Featured Falls Research – October

Fall Prevention Interventions for Cognitively Impaired Older Adults: A Systematic Literature Review and Meta-Analysis

Choi H, H Tak S, Lee D. West J Nurs Res. 2025 Oct 17:1939459251381979.

DOI: 10.1177/01939459251381979 **PMID:** 41104487

Abstract

Background: Older adults with cognitive impairment are at increased risk of falls due to impaired judgment, balance, and mobility. The effectiveness of fall prevention interventions in this population remains unclear.

Objective: To investigate the effects of fall prevention interventions on fall incidence in older adults with cognitive impairment.

Methods: A systematic review and meta-analysis were conducted and reported following PRISMA guidelines. Six databases (PubMed, CINAHL, PsycINFO, Embase, Cochrane CENTRAL, and PQDT) were searched for studies published from January 2014 to December 2023, with an updated search in May 2025. Eligible studies were randomized or quasi-experimental trials involving adults aged ≥60 years with cognitive impairment. Of 2342 records identified, 17 studies were included in the review and 10 studies (13 data sets) in the meta-analysis. Study quality was appraised using a modified Scottish Intercollegiate Guidelines Network checklist. A random-effects model was used to synthesize results.

Results: Interventions included exercise programs (eg, Tai Chi, resistance training), technology-enhanced training, and environmental or cognitive strategies. They were delivered 1 to 4 times/week over 4 to 52 weeks. Meta-analysis showed a significant reduction in fall rates in intervention groups compared to controls (pooled incidence rate ratio = 0.82; 95% confidence interval: 0.69-0.98). Moderate heterogeneity was observed (I^2 = 73.7%; p < .001).

Conclusions: Fall prevention interventions can effectively reduce fall rates among older adults with cognitive impairment. Implementing tailored, evidence-based strategies is essential to supporting this high-risk population.

Keywords: cognitive impairment; fall prevention; incidence; interventions; meta-analysis; older adults; systematic review.

Falling short on implementation of fall prevention guidelines in health services: a systematic review with meta-analysis

Haley MN, Sherrington C, Lawler K, Harding KE, Lord M, Williams S, Taylor NF. Age Ageing. 2025 Aug 29;54(10):afaf307.

DOI: 10.1093/ageing/afaf307 **PMID:** 41134532 **PMCID:** PMC12551386

Abstract

Background: Falls are a serious risk for people who use health services. We aimed to evaluate the implementation of fall prevention guidelines in health services.

Methods: Databases and grey literature were searched for studies of the implementation of fall prevention guidelines in health services. Implementation outcomes were aligned with the reach, effectiveness, adoption, implementation and maintenance framework. The methodological quality of included papers was assessed using an internal validity checklist. Results were synthesised using narrative synthesis and meta-analysis. The certainty of evidence of each meta-analysis was assessed using the Grading of Recommendations Assessment, Development and Evaluation framework.

Results: Fifty-five studies of over 115 000 patients implemented recommendations from 14 fall prevention guidelines. Methodological quality was generally poor (median of 5 of 13 internal validity criteria). Median reach of guideline implementation was 64% (range 38%-96%, five studies). Meta-analysis provided low certainty evidence that implementing guidelines did not prevent falls [falls risk ratio 1.01, 95% confidence interval (CI) = 0.81-1.26; falls rate ratio 1.06, 95% CI = 0.77-1.46]. Adoption of fall prevention recommendations by health professionals improved in 87% of recorded outcomes across 43 studies and was maintained 50% of the time. Adherence of patients to recommendations, however, varied from 7% to 73%. Two studies assessed maintenance of reduced falls percentage or rates and found that changes were sustained.

Conclusion: Implementation of fall prevention guidelines in health services can change and sometimes sustain fall prevention behaviour of health professionals. It is uncertain whether implementation leads to reduced falls or changes in patient behaviour.

Keywords: falls; guideline; healthcare; hospital; implementation; older people; systematic review.

Reference standard for the prevention and management of hospital falls: a multidisciplinary Delphi consensus study

Morris ME, Said CM, Haines T, Heng HWF, Batchelor F, Hutchinson AM, McKercher JP, Semciw AI, Hill AM, Peterson S, Kane R, Fowler-Davis S, Campbell S, Sherrington C, Gilmartin-Thomas J, Phan U, Thwaites C; Hospital Falls Reference Standard Consensus Group. BMJ Open. 2025 Oct 6;15(10):e105950.

DOI: 10.1136/bmjopen-2025-105950 **PMID:** 41057179 **PMCID:** PMC12506041

Abstract

Background: Hospital falls persist as a major threat to patient safety. This study aimed to develop an interprofessional reference standard to prevent, manage and report hospital falls.

Methods: A Delphi consensus methodology, informed by the Conducting and Reporting Delphi Studies guideline, was used to design the reference standard. An interprofessional expert panel (n=47) of health professionals, researchers, policymakers and consumers participated in three Delphi rounds. Following the review of clinical guidelines, an e-Delphi survey was developed and piloted to derive 60 initial items for the standard. Two iterative rounds of e-Delphi surveys were distributed via Research Electronic Data Capture and included free-text questions and 9-point Likert scales. An online consensus meeting followed, to ratify the final standard.

Results: In the first Delphi round, there was over 80% agreement for 44/60 items to be included in the reference standard. This increased to 48/60 items in Round 2. At the final consensus meeting, 12 items still did not reach consensus for inclusion and one was added, yielding 49 items. Items that replicated text according to falls with injury/without injury were combined, resulting in 42 items in the final reference standard. Agreed items included: (1) brief screening of falls risk on hospital admission; (2) comprehensive falls assessment for inpatients who are older, frailer or have complex conditions; (3) single interventions (such as environmental adaptations and exercise); (4) multifactorial interventions; (5) education of patients, families and staff; (6) optimising local falls hospital policies, procedures and leadership capability; (7) optimising documentation and reporting; (8) improving accreditation processes; (9) workforce redesign to augment falls education. Items that did not reach agreement (n=12) pertained to alarms, bed rails, grip socks, artificial intelligence, volunteers and care bundles.

