjopen-2024-092775 **PMID:** 40306983

Abstract

Objectives: This systematic review and meta-analysis synthesised the evidence and evaluated the effect of exercise programmes delivered using instructional videos compared with control on physical performance and falls in community-dwelling older people aged 60 years and older.

Design: A systematic review and meta-analysis conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.

Data sources: MEDLINE, EMBASE, CINAHL, PsycINFO, The Cochrane Central Register of Controlled Trials, TRIP and PEDro. Grey literature sources included theses and dissertations from Ethos and ProQuest.

Eligibility criteria: Studies were included if they involved community-dwelling older people (aged >60 years) participating in exercise programmes delivered through instructional videos.

Data extraction and synthesis: Treatment effects were estimated using a random-effects model, reporting 95% CIs, mean differences (MD) and standardised MDs (SMD, Hedges' g) for outcomes measured in different units. The risk of bias was assessed using ROB2, and the certainty of evidence was evaluated using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach.

Results: A total of 7487 records were screened, with 16 studies (n=1910) meeting the inclusion criteria. Meta-analysis of 11 studies revealed significant effects of video-delivered exercise programmes in lower extremity strength (SMD=0.35, 95% CI 0.11 to 0.59; I^2=70.35%, p<0.001, GRADE moderate quality), balance (SMD=0.45, 95% CI 0.07 to 0.83; I^2=85.07%, p=0.02, GRADE low quality), mobility (MD=0.96, 95% CI 0.46 to 1.46; I^2=53.31%, p<0.001, GRADE moderate quality) and physical performance SMD=0.36, 95% CI 0.17 to 0.56; I^2=13.49%, p<0.001, GRADE moderate quality). No evidence of an effect of video-delivered exercise programmes on fear of falling was found (SMD=0.5, 95% CI -0.30 to 1.29; I^2=95.48%, p=0.22, GRADE very low quality). There were insufficient data for reporting falls.

Conclusions: Video-delivered exercise programmes improved physical performance, particularly lower extremity strength, balance and mobility, with low to moderate quality evidence. There is uncertainty about the effect of video-delivered exercise programmes on the number of falls, number of fallers and fear of falling.

Prospero registration number: CRD42023415530**.**

Keywords: Aged; Digital Technology; Exercise.

Factors influencing fall prevention programmes across three regions of the UK: the challenge of implementing and spreading the Falls Management Exercise (FaME) programme in a complex landscape.

Ventre JP, Manning F, Mahmoud A, Brough G, Timmons S, Hawley-Hague H, Skelton DA, Goodwin VA, Todd CJ, Kendrick D, Logan P, Orton E. Age Ageing. 2025 Mar 28;54(4):afaf083.

DOI: 10.1093/ageing/afaf083 **PMID:** 40207379 **PMCID:** PMC11982667

Abstract

Background: The occurrence of falls in adults 65+ years remains a common and costly issue worldwide. There is current evidence to suggest that falls can be prevented using evidence-based strength and balance interventions, such as the six-month Falls Management Exercise (FaME) programme. Perspectives of multiple key partners and providers of the FaME programme could inform future implementation and fall prevention strategies.

Methods: Partners and providers involved in local community fall prevention pathways were purposefully recruited from three geographical areas across the UK. Semistructured interviews were conducted to gain a broad understanding of factors affecting the adoption, implementation and spread of FaME. Data were analysed using an inductive thematic approach and mapped to the Consolidated Framework for Implementation Research (CFIR).

Results: Data from 25 participant interviews and document analysis revealed 11 themes organised within five CFIR domains-the innovation (3), outer setting (3), inner setting (1), characteristics of individuals (1) and process (2).

Conclusion: The adoption, implementation and spread of FaME into community settings is complex and faces multiple health system challenges. For adoption and implementation to be facilitated, FaME programmes must demonstrate effectiveness and fit the local needs of those receiving the intervention. For spread to occur, influential decision-makers and funders must support wider programme rollout whilst also securing sufficient expert capacity to deliver the programme and ensure monitoring is in place to determine effectiveness of provision for older adults.

Keywords: commissioning; fall prevention; implementation; older people; qualitative research; the Falls Management Exercise (FaME).

Strategies to minimize fall-related injuries in older adults at risk of falls: the Falling Safely Training (FAST) study

Zanotto T, Chen L, Fang JR, Tabatabaei A, He J, Bhattacharya SB, Alexander NB, Sosnoff JJ. J Gerontol A Biol Sci Med Sci. 2025 Apr 17:glaf076.