Conclusion: This new reference standard provides a checklist for staff, patients, managers and policymakers to reduce unwanted variations in prevention, management and reporting of hospital falls.

Trial registration number: ANZCTR 386960.

Keywords: Health Services; Hospitals; Quality Improvement; Wounds and Injuries.

Potentially inappropriate prescribing and falls-risk increasing drugs in people who have experienced a fall: a systematic review and meta-analysis

O'Reilly T, Gómez Lemus J, Booth L, Clyne B, McCarthy C, Ibrahim K, Thompson W, McAuliffe C, Moriarty F. Age Ageing. 2025 Aug 29;54(10):afaf300.

DOI: 10.1093/ageing/afaf300 **PMID:** 41118395

Abstract

Background: As certain medications increase risk of falls, it is important to review and optimise prescribing in those who have fallen to reduce risk of recurrent falls.

Objectives: To systematically review evidence on the prevalence and types of potentially inappropriate prescribing (PIP), including falls-risk increasing drug (FRID) use, in fallers.

Methods: A systematic search was conducted in July 2024 in MEDLINE, EMBASE, CINAHL and Google Scholar using keywords for fall events, inappropriate prescribing and FRIDs. Observational studies (cohort, case-control, cross-sectional, before-after) and randomised trials were included. Studies were eligible where participants had experienced a fall and PIP (including FRID use) was reported. Random-effects meta-analyses were conducted to pool prevalence of inappropriate prescribing and mean number of inappropriate prescriptions across studies, with stratified analysis to assess heterogeneity.

Results: Fifty papers reporting 46 studies met the inclusion criteria. All studies assessed FRIDs, and 29 assessed other PIP. The prevalence of PIP at the time of the fall was reported in 43 studies, and the pooled estimate was 68.6% (95% CI 66.1%-71.2%). Amongst 23 studies reporting it, the mean number of inappropriate prescriptions per participant was 2.21 (95%CI 1.98-2.45). The most common FRIDs prescribed were sedatives/hypnotics, opioids, diuretics and antidepressants. Twenty-one studies assessed changes in PIP prevalence post-fall; nine reported decreasing prevalence, with others noting increases/no change/mixed results.

Conclusion: Inappropriate prescribing is highly prevalent amongst fallers, with cardiovascular and psychotropic drugs being the most common. This suggests significant scope to optimise medicines use in these patients to potentially reduce falls risk and improve outcomes.

Keywords: falls-risk increasing drug; inappropriate; older people; potentially inappropriate prescribing; prescribing; prevalence.

Falls Research – October

Association between chronic pain severity, falls, frailty and perceived health in older adults at risk of falls

Anbarasan D, Merchant RA. Eur J Med Res. 2025 Oct 31;30(1):1047.

DOI: 10.1186/s40001-025-03304-w **PMID:** 41174709 **PMCID:** PMC12577368

Abstract

Background: Chronic pain, defined as pain persisting for ≥ 3 months, is associated with frailty, falls, and reduced quality of life. Falls remain a major cause of morbidity and mortality in older adults, yet the value of integrating pain severity into falls risk assessment is underexplored. This study examined associations between chronic pain severity and subsequent falls, frailty, physical performance, and perceived health in older adults at risk of falls.

Methods: In this cross-sectional study, baseline data from 143 community-dwelling adults aged ≥ 60 years at risk of falls were analysed. Participants were recruited from community and primary care centres in Singapore. Pain severity was assessed using the Wong-Baker Faces Pain Rating Scale (0-10) and classified as no pain, mild pain (< 3), or at least moderate pain (≥ 3). Data on demographics, frailty, sarcopenia (SARC-F ≥ 2), nutrition, cognition, fear of falling, and perceived health (EuroQol Visual Analogue Scale [EQ-VAS] and EuroQoL 5-Dimensions [EQ-5D]) were collected. Physical performance tests included handgrip strength, gait speed, 5-times sit-to-stand, and Timed-Up-and-Go (TUG). Logistic and linear regression models examined associations between pain severity and outcomes, adjusting for demographic and clinical covariates.

Results: Chronic pain was prevalent in 37.1%. Compared with no pain, at least moderate pain was associated with higher odds of future falls (adjusted odds ratio (aOR) 3.54, 95% CI 1.53-8.19), moderate/high falls risk (aOR 4.78, 95% CI 1.65-10.77), frailty (aOR 4.17, 95% CI 1.42-8.26), sarcopenia (aOR 4.99, 95% CI 1.63-7.28), slower gait speed (aOR 3.87, 95% CI 1.18-8.67), longer TUG (aOR 4.52, 95% CI 1.36-10.01), and poor physical performance (aOR 12.50, 95% CI 3.94-17.17). Pain severity was associated with EQ-VAS (β = - 4.07, 95% CI - 7.67 to - 1.47) and EQ-5D index (β = - 0.11, 95% CI - 0.15 to - 0.07).

Conclusion: Higher chronic pain severity was associated with future falls, frailty, poor physical performance and lower perceived health in at-risk older adults. Incorporating pain severity assessment into falls risk stratification could support earlier, targeted interventions to prevent injurious falls. Longitudinal studies are needed to determine the causal impact of pain management on falls, frailty, and quality of life.

Clinical relevance: Chronic pain in older adults is significantly associated with an increased risk of future falls, frailty, poor physical performance, and lower perceived health, highlighting the importance of evaluating chronic pain in fall risk assessments and vice versa. Implementing targeted prevention measures for individuals with chronic pain can potentially mitigate the risk of falls and improve overall health outcomes in this population.

Keywords: Back pain; Chronic pain; Falls risk; Frailty; Older adults; Quality of life.

Mediating effect analysis: How frailty affects fear of falling and fall risk in elderly patients with ischemic stroke

Chen M, Pan Z, Lin C. Medicine (Baltimore). 2025 Oct 3;104(40):e45035.

DOI: 10.1136/bmjopen-2025-105950 **PMID:** 41054061 **PMCID:** PMC12506041

Abstract

This study aimed to examine how frailty affects fall risk in elderly ischemic stroke patients through the mediating role of fear of falling, by analyzing their associations and pathways. A total of 280 elderly ischemic stroke patients were recruited by convenience sampling. Evaluations included the Chinese versions of the elderly falls risk self-assessment scale, modified falls efficacy scale (MFES), tilburg frailty indicator (TFI), hospital anxiety and depression scale (HADS), and family APGAR index, all showing good reliability (Cronbach $\alpha \geq 0.80$). Data were analyzed using Pearson correlation, univariate analysis, and multiple linear regression. Age increased fall risk, while exercise and assistive devices reduced it ($P < .0001$). Multiple regression analysis confirmed the effects of age ($\beta = 0.8233$, $P < .0001$) and use of assistive devices ($\beta = -0.0143$, $P < .0001$). Scores across frailty dimensions (mean = 5.12) were strongly and positively associated with fall risk ($R = 0.886$, $P < .001$). Conversely, fear of falling showed a significant negative correlation with fall risk ($r = -0.834$, $P < .001$), suggesting that higher levels of fear may reduce actual fall events through defensive or avoidance behaviors. Frailty significantly increased fall risk in elderly patients with ischemic stroke, while fear of falling served as a partial mediator in this process. Greater frailty was associated with stronger fear of falling, which in turn contributed to an elevated fall risk. This underscores the importance of addressing both frailty and psychological factors (e.g., fear of falling) in clinical care for this population. Future interventions should target both physical frailty and fear of falling to reduce fall incidence, alleviate patients' physical and psychological burdens, and improve safety and quality of life. The novelty of this study lies in being the first to construct and validate a frailty-fear of falling-fall risk mediation model in elderly patients with ischemic stroke, thereby providing new evidence on the mechanisms underlying fall risk in this group. The observed association may be partly explained by the fact that patients with higher fear levels tend to adopt more protective or avoidance behaviors.

Keywords: elderly ischemic stroke; fall risk; fear of falling; frailty; mediating effect.

Optimal type and dose of exercise to improve fall behavior in older adults: a systematic evaluation and network meta-analysis

Cheng M, Ni J, Liu F, Wang S. Ageing Res Rev. 2025 Oct 17:102924.

DOI: 10.1016/j.arr.2025.102924 **PMID:** 41110662

Abstract

Background: This meta-analysis aims to evaluate the effects of exercise interventions on fall rates and fall risk in older adults and identify the most effective exercise types and doses for fall prevention.

Methods: Systematic searches of PubMed, Web of Science, SPORTDiscus, PsychINFO, Embase, and Scopus databases were conducted from the beginning of database construction through November 2024. Studies were included if they were randomized controlled trials (RCTs) of exercise interventions for older adults. Paired, network, and dose-response meta-analyses were conducted using random-effects models for outcomes of falls behavior in older adults.

Results: A total of 21 RCTs involving 3387 participants were included in this study. The results indicated that the ranking of intervention effectiveness in reducing fall-related behaviors among older adults, based on SUCRA values, was as follows: Falls Management Exercise Programme (FaME) (68.56%) > Otago Exercise Program (OEP) (57.58%) > aquatic exercise (43.96%) > Tai Chi (41.52%) > balance training (0.58%). In addition, a reverse U-shaped dose-response relationship was observed between total exercise dose and fall-related outcomes in older adults, with the optimal response occurring at approximately 420 MET·min/week. Notably, the optimal dose varied across different exercise modalities.

Conclusions: The study identified the relative effectiveness of different exercise interventions in improving fall-related outcomes among older adults. Falls Management Exercise Programme (FaME) was found to be the most effective adjunctive intervention, followed by Otago Exercise Program (OEP), aquatic exercise, Tai Chi, and balance training. Providing the most effective exercise strategies may enhance fall prevention in older adults, even when the exercise dose falls below the thresholds recommended by the WHO guidelines.

Keywords: dose; fall behavior; movement type; network meta-analysis; older adults.

Should whole body vibration be used for falls prevention in older people living in the community?

Dyer SM, Kwok WS, Dawson R, Cameron ID, Sherrington C. Syst Rev. 2025 Oct 31;14(1):209.

DOI: 10.1186/s13643-025-02946-5 **PMID:** 41174672 **PMCID:** PMC12577057

Abstract

The Canadian Task Force on Preventive Health Care has recently published a systematic review and network meta-analysis that concludes that whole-body vibration (WBV) has moderate-certainty evidence for falls prevention for older people living in the community. However, as Cochrane Collaboration falls prevention review authors and clinicians, we suggest that when the range of possible effects captured with the 95% confidence intervals, the likelihood of adverse events and the lack of evidence for effectiveness in older people living in care facilities are taken into account, that this intervention should be implemented with caution in this population. Outside of the clinical trial setting, WBV in this population should only be implemented following an individually tailored assessment and with guidance from an appropriately trained health professional.

Keywords: Care homes; Community; Falls; Older people; Whole body vibration.

Expanding the Design Space for Fall Prevention in Acute Orthopedic Hospital Care: Human-Centered Design Study

Ehn M, Revenäs Å, Tobiasson H. JMIR Hum Factors. 2025 Oct 2;12:e73110.