DOI: 10.1093/gerona/glaf076 **PMID:** 40243432

Abstract

Background: Falls are the leading cause of accidental injury among older adults. Current fall prevention programs are useful but do not target the key variable for injury (i.e., impact force). An approach, which has shown promise in robust older adults, is to teach safe-falling strategies to reduce impact forces. In this single-blinded, pilot randomized controlled trial, we explored the feasibility and preliminary efficacy of a safe-falling program.

Methods: Twenty-four older adults at risk of injurious falls were randomly assigned either to Falling Safely Training (FAST), a standardized progressive training of safe-falling strategies, or an active control group consisting of evidence-based balance training. Participants underwent a series of experimentally induced falls at baseline, after the 4-week intervention, and three months after the intervention. Hip and head acceleration (proxies of impact force) and the number of head impacts experienced during the falls were collected.

Results: No adverse events were reported, and eleven of 12 FAST participants completed the intervention. The FAST group had a greater reduction in the number of fall-related head impacts following the intervention (odds ratio = 0.10, 95% CI: 0.02, 0.61, p=0.012). This improvement coincided with a significant reduction in head acceleration in the FAST group compared to control (between-group mean difference = -9.54 m/sec2, p=0.028). Hip acceleration decreased significantly in both groups (p's<0.001).

Conclusion: Teaching older adults at risk of falls safe-falling strategies is safe and feasible and has the potential to minimize fall-related head impacts and reduce fall morbidity.

Keywords: Accident prevention; Accidental injury; Aging; Falls; Motor skill learning.

Falls Research – April

Assessing fall risk in multiple sclerosis using patient-reported outcomes and wearable gait metrics

Banks SA, Howe CL, Mandrekar J, Jahanian O, Pittock SJ, Ali F, Sagen JA, Spence R 3rd, Gossman KA, Baker MR, Flanagan EP, Kantarci OH, Keegan BM, Tobin WO. Mult Scler J Exp Transl Clin. 2025 Apr 16;11(2):20552173251329825

DOI: 10.1177/20552173251329825 **PMID:** 40292035 **PMCID:** PMC12033493

Abstract

Background: Falls in people with multiple sclerosis (pwMS) lead to morbidity and expense.

Objective: Identify clinical metrics associated with falls.

Methods: Eighty-six pwMS completed fall surveys, timed 25-foot walk (T25FW), and motion analysis with Clario Opal devices. Logistic regression models were created.

Results: Median age was 54.5 years (range 21-73), 62% (53) were female. The cohort included 58% with relapsing (50) and 42% with progressive MS (36). Those who reported falling in the last year were older (median age 58 vs 52.5, $p = .03$) and had a higher Patient Determined Disease Step (PDDS) score (median 3 vs 1, $p < .0001$). Falls were associated with worse balance metrics including sway area (median 2.3 degrees^2 vs 1.2, $p = .01$), jerk (median 3.3 m^2/s^5 vs 1.6, $p = .005$), and slower T25FW (median 11.5 s vs 8; $p < .0001$). A multivariable regression model based on gait aid use and T25FW time >10.8 s (c = 0.80) was derived. Having both features portended a probability of falling of 0.97, while having neither, a probability of 0.26.

Conclusions: Falls in pwMS are more frequent in patients who are older, have higher PDDS, slower walking, and worse balance. Gait aid use and T25FW >10.8 s were strongly associated with falls in the past year.

Keywords: Biomarkers; multiple sclerosis; outcome measurement; quality of life; rehabilitation; symptomatic treatment.

Fear of falling is a top issue for older adults with a history of falling: multidimensional perspective

Demircioglu-Karagoz A, Sahin UK, Dag O, Sari IF. Psychogeriatrics. 2025 May;25(3):e70029

DOI: 10.1111/psyg.70029 **PMID:** 40235139 **PMCID:** PMC12000705

Abstract

Backround: Fear of falling is a frequently encountered psychological phenomenon, especially in older adults with a history of falling. Many psychological, physical, and social factors affect the fear of falling. The aim of this research is to examine the physical, psychological and social factors that affect the fear of falling in older adults.

Methods: One hundred and fifty-two older adults with a history of falling in the last year were included in this cross-sectional study. In addition to variables such as age, educational status, use of mobility aids, fall frequency and comorbidity in individuals, physical, psychological and social variables were examined. Fear of falling was assessed with the Modified Fall Efficacy Scale.