DOI: 10.2196/73110 **PMID:** 41037806

Abstract

Background: In-hospital fall prevention is a complex phenomenon most efficiently addressed via a wide range of multifactorial interventions. Technology may contribute, but research in this field has so far mainly focused on detecting falls. As a result, new knowledge from a system perspective is needed regarding when and how new technologies may support fall prevention among patients who have been hospitalized.

Objective: This study aimed to explore and describe clinical practices in an acute orthopedic hospital ward for fall prevention from a system perspective; determine the needs and possibilities related to support for clinical practices for fall prevention; and test whether a framework for studying interactions between people, activities, contexts, and technologies can be used to support observations of complex phenomena such as clinical fall prevention.

Methods: This qualitative study followed the principles of human-centered design while combining focused ethnography with a workshop. Eight health care professionals representing different staff categories in an acute hospital ward of an orthopedic clinic participated in on-site interviews or were observed in their clinical practice. Data from these events were subjected to qualitative content analysis to describe the clinical practices for fall prevention observed in terms of people, activities, context, and tools. In a workshop, a larger group of clinic personnel provided their views on fall prevention, described the activities and tools they observed to prevent falls, and discussed needs for further support.

Results: This study determined that health personnel considered fall prevention in all their interactions with patients, which included a wide range of activities for fall prevention wherein staff categories played complementary roles. These staff-patient meetings were goal oriented, responsive, and patient centered. The staff often served as key "tools" in assessment, communication, and coaching, while digital tools (mainly computer-based software programs) were used for information retrieval, documentation, and communication. The personnel worked to prevent patient falls both during hospitalization and after discharge. They believed that the long-term perspective was much more difficult to address in their clinical practice, and they expressed a need for more homelike environments in the hospital.

Conclusions: The view on technology-based in-hospital fall prevention can be broadened not only to mainly include monitoring and alarm systems, information systems in general, or computer-based information in particular systems but also to support activities performed by health personnel that engage patients in fall prevention. For example, tools such as these can be implemented in training involving daily activities and mobility within safe yet more homelike clinical contexts.

Keywords: falls; hospital; interaction; prevention; technology.

Association of Systemic Inflammation with Balance and Falls in Older Adults: NHANES and Mendelian Randomization Study

Fakorede S, Cheng K, Lateef OM, Fakorede OS, Wang D, Wang D, Liu X. J Gerontol A Biol Sci Med Sci. 2025 Oct 31:glaf242.

DOI: 10.1093/gerona/glaf242 **PMID:** 41172260

Abstract

Background: Falls are a leading cause of morbidity in older adults, with emerging evidence suggesting that systemic inflammation may contribute to this risk. C-reactive protein (CRP), a biomarker of inflammation, has been linked to various health issues, including declines in physical function. However, its direct influence on balance and fall risk remains uncertain. This study investigates the association between CRP levels and balance using observational data and Mendelian Randomization (MR) to explore its causal role in fall risk.

Methods: We analyzed data from the 2021-2023 National Health and Nutrition Examination Survey (NHANES), including 1,215 participants aged 60 and older. CRP levels were measured using immunoturbidimetric assays, and balance was assessed via the Modified Romberg Test. We used multivariable ordinal logistic regression models to evaluate the relationship between CRP and balance, adjusting for demographic, health, and lifestyle factors. Genetic instruments for CRP were derived from genome-wide association studies (GWAS), and MR analysis was performed using fall risk summary statistics (2,215 cases, 6,289 controls).

Results: In the NHANES cohort, higher CRP levels were associated with poorer balance (β = -0.201, p = 0.007). This association was stronger in males but not in females. MR analysis confirmed a causal link between elevated CRP and increased fall risk (OR = 1.13, p = 8.96 × 10-8), with no evidence of pleiotropy or heterogeneity.

Conclusions: our findings highlight CRP as a key factor influencing balance and a causal contributor to fall risk in older adults, suggesting that anti-inflammatory interventions may help reduce fall risk.

Keywords: C-reactive protein; Mendelian randomization; balance performance; fall risk.

Emergency department visits due to severe falls: comparing patient self- reports and general practitioner records: A cross-sectional study

Fellhölter G, Stuckenschneider T, Himmelmann L, Zieschang T. BMC Geriatr. 2025 Oct 6;25(1):757.

DOI: 10.1186/s12877-025-06411-9 **PMID:** 41053639 **PMCID:** PMC12502360

Abstract

Background: Older individuals who experience a severe fall are at high risk for long-term consequences and require structured follow-up care including risk assessments and secondary prevention (e.g. exercise). Accurate knowledge of pre-existing diagnoses is essential for tailoring interventions. However, identifying these diagnoses in emergency department (ED) is challenging due to time constraints, high workload, potential recall bias after a traumatic event, and limited electronic data exchange across healthcare settings in Germany. This study analyses the concordance between self-reported diagnoses of adults aged > 60 years presenting to the ED after a fall without hospitalisation and diagnostic information provided by their general practitioners (GPs).

Methods: Data from the SeFallED study conducted in Germany were analysed. To analyse concordance, 28 major diagnostic groups (e.g. heart diseases, cancer, lung diseases) were established. Cohen's Kappa assessed the agreement between self-reported and GP-reported diagnoses. Logistic regression identified associations between population characteristics (e.g., cognition, concerns about falling, age) and discordance between self-reported and GP-reported diagnoses.

Results: A total of 216 participants (mean age 75.2), with an average of five diagnoses per person, were included. Agreement was almost perfect (K = 0.81-1.0) for Parkinson's disease, substantial (K = 0.61-0.80) for diabetes mellitus and cancer, and moderate (K = 0.41-0.60) for heart and lung diseases. Other conditions showed fair, poor, or no agreement. Age, sex, BMI, cognition, concerns about falling, education, and living arrangements were associated with discordance. Only higher concerns about falling were linked to non-agreement for overall diagnoses.

Conclusion: Overall, there was poor agreement between self-reported and GP-reported diagnoses. Special attention should be given to older adults and individuals with high concerns about falling, as these factors predicted discordance. Participants were more likely to report diseases with more noticeable symptoms and frequent monitoring such as Parkinson's disease or diabetes mellitus. To optimise follow-up care, improving the accuracy of diagnostic information is essential, which may be facilitated by harmonizing patient information across electronic systems (e.g., electronic health cards). Improved communication between GPs and patients regarding existing illnesses is also crucial to enhance the accuracy of patient self-reports.

Trial registration: DRKS (Deutsches Register für klinische Studien, DRKS00025949, prospectively registered on 4th November, 2021).

Keywords: Emergency department; Falls prevention; Morbidity; Older people; Self-report.

Diagnostic Accuracy of Fall Risk Screening Tools in Older Individuals: A Systematic Review With Bivariate Random-Effects Meta-Analysis

Hu Z, Jiang S, Xin X, Niu X, Chen S, Gu J. J Am Med Dir Assoc. 2025 Oct 15:105943.

DOI: 10.1016/j.jamda.2025.105943 **PMID:** 41109333

Abstract

Objectives: To evaluate the diagnostic accuracy of the most commonly used fall risk screening tools in older individuals from different settings.

Design: Systematic review and meta-analysis of diagnostic accuracy studies.

Settings and participants: A total of 53 studies involving 21,554 adults aged ≥60 were included: 24 studies in community settings (n = 9358), 6 in institutional or long-term care settings (n = 733), 22 in hospital settings (n = 10,245), and 2 with mixed populations (n = 1218).

Method: CINAHL, Cochrane library, EMBASE, PubMed, and Web of Science, 5 electronic databases were searched from inception to April 2025. A bivariate random-effects model was fitted separately for each screening tool to jointly model sensitivity and specificity, and to derive pooled estimates and summary receiver operating characteristic curves. Sensitivity, specificity, and diagnostic odds ratio were also independently synthesized for each tool using univariate random-effects meta-analyses of proportions. Threshold effects were tested, and methodological quality was assessed using the Quality Assessment of Diagnostic Accuracy Studies-2 tool.

Results: Nine fall risk screening tools were evaluated. The Mini Balance Evaluation Systems Test (Mini-BESTest) (area under the curve [AUC] = 0.793) and Berg Balance Scale (BBS) (AUC = 0.774) showed overall relative higher diagnostic accuracy, whereas St. Thomas's Risk Assessment Tool in Falling Elderly Inpatients (AUC = 0.754) and the Hendrich II Fall Risk Model (AUC = 0.734) demonstrated acceptable diagnostic accuracy in hospitalized settings.

Conclusions and implications: No single screening tool showed sufficient diagnostic accuracy to be recommended as a standalone instrument for identifying fall risk in older adults. However, Mini-BESTest and BBS demonstrated relatively higher overall diagnostic performance and may be prioritized in clinical practice among 9 tools evaluated in this study.

Keywords: Older adults; bivariate model; diagnostic accuracy; fall risk screening.

Factors Associated with Health Service Use for Self-Reported Balance Problems in Community-Dwelling Adults: A Secondary Analysis of Nationally Representative NHANES 2001-2004 Data

Kapur S, Sakyi KS, Haworth JL, Lohia P, Goble DJ. Healthcare (Basel). 2025 Oct 21;13(20):2654.

DOI: 10.3390/healthcare13202654 **PMID:** 41154331 **PMCID:** PMC12562649

Abstract

Background: Balance problems are one of the major risk factors for falls. Despite the availability of effective fall prevention interventions, falls and related injuries are rising. This study explored the factors associated with healthcare utilization for balance problems in community-dwelling adults in the United States.

Methods: Study involved secondary analysis of nationally representative National Health and Nutrition Examination Survey 2001-2004 data (latest data with variables of interest at the time of study). All adults (≥40 years) who reported balance problems in the past 12 months were included. Dependent variable was whether the individual ever saw a healthcare professional for balance problems. All analyses were adjusted for probability sampling weights. Adjusted odds ratio (AOR) and 95% confidence interval (CI) were calculated using multivariable logistic regression.

Results: Study included 1834 adults with self-reported balance problems (mean age 60.1 years (0.5 SE), 62.3% females). Of these, only 32.13% ever saw a healthcare professional for their balance problems. Having encounter(s) with a healthcare provider for any reason in the past year (AOR 2.45; 95% CI,1.19-5.06; p = 0.017), lack of health insurance (AOR 0.52; 95% CI,0.32-0.84; p = 0.009), falls in the past year (AOR, 1.29; 95% CI,1.03-1.61; p = 0.028) and age (AOR, 0.98; 95% CI,0.97-0.996; p = 0.011) had significant association with healthcare utilization for balance problems. The predicted probability of healthcare use for balance problems decreased from 0.39 for 40-year-olds to 0.26 for 80-year-olds.

Conclusions: This study reports the association between factors such as age, health insurance, encounter with a healthcare provider, and falls in the past year with healthcare utilization for balance problems among community-dwelling adults with self-reported balance problems and identifies populations at increased risk of underutilization. Despite the use of older data, it provides useful information for guiding future research in this novel domain of healthcare research.

Keywords: NHANES; balance; falls; healthcare; healthcare utilization.

Effectiveness of dual-task exercise in improving balance and preventing falls among older adults: systematic review with meta-analysis and meta-regression

Khan MJ, Fong KNK, Wong TW, Tsang WW, Chen C, Chan WC, Winser SJ. Eur Geriatr Med. 2025 Oct 28.

DOI: 10.1007/s41999-025-01328-3 **PMID:** 41152559

Abstract

Purpose: To investigate whether dual-task (DT) training improves dynamic balance and functional mobility and reduces falls and determine how DT training dosage, including exercise duration, intensity, challenge and adherence, affects treatment outcomes in older adults.