Results: The Modified Fall Efficacy Scale's score was significantly predicted by gait speed ($P < 0.001$), muscle strength ($P = 0.006$), balance ($P < 0.001$), physical activity ($P = 0.032$), pain ($P = 0.004$), depression ($P = 0.007$), and community integration ($P < 0.001$). Physical, psychological and social variables explain 78% of the Modified Fall Efficacy Scale's score in older adults with a history of falling in the last 1 year.

Conclusions: Increased pain and depressive mood, in addition to decreased walking speed, lower extremity muscle strength, balance, physical activity and social participation, have negative impacts on the fear of falling in older adults. Especially, older adults with a history of falling should be evaluated physically, psychologically and socially and the factors affecting their fear of falling should be determined. In this way, suitable rehabilitation protocols for older adults will be developed.

Keywords: aged; community integration; depression; pain; walking speed.

Neuromuscular Electrical Stimulation to Maximize Hip Abductor Strength and Reduce Fall Risk in Older Veterans: Protocol for a Randomized Controlled Trial

Friedman B, Beamer BA, Beans J, Gray V, Alon G, Ryan A, Katzel LI, Sorkin JD, Addison O. JMIR Res Protoc. 2025 May 1;14:e68082

DOI: 10.1186/s12877-025-05970-1 **PMID:** 40312027

Abstract

Background: Nearly half of all veterans are 65 years and older, and they have a higher prevalence of functional disabilities compared to the nonveteran population. Balance impairments resulting in injurious falls are a leading cause of morbidity and mortality in older adults. Instability or fear of falling can significantly reduce physical activity and social participation, even in the absence of falls. Dysmobility is a leading factor in long-care admissions, and therefore, maintenance of mobility throughout aging is crucial. Recent evidence indicates lower extremity muscle weakness as a key risk factor for falls, with lower limb muscle strength and quality being critical for balance recovery. The primary hip abductors, the gluteus maximus, medius, and minimus, are particularly essential for balance recovery.

Objective: This study aims to test the hypothesis that adding neuromuscular electrical stimulation (NMES) to a multimodality balance intervention (MMBI) will yield greater reductions in fall risk and improvements in muscle and mobility function compared with MMBI alone.

Methods: This randomized controlled trial will enroll 80 veterans aged 55 years and older at risk for falls (defined by a four-square step test [FSST] time >12 seconds, history of falls, or fear of falling). Participants will be randomized to receive either NMES + MMBI or MMBI alone. The 12-week outpatient center-based intervention will include 3 sessions per week, focusing on hip abductor strength, balance, and mobility. Assessments will occur at baseline, postintervention, and at 6- and 12-month follow-ups. Primary outcomes include fall risk and dynamic balance, measured by FSST and hip abductor strength using a Biodex dynamometer. Secondary outcomes will examine muscle composition through computed tomography (CT) scans and assess gait variability parameters.

Results: This study was funded on January 1, 2022, with a data collection period from April 1, 2022, to December 31, 2026. As of March 2025, we have screened 100 potential participants and excluded 38. Out of the 61 participants enrolled to date, 21 have completed the 12-month follow-up, 32 have completed the 6-month follow-up, and 41 have completed the posttesting. A total of 4 participants are currently in the intervention phase; 1 has just completed the baseline testing, while 15 have been dropped from the study.

Conclusions: This trial will be the first large, randomized controlled trial to evaluate NMES as an adjunct to an MMBI for fall prevention in older veterans. If successful, NMES combined with hip abductor strengthening and balance training could provide a low-cost, scalable solution to reduce falls, improve balance and mobility, and decrease health care costs related to falls in older adults. This study will address a critical gap in knowledge about the effectiveness of NMES in enhancing rehabilitation outcomes for fall prevention.

Trial registration: ClinicalTrials.gov NCT04969094; https://clinicaltrials.gov/study/NCT04969094.

International registered report identifier (irrid): DERR1-10.2196/68082.

Keywords: balance intervention; dynamic balance; fall prevention; gait variability; hip abductor strengthening; multimodality balance intervention; muscle function; neuromuscular electrical stimulation; veterans.

The national and subnational burden of falls and its attributable risk factors among older adults in Iran from 1990 to 2021: findings from the global burden of disease study

Ghasemi H, Kharaghani MA, Golestani A, Najafi M, Khosravi S, Malekpour MR, Tabatabaei-Malazy O, Rezaei N, Ostovar A, Ghamari SH. BMC Geriatr. 2025 Apr 16;25(1):253

DOI: 10.1186/s12877-025-05909-6 **PMID:** 40240991 **PMCID:** PMC12004857

Abstract

Background: Falls among older adults (individuals aged 60 and above) are a substantial health issue worldwide. This study aimed to analyze the burden of falls and its attributable risk factors among older adults at the national and subnational levels in Iran over 32 years.