Methods: Databases were searched until May 2025. Methodology, risk of bias and evidence quality were assessed using the Physiotherapy Evidence Database (PEDro), Cochrane risk of bias and Grading of Recommendations, Assessment, Development, and Evaluation tools, respectively. Dynamic balance was assessed using the Berg Balance Scale (BBS) and Fullerton Advanced Balance (FAB), and functional mobility using Timed Up and Go (TUG), and falls assessed the frequency of fall.

Results: Forty-four studies involving 2782 older adults were included. The mean PEDro score was 6.1, 58% of studies were found to have low risk of bias, and evidence quality ranged from very low to moderate. Meta-analysis indicated that DT exercise significantly improves dynamic balance and functional mobility, and reduces fall frequency. Meta-regression revealed that dynamic balance improved with 95% adherence to 30 min of moderately challenging and moderate-intensity DT training three times per week for four weeks. Functional mobility improved with 95% adherence to 50 min of mildly challenging and moderate-intensity DT training three times per week for 13 weeks.

Conclusion: DT training improved dynamic balance and functional mobility and reduced falls. The recommended dosages may elicit optimal outcomes. Additional meta-regression analyses are needed to determine the impact of DT training dosage on falls.

Keywords: Accidental fall; Elderly; Meta-regression; Motor–cognitive task; Posture control.

Electrical vestibular stimulation to improve balance in older adults: a pilot randomized controlled trial

King JA, Walters N, Rodrigues N, Al Bastami J, Mehri N, Chan A, Spencer M, Clark S, Ferrier E, Orr SL, Rempel J, Hauenstein A, Roper JM, Ralston JD, Peters RM. J Neuroeng Rehabil. 2025 Oct 31;22(1):231.

DOI: 10.1186/s12984-025-01749-y **PMID:** 41174737 **PMCID:** PMC12577125

Abstract

Background: Falls are the leading cause of injury-related hospitalizations among older adults, often linked to vestibular dysfunction. While vestibular rehabilitation therapy is a standard intervention, designed to compensate for vestibular impairment with proprioceptive and visual cues, potential cumulative effects of noisy Electrical Vestibular Stimulation (nEVS) on balance improvement in older adults are not well understood.

Objective: This study evaluated the efficacy of cumulative nEVS dosing in improving static balance, its potential mechanisms, and clinical significance.

Methods: A single-blind, pilot randomized controlled trial enrolled 40 older adults (mean age: 77.7 ± 11.8 years). Participants were randomly assigned to a Stimulation group (nEVS intervention) or Sham group. The nEVS regimen included low-amplitude wideband stimulation (± 0.35 mA, 0.001-300 Hz) for 20 min, three times weekly for six weeks. Balance performance was assessed immediately before and after nEVS using a head-mounted sensor to measure physiological vibration acceleration ('Phybrata') power as a measure of postural stability in four conditions: Floor Eyes Open, Floor Eyes Closed, Foam Eyes Open, and Foam Eyes Closed. Follow-ups occurred at 3 months and 6 months post-intervention.

Results: The Stimulation group exhibited significant and sustained reductions in Phybrata power with improvements observed as early as Session 3 and persisting through 6 months in Foam EC. Additionally, the Sham group demonstrated smaller reductions in Phybrata power, potentially reflecting a learning effect.

Conclusion: nEVS may be a safe and effective intervention for improving balance in older adults. Its benefits in addressing age-related deficits in balance and sensory integration highlight its potential for fall prevention and rehabilitation. This study was retrospectively registered as a clinical trial on February 25, 2025 (NCT06846047).

Keywords: Aging; Balance control; Balance therapy; Electrical vestibular stimulation; Galvanic vestibular stimulation; Phybrata power; Postural stability; Vestibular system; Vestibular therapy.

Promoting Physical Activity and Preventing Falls Among Older Adults in a Nursing Home Setting: Protocol for Development and Implementation of the BeSt Age Mobile App

Krell-Roesch J, Diener J, Krafft J, Rayling S, Woll A, Wunsch K. JMIR Res Protoc. 2025 Oct 6;14:e74174.

DOI: 10.2196/74174 **PMID:** 41052426 **PMCID:** PMC12500227

Abstract

Background: Most nursing home residents do not meet physical activity guidelines. Many interventions to promote physical activity and prevent falls in nursing home residents have low adherence rates, lack a theoretical foundation, or require much time from staff for preparation or delivery.

Objective: This study aims to describe the rationale, development, and implementation approach of the BeSt Age app through a cluster randomized controlled trial. We also provide baseline characteristics of the study sample and discuss possible implications for further app developments.

Methods: We iteratively developed a novel, tablet-based mobile app (BeSt Age) that enables nursing home staff to deliver individualized physical exercise training to residents with or without motor or cognitive impairments. The app was designed and developed based on an intervention-mapping approach. A needs assessment was performed, followed by defining objectives, theory-based methods, program development, implementation, and evaluation. We took several steps to ensure that the app was based on a sound theoretical background and considered limitations identified in prior research. For implementation and evaluation purposes, we conducted a study among 229 older adults from 19 nursing homes (171 females, 58 males; mean age 85, SD 7 years). Results will be used to examine the effectiveness of the app with regard to different outcomes. Primary outcomes among participating nursing home residents are quality of life, fall risk evaluated through 2 performance-oriented balance tests, and fall incidence. Secondary outcomes include motor performance, cognition, activities of daily living, physical activity behavior, and fall efficacy. In this paper, we examined differences between intervention group (IG) and control group (CG) participants at baseline using the chi-square test, the Mann-Whitney U test, or the t test.