Methods: Using the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2021 data, we estimated the incidence, prevalence, death, and disability-adjusted life-years (DALYs) of falls and its attributable risk factors among older adults by sex, age groups, and socio-demographic index (SDI) in Iran and its provinces. We reported the estimates with their 95% uncertainty intervals (UIs). Rates were reported per 100,000 population.

Results: In 2021 in Iran, the incidence rate of falls among older adults was 1674.0 (95% UI: 1454.9-1897.3), the prevalence rate was 11302.5 (10504.7-12095.7), the death rate was 16.9 (12.9-21.0), and the DALYs rate was 736.3 (647.6-825.4). In 2021, at the subnational level, Qazvin had the highest incidence, death, and DALYs rates for falls with values at 2329.5 (2008.8-2652.1), 24.2 (19.5-29.0), and 965.9 (856.2-1074.6), respectively, while Kohgiluyeh and Boyer-Ahmad had the highest falls prevalence rate at 16043.1 (14918.4-17149.0). In 2021, males had higher prevalence, death, and DALYs rates of falls compared to females, while females had a higher incidence rate. Among the age groups, the 90-94 age group had the highest rates of incidence, prevalence, death, and DALYs from falls. Low bone mineral density was the primary risk factor attributable to the burden of falls. There were significant positive associations between SDI and both the incidence and prevalence rates of falls. Conversely, a significant inverse association was found between SDI and the death rate.

Conclusions: From 1990 to 2021, the incidence rate of falls has increased significantly among older adults in Iran, necessitating urgent interventions. Implementing nationwide, cost-effective strategies such as exercise programs to improve strength and balance, home hazard modifications, medication reviews to reduce fall-related risks, and routine screening programs for osteoporosis and fall risk assessment can help protect and support older people, minimizing their risk of falls.

Keywords: Accidental falls; Global burden of diseases; Iran; Older adults; Risk factors.

Virtual obstacle-avoidance training using daily-life obstacles with physical feedback in older people: A cross-over trial

He Y, Lee J, Kim J, Brodie MA, Mitri G, van Schooten KS, Lovell NH, Lord SR, Okubo Y. Arch Gerontol Geriatr. 2025 Apr 21;135:105866.

DOI: 10.1016/j.archger.2025.105866 **PMID:** 40318297

Abstract

Failures in avoiding environmental hazards can lead to falls. We developed a virtual reality (VR) obstacle-avoidance training system that provides physical feedback upon foot contact with a virtual obstacle. This study aimed to assess whether physical feedback reduces obstacle collisions in older adults within a VR environment. Fifty-six participants (mean age 72.3 ± 5.4 (SD) years) wore an immersive VR head-mounted display and safety harness and walked on a split-belt treadmill in two 8-minute conditions performed in random order. They walked on a virtual suburban footpath, collecting virtual apples and avoiding slip-and-trip obstacles. In the perturbation condition (VR+P), foot-obstacle collisions were accompanied by immediate physical feedback via treadmill belt accelerations/decelerations. In the non-perturbation condition (VR-only), no physical feedback was provided. Obstacle collision rates and subjective acceptability were assessed. In the VR+P condition, participants had fewer obstacle collisions (0.63 versus 0.75), fewer trailing foot collisions (0.57 versus 0.68) and a greater margin of stability compared with the VR-only condition ($p < 0.05$). Participants reported significantly higher levels of anxiety and greater task difficulty for the VR+P condition ($p < 0.05$). Motion sickness was rarely reported, and enjoyment ratings were high, with no significant differences between the conditions. In summary, physical feedback reduced obstacle collisions and increased gait stability. The low levels of motion sickness and anxiety and high levels of enjoyment reported suggest that VR obstacle avoidance training is highly acceptable to older people. Future research is required to determine the generalisation of improved motor skills to real-world scenarios.

Keywords: Accidental falls; Aged; Gait; Obstacle avoidance; Virtual reality.

A Systematic Review and Meta-Analysis to Examine the Effectiveness of Exercise Training in People With Osteoporosis or Osteopenia Compared to Other Rehabilitation Interventions on Fear of Falling and the Number of Falls

Johari S, MacDermid J, Graham LJ, Ziebart CT, Shafiee E. J Geriatr Phys Ther. 2025 Apr 22.