Results: The IG (n=137 from 11 nursing homes) received a 12-week intervention with the BeSt Age app in small, homogenous groups of 5-7 nursing home residents, with 2 exercise sessions per week, each lasting 25-30 minutes. The CG (n=92 from 8 nursing homes) received usual care. At baseline, the IG had a statistically significantly larger number of females, participants had a higher BMI, and more participants rated attending physical activity programs as important. There were no further statistically significant differences between the groups. Results with regard to the effectiveness of the BeSt Age app are expected to be published in spring 2026.

Conclusions: If proven effective, the BeSt Age app may be a viable solution for physical activity promotion and fall prevention among older adults residing in nursing homes, thereby contributing to maintaining quality of life and overall well-being in this vulnerable population. The app can support nursing home staff in delivering exercise training to residents with minimal additional workload and without requiring specific resources.

Keywords: cluster randomized controlled trial; fall prevention; mobile health; nursing homes; older adults; physical activity.

Incidence and risk factors of falls in older people with chronic comorbidities in community: a cross-sectional study

Liu S, Si Y, Peng Y, Wang D, Yuan X, Peng Y. Front Public Health. 2025 Sep 24;13:1643699.

DOI: 10.3389/fpubh.2025.1643699 **PMID:** 41069810 **PMCID:** PMC12504252

Abstract

Objective: To investigate the prevalence of falls among older adult individuals with comorbidities in community and to analyze the risk factors.

Methods: Using multi-stage stratified random sampling method, a total of 886 older people aged over 60 years with comorbidities were selected from 10 communities as research subjects between April 2022 and December 2023. Data collection involved the use of a general information questionnaire, frail scale, self-rating anxiety scale, fall risk self-rating scale, standing up and walking timing test, and Berg Balance Scale. The patients were categorized into two groups based on fall occurrence, and χ^2 test and logistic regression analysis were employed to identify the risk factors for falls.

Results: The incidence of falls was 24.8% (220/886). The logistic regression analysis indicated that factors such as frailty, visual impairments, anxiety, fall risk score, physical exercise, social support, category of residence, and social interaction (OR = 0.535, 1.826, 4.284, 5.584, 1.965, 1.649, 2.308, 1.806; all $p < 0.05$) were significantly associated with falls in older people with comorbidities.

Conclusion: The incidence of falls is higher among older people with comorbidities in the community, it is essential to prioritize older people with comorbidities who have limited daily social activities, insufficient social support, visual impairments, high fall risk scores, and impaired sit-stand and walking tests in order to prevent falls and promote healthy aging.

Keywords: comorbidity; falls; health ecological model; older people; risk factors.

Does predicting who will fall tomorrow tell you who is frail today?

Logan Ellis H, Rockwood K. Age Ageing. 2025 Aug 29;54(10):afaf309.

DOI: 10.1093/ageing/afaf309 **PMID:** 41134533

Abstract

A frequently raised question about frailty indices is whether certain variables should be weighted more heavily than others. In this commentary, we outline some of the pros and cons of weighting. Weighting can improve prediction of outcomes, but it also carries risks: underestimating the effects of existing interventions, prioritising factors that may not align with classical frailty phenotypes, and the risk that a model will not predict outcomes in the same way in a new population as it did in the one it was trained on. We offer an alternative perspective that frailty indices need not be seen only as prediction tools. Used as latent measures of health, they can support and complement clinical assessment. The true test of any data-derived frailty measure should be whether clinicians find it helpful in practice and whether its use can reduce the rate of adverse outcomes in a randomised controlled trial.

Keywords: electronic health records; frailty; frailty screening; older people.

Mediators implementation and delivery: the falls management exercise programme (FaME)

Manning F, Ventre JP, Brough G, Hawley-Hague H, Hulme C, Kendrick D, Logan P, Mahmoud A, Masud T, Orton E, Skelton DA, Timmons S, Todd C, Goodwin VA. BMC Health Serv Res. 2025 Oct 22;25(1):1396.

DOI: 10.1186/s12913-025-13550-7 **PMID:** 41126178 **PMCID:** PMC12542040

Abstract

Background: When implementing multicomponent interventions, fidelity to the intervention is key for reproducible outcomes. This study investigates the main influences on the fidelity (implementation strategy fidelity and intervention delivery fidelity) of the community-based Falls Management Exercise (FaME) programmes in three different areas of England.

Methods: FaME classes across Greater Manchester (GM), Devon and the East Midlands (EM) were studied between 2021 and 23 using a mixed-methodological approach. Data sources included interviews, observations of FaME classes, field notes, and communities of practice recordings.

Results: Forty interviews were conducted with stakeholders, providers and class attendees. Additionally, twenty-one class observations were conducted. Triangulated quantitative and qualitative data revealed issues with fidelity to the FaME programme, especially in sites with limited oversight roles/structures and limited funding. There was a lack of understanding and clarity of essential components which impacted both implementation strategy and intervention delivery fidelity. The conceptual map developed highlights the importance of mediators of fidelity in relation to implementation and delivery, including: economic influence, organisational influence, oversight roles, fidelity evaluation, participant responsiveness, essential components and knowledge, training and professionalism.

Conclusion: Despite a recognised need for implementing evidence-based falls prevention programmes, a lack of sufficient funding, formalised oversight roles/structures and understanding of essential intervention components is associated with lower fidelity to the intervention. Unchecked by local monitoring, this can lead to an incremental migration of delivery away from the evidence base. We recommend: (i) providers have clarity on essential intervention components, (ii) standardised fidelity monitoring based on essential components, and (iii) effective local oversight roles and structures.

Keywords: Exercise; Falls; Fidelity; Implementation; Mixed methods; Older adults.

Existing psychological interventions addressing concerns about falling in older adults: a scoping review

Nicklen B, Delbaere K, Ellmers TJ. Age Ageing. 2025 Aug 29;54(10):afaf281.

DOI: 10.1093/ageing/afaf281 **PMID:** 41110132 **PMCID:** PMC12535764

Abstract

Aims: Concerns about falling (CaF) are common in older adults. They are associated with increased falls and reduced quality of life. This scoping review aimed to (i) explore the psychological interventions that exist to address CaF in older adults and (ii) determine their feasibility and acceptability.