DOI: 10.1519/JPT.0000000000000457 **PMID:** 40260904

Abstract

Background and purpose: Fear of falling (FoF) and falls are significant concerns for community-dwelling older adults with osteoporosis or osteopenia, leading to decreased mobility and quality of life. Despite evidence suggesting the benefits of exercise training, its specific effects on the FoF and number of falls (NoF) in this population are not well-documented. This study aims to appraise research evidence on the effects of exercise training, including balance, resistance, and aerobic exercises, on the FoF and NoF in community-dwelling older adults with osteoporosis or osteopenia.

Methods: A comprehensive search was conducted on scientific databases, including EMBASE, MEDLINE, PEDRO, the Cochrane Library, Psych INFO, CINHAL, and Google Scholar, to identify relevant articles. Randomized controlled trials written in English and focusing on exercise training in older adults with osteoporosis or osteopenia were considered for inclusion in this study. Two independent authors conducted screening and reviewed articles. They extracted pertinent information, including authors' names, publication year, sample characteristics, intervention and comparison groups details, the FoF and NoF outcomes, intervention duration and dosage, and follow-up periods. We used the Cochrane Risk of Bias tool (RoB2) for the risk of bias assessment and the GRADE approach to evaluate the quality of evidence for each outcome. We calculated standardized mean difference, Incidence Rate Ratio, and 95% confidence intervals for the quantitative synthesis of the FoF and NoF.

Results and discussion: We included 14 randomized controlled trials (8 for FoF, 5 for the NoF, and 1 with both outcomes) with 2797 participants. All studies but one (with some risk) had a high risk of bias. The primary sources of bias in the included studies were the measurement of outcomes and selective reporting of results. Meta-analyses demonstrated that exercise training including balance, resistance, and aerobic exercises reduced FoF measured using the Fall Efficacy Scale International (overall effect size: -2.15, 95% CI = -3.16 to -1.15, Z = -4.2, P = .001, and I2 = 0.97) and NoF (IRR = 0.46, 95% CI: 0.14 to 0.78, Z = 2.79, P = .012, and I2 = 96%) significantly. Exercise training may effectively reduce the FoF and fall incidence in patients with osteoporosis or osteopenia. However, the considerable variability, high risk of bias, and methodological limitations in most studies underscored the critical need for high-quality studies to inform evidence-based guidelines, optimize intervention protocols, and establish these programs' long-term effects and sustainability.

Conclusion: Our study highlighted that exercise training including balance, resistance, and aerobic exercises can significantly decrease the FoF and NoF in older adults with osteoporosis or osteopenia. This issue supports the inclusion of tailored exercise prescriptions within fall prevention strategies for this group. Future research should aim to standardize these exercise interventions to enhance their effectiveness.

Keywords: exercise training; falls; fear of falling; osteopenia; osteoporosis.

Step by adaptive step: How younger and older adults navigate obstacles

Kulkarni A, Cui C, Rietdyk S, Ambike S. Gait Posture. 2025 Apr 17;120:192-198

DOI: 10.1016/j.gaitpost.2025.04.014 **PMID:** 40262367

Abstract

Background: Younger adults, while approaching and crossing an obstacle, destabilize step length over several steps to ensure accurate foot placement around the obstacle and thereby avoid a trip. Destabilized step length has two potential effects: it facilitates corrections in foot placements to achieve the required accuracy, but it may also impair balance by perturbing the relation between the base of support and the motion or state of the whole-body center of mass. Therefore, destabilized step length in younger adults reflects a greater concern for tripping versus small variations in step length.

Research question: Do healthy older adults demonstrate greater step length destabilization than younger adults while approaching and crossing stationary obstacles?

Methods: Healthy younger and older adults approached and crossed a stationary visible obstacle multiple times. The across-trial foot placement data were analyzed using the uncontrolled manifold method to obtain the inter-step covariance (ISCz) index for several approach steps and the obstacle crossing step. Higher index value indicates higher step length stability and vice-versa.

Results and significance: Younger and older adults destabilized step length (ISCz index reduced) while approaching and crossing the obstacle ($p < .0001$). The ISCz index was 14.5 % lower for older adults indicating that they destabilized step length more than younger adults ($p = .02$). Given the higher costs of a trip-induced fall, the pattern likely represents a rational adaptation by the older adults to avoid tripping. This pattern in the ISCz index could be used to assess the health of the neuromuscular control system in clinical populations.