Methods: The Arksey and O'Malley framework was used to identify all intervention studies that utilised a psychologically informed method to target CaF in older adults. Searches were conducted on five databases (Medline, CINAHL, Embase, Psychinfo and Scopus).

Results: This review included 32 interventions (21 randomised controlled trials, five non-controlled trials, two non-randomised controlled trials and four case studies), comprising of 3674 participants. Thirteen different psychologically informed methods were used across interventions. Cognitive behavioural therapy (CBT) was the most common (n = 15), followed by exposure therapy (n = 4) and motivational interviewing (n = 3). Most interventions significantly reduced CaF. The median total dose across all interventions was 5 hours 40 minutes. CBT interventions tended to last the longest (median = 8 × 60-minute sessions). The shortest efficacious intervention involved a single ~20-minute session of motivational interviewing.

Conclusion: Numerous psychologically informed techniques are currently used to address CaF-with CBT being the most common. However, the time and resource demands of many interventions may challenge their integration into clinical practice. Future work should explore the perspectives of those working in falls prevention services, and older adults themselves, to identify the most feasible and acceptable way to clinically manage CaF.

Keywords: CaF; clinical practice; interventions; older adults; reviews.

Preventive measures for falls and fractures in the community

Palmer SJ. Br J Community Nurs. 2025 Nov 2;30(11):520-522.

DOI: 10.12968/bjcn.2025.0201 **PMID:** 41171049

Abstract

Falls and fractures, are a major public health concern among older adults in the UK, often resulting in injury, loss of independence and increased demands on health and social care services. The causes of falls are multifactorial such as muscle weakness, poor balance, visual impairment, polypharmacy, frailty and comorbidities, as well as environmental hazards. Osteoporosis further increases the risk and severity of fragility fractures, particularly in the spine, wrist and hip. Evidence demonstrates that community-based interventions can significantly reduce falls and associated injuries. These include multifactorial risk assessment, strength and balance exercise programmes, environmental modifications and structured care pathways. Nurses and community health professionals can play a central role in identifying at-risk individuals and delivering tailored interventions. By educating patients and coordinating to their multidisciplinary care, they can make a difference. However, there are many persistent challenges to implementation, such as resource limitations, workforce capacity and patient adherence. It is also important to highlight the need for integrated, person-centred and cross-sector approaches. By embedding evidence-based falls prevention into routine community practice, healthcare professionals can maintain independence, enhance wellbeing and reduce the overall burden of falls and fractures.

Keywords: exercise; falls; fractures; interventions; osteoporosis; prevention; strength.

Neuromechanistic causes of timber falls in older adults with mild cognitive impairment: Is response initiation or motor execution the problem?

Pitts J, Wang S, Bhatt T. Geroscience. 2025 Oct 24.

DOI: 10.1007/s11357-025-01910-4 **PMID:** 41131191

Abstract

Older adults with mild cognitive impairment (OAwMCI) show reactive balance deficits compared to cognitively intact older adults (CIOA), which could increase the likelihood of 'Timber' falls (i.e., backward falls caused by extremely delayed reactive stepping). This study investigated potential neuromechanistic causes of Timber falls in OAwMCI, including delayed muscle onset latencies and/or altered muscle synergies during reactive stepping. 36 OAwMCI, 38 CIOA, and 20 young adults were exposed to a large anterior stance perturbation, with electromyography collected from the biceps femoris (BF), vastus lateralis (VL), medial gastrocnemius (MG), and tibialis anterior (TA). Timber falls were identified by falling (> 30% weight in harness) without initiating stepping within 430 ms (perturbation duration). Timber falls only occurred in OAwMCI, who were subcategorized into MCI: Timber (36%) or MCI: Step (intact stepping, 64%). MCI: Timber had higher fall rate, lower reactive stability, shorter step length, and longer step initiation time compared to groups with intact stepping ($p < 0.05$), and delayed onsets of stepping limb muscles and the stance limb MG ($p \leq 0.03$). MCI: Timber also showed many structural differences in muscle synergies (M1-6), such as recruiting a unique synergy (M4) which might affect coordination of the stepping limb MG, and failing to recruit M6, which might be involved in taking a long recovery step (stepping limb VL). These results suggest that reactive balance deficits in OAwMCI may be related to problems with both initiating and executing reactive stepping, possibly due to neural pathology and sensorimotor processing deficits which delay response initiation and/or affect motor command execution.

Keywords: Alzheimer's Disease; Fall risk; Mild cognitive impairment; Muscle synergies; Reactive balance; Reactive stepping.

Clinical estimates of three physiologic capacities explain a majority of unipedal stance time

Richardson JK, Lord SR, Delbaere K, Ashton-Miller JA. Aging Clin Exp Res. 2025 Oct 7;37(1):281.

DOI: 10.1007/s40520-025-03164-8 **PMID:** 41055830 **PMCID:** PMC12504375

Abstract

Background: Recent prospective research indicates that unipedal stance time (UST) of < 15 s in middle/older adults increases their risk of repetitive falls within 5 to 10 years.

Aim: To determine the extent that clinical measures of three physiologic capacities, peripheral afferent acuity, processing speed, and proximal frontal plane strength, are responsible for UST.

Methods: UST, distal lower limb clinical vibratory sense, short latency go/no-go accuracy using ReacStick, and lateral plank time, were evaluated in a cohort (n = 172, 51% female, age 64.8 +/- 9.6 years) with diabetic neuropathy (n = 31), cirrhosis (n = 94), and no known neurologic disease (n = 47) using age, body mass index (BMI), sex, and medication number as covariates.

Results: Multivariate analyses demonstrated that the three variables separately, and as a composite variable