Keywords: Adaptive gait; Aging; Stability; Synergy; Uncontrolled manifold.

Reduced Balance Confidence Significantly Mediates Fear of Falling Avoidance Behavior and Effectiveness of Balance Training in Older Adults With Type II Diabetes

Lee SP, Habashi K, Iida T, Shih HT, Chien LC, Kaufman PG, Winstein CJ. J Geriatr Phys Ther. 2025 Apr 22

DOI: 10.1519/JPT.0000000000000433 **PMID:** 40265203

Abstract

Background and purpose: Older adults with chronic diabetes have been shown to exhibit reduced balance function and increased fear of falling; however, the contextual inter-relationships between diabetes and its psychological consequences on physical functioning are not fully understood. This study examined the relationships between diabetes disease status, balance confidence, fear of falling avoidance behavior, and changes in performance and confidence after massed practice of a balance task in participants with and without diabetes (PWD and PWOD).

Methods: Older adult PWD and PWOD were recruited for the pre-post control group study (n = 27 PWD, n = 26 PWOD). Participants underwent practice of a novel stabilometer-based balance task over a 2-day period (40 practice trials in 8 blocks). Changes in balance task performance and balance confidence were assessed pre- and post-training. Balance confidence and activity avoidance behavior associated with fear of falling were assessed using the Activities-Specific Balance Confidence Scale and Fear of Falling Avoidance Behavior Questionnaire, respectively. Repeated measures analysis of variance and mediation analyses were conducted to examine the effects of diabetes and training on balance performance and confidence, as well as how baseline balance confidence affects the training outcomes.

Results and discussion: Fifty-three participants (27 with type II diabetes, 29 men, 23 women, and 1 gender nonconforming, mean age = 63.8, range 50-89 years) were enrolled in the study. Of them, 48 (90.6%) successfully completed the balance training with significant balance task performance improvement of approximately 30% in both groups (PWD: 3.04 [95% confidence interval, 1.77-4.31], P < .001; PWOD: 4.39 [95% confidence interval, 3.04-5.74], P < .001). Activities-Specific Balance Confidence Scale score significantly mediated the effect of diabetes on balance confidence after training and fear of falling avoidance behavior.

Conclusions: Despite the physical and psychological deficits associated with diabetes, individuals with chronic diabetes are capable of improving balance confidence and performance through targeted training. Balance confidence was identified as an important mediating factor, explaining the relationship between diabetes disease status and activity-related psycho-physical outcomes. Future research should focus on the potentially self-reinforcing effects of psycho-physical gains induced by exercise training.

Keywords: balance; fall risk; intervention; motor learning; training; type II diabetes.

A societal cost-benefit analysis of falls prevention in community-dwelling older people in the Netherlands

Panneman MJM, van Beeck EF, Olij BF, Haagsma JA, van Zoest F, Kuiper JI, Polinder S. Exp Gerontol. 2025 Apr 17;205:112755

DOI: 10.1016/j.exger.2025.112755 **PMID:** 40252716

Abstract

Background: Aging populations face rising incidents of falls among older people, leading to increased healthcare costs. Preventive measures can reduce this burden and associated costs. However, implementing falls prevention interventions causes costs for society. In order to gain insight in the balance between investments and gains for society the Societal Cost Benefit Analysis (SCBA) methodology can be applied. We conducted a societal cost-benefit analysis (SCBA) of falls prevention interventions in the Netherlands in order to show the stepwise approach, data sources needed and analyses that characterize this method.

Methods: We used SCBA to assess falls prevention interventions' costs and benefits for three stakeholders: private health insurance companies, the national government, and local government. We created five healthcare scenarios for falls prevention interventions, involving informal care, primary care, home care, social work, and an integral scenario. Our SCBA model considered all associated costs with case-finding, screening, and recruitment for each scenario, as well as multifactorial falls prevention programs' costs and benefits, such as reduced healthcare expenses and health gains (DALYs).

Results: All scenarios lead to health gains, ranging from 90 averted DALYs in the informal care to 300 in the primary care scenario.The net benefits per 100,000 senior citizens of falls prevention programs range from €0.2- €5.6 million respectively for social care and home care scenario with benefit-cost ratios of respectively 1.1 and 2.5. Sensitivity analysis revealed that a lower age limit accompanied by a low initial fall risk for recruitment significantly influence the SCBA outcomes.

Conclusion: Structural implementation of evidence-based falls prevention can provide significant health benefits and net cost savings, supporting its implementation at the societal level. The SCBA offers guidance to policymakers on the optimal falls prevention programs for older people, reducing the disease burden of falls in the Netherlands.

Keywords: Falls prevention; Healthcare scenario; Older people; Societal cost benefit analysis (SCBA).

Effectiveness of HAPA-based multidomain fall risk management for older adults with declining intrinsic capacity in nursing homes: protocol of a randomised controlled trial

Shang S, Cheng S, Qi L, Liu T, Yang Y, Yao X, Lu D, Cheng X, Yang J, Cheng M, Zhang Q. BMJ Open. 2025 Apr 30;15(4):e082702

DOI: 10.1136/bmjopen-2023-082702 **PMID:** 40306996

Abstract

Introduction: Accidental falls are a common geriatric syndrome that hinders healthy ageing in older adults. Older adults who live in nursing homes (NHs) are at a greater risk of accidental falls than those who reside in communities. Intrinsic capacity (IC) decline has been shown to be an independent influencing factor for fall risk. Moreover, healthy behaviour is a prerequisite for IC. Therefore, this study considers IC as a starting point, with an aim of developing, implementing and evaluating a low-administration-cost multidomain fall risk management intervention programme based on the Health Action Process Approach.

Methods and analysis: The target population includes older adults with declining IC in Chinese NHs. A random lottery method will be adopted to divide the 100 participants into the control group and intervention group. The project will be conducted in three parts over 24 weeks. In the first part, a fall risk management intervention pathway and programme will be developed with the theoretical and IC framework, which will be refined via the Delphi method. In the second part, a randomised controlled trial will be implemented. The control group will receive usual care and health education, and the intervention group will complete a three-stage process to complete fall risk management behaviour intention and behaviour maintenance. In the third part, follow-up will be conducted to clarify the maintenance effectiveness of the programme in fall risk management. Behaviour change techniques and an interactive handbook will be used to increase the feasibility of the programme. The primary outcomes will include the IC composite score (cognition, locomotion, vitality, sensation and psychology) and fall risk. The secondary outcomes will include gait and balance, strength, fall efficacy, fall prevention self-management, fall management behaviour stages and healthy ageing. The outcomes will be assessed at baseline, and then after 4 weeks, 16 weeks and 24 weeks in both groups. The effectiveness of the intervention will be analysed via linear mixed models on a range of outcomes.

Ethics and dissemination: The trial was approved by the Huzhou University Committee (No.2023-06-06). The results will be submitted for publication in a peer-reviewed journal and presented at conferences.

Trial registration number: NCT05891782.

Keywords: Health Education; Nursing Homes; Protocols & guidelines; Randomized Controlled Trial.

The effect of 12-week long exercise intervention, and 2-weeks of detraining period on lower limbs strength parameters and postural stability in older adults: a linear mixed model analysis

Svobodová L, Sebera M, Vodička T, Svobodová A, Horáková A, Stračárová N, Svobodová Š, Eclerová V, Vespalec T, Kasović M, Paludo AC, Bienertova-Vasku J, Gimunová M. BMC Geriatr. 2025 May 2;25(1):305

DOI: 10.1186/s12877-025-05970-1 **PMID:** 40316894

Abstract

Background: Muscle strength and postural control are essential components for performing daily living activities, particularly in older adults, and can therefore serve as screening tools for assessing fall risk in this population.

Methods: The aim of this quasi-experimental study was to evaluate the impact of a 12-week exercise intervention followed by a 2-week detraining period on lower limb strength and postural stability in older adults. The study involved 38 community-dwelling participants of Central European origin over 60 years of age. Participants underwent the measurements consisting of assessments of knee flexors and extensors strength (isokinetic dynamometer, 90° range of motion, 60°/s angular velocity, Humac Norm CSMI, Stoughton MA, USA), toe grip strength (toe grip dynamometer, Takei Scientific Instruments, Niigata, Japan), and postural stability (narrow stand, 30 s, Kistler, Switzerland). Testing was repeated three times during the study (pre-intervention, post-intervention, and post-detraining). Participants were separated into 3 groups according to the type of training: resistance training group (n = 13), proprioceptive training group (n = 14), and endurance training group (n = 11). The intervention program lasted 12 weeks, two 60-min sessions per week. A linear mixed model (LMM) predicted a change in postural stability after the resistance, proprioceptive, and endurance exercise interventions were applied.

Results: Results showed that knee extensor strength normalized to body mass significantly increased in the resistance training group post-intervention (p = 0.01). Toe grip strength was significantly higher after the intervention in the endurance training group (p = 0.02). A statistically significant increase in knee flexor strength was observed in the proprioceptive training group (p = 0.01). The 2-weeks detraining period revealed no statistically significant loss in training gains. The LMM found different predictions of postural stability changes related to knee extensor strength after each type of training intervention. The final LMM model explains well the variability of the dependent variable R2 = 0.866.

Conclusions: These results highlight the unique characteristics of specific exercise interventions in enhancing muscular strength and postural stability, which are critical for fall prevention among older adults.

Keywords: Aged; Falls prevention; Female; Male; Muscle strength; Postural balance; Resistance training.

Reactive stepping behavior during dual tasking is related to falls in community-dwelling older adults: A cross-sectional study

Tashiro H, Hirosaki S, Sato Y, Ihira H, Toki M, Kozuka N. Clin Biomech (Bristol). 2025 Apr 24;125:106536.

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Abstract

Background: We investigated whether reactive stepping during dual tasking is associated with falls in community-dwelling older adults.

Methods: In 78 healthy community-dwelling older adults, we evaluated quiet standing stability, limits of stability, and reactive stepping performance during single and dual tasking. Participants were suspended in a forward-leaning position using a lean control cable with a load of 12 % of their body weight and were instructed to regain balance upon release by taking steps forward. Reactive stepping was induced under two conditions: (1) simple front-fixed gaze (single-task condition) and (2) reading color names written in different colors (dual-task condition). Reactive stepping performance was measured using the onset latency of the medial gastrocnemius of the stepping limb and the number of steps required to recover balance after forward balance loss. Participants were classified as fallers or non-fallers based on fall history during the past 12 months.

Findings: Twenty-two participants were classified as fallers. Both fallers and non-fallers exhibited a significantly increased number of steps during dual-tasking compared to the single-task condition. An interaction between group and condition was observed. The increased number of steps to balance recovery from forward balance loss during dual-tasking was significantly associated with falls after controlling for age, sex, body mass, cognitive function, and concerns about falling.

Interpretation: The number of steps taken to recover balance during dual-tasking was independently related to fall history in community-dwelling older adults. Fall prevention strategies for older adults should include measuring and improving their response to balance loss while dual tasking.

Keywords: Accidental falls; Aging; Attention; Exercise; Postural balance.

Determinants of Implementing an Adapted Version of STEADI for Fall Prevention of Older Adults Attending Outpatient Rehabilitation in a Large Health Care System

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Abstract

Background and purpose: An adapted version of the Centers for Disease Control and Prevention Stopping Elderly Accidents, Deaths, and Injuries (STEADI) fall prevention initiative was implemented for older adults ≥ 65 years of age attending 34 outpatient physical therapy clinics in a large state-wide health system.

Methods: We explored physical therapists' (PTs) use and perceived determinants of implementation of an adapted version of STEADI using an explanatory mixed-methods approach (n = 50 surveys, 13 interviews). We analyzed survey data using descriptive statistics and mapped interview data to Consolidated Framework for Implementation Research 2.0 constructs using rapid template analysis.

Results and discussion: Participants believed that falls were preventable, used STEADI > 50% of the time, and agreed that STEADI was suitable and implementable. The STEADI components with low reported complexity aligned with high use and are included in the original STEADI (>50%; assessing and intervening in foot problems/footwear, home safety, balance, strength, endurance, gait, activity modifications, and caregiver training). Components with high reported complexity aligned with lower use, and the majority are not included in the original STEADI (<50%; assessing medication, vestibular function, cognition, and pelvic health interventions). Implementation facilitators included compatibility, embedding components of STEADI (eg, questionnaire and functional assessment) in the workflow and electronic health record (EHR), and relational connections. Implementation barriers included perceived lack of capability to conduct specific STEADI components (eg, medication assessment and specific interventions), lack of the EHR workflow of assessment and intervention components, and desire for more clinical decision support in the EHR, implementation support, and ongoing training.

Conclusion: Physical therapists reported higher adoption rates and lower complexity to implement components original to STEADI or common in physical therapy practice compared to the adapted/additional components added by the health system. The study results can be used to develop and adapt strategies to support the implementation and dissemination of STEADI or adapted versions in other outpatient clinics and health systems.

Keywords: geriatric rehabilitation; implementation science; injury prevention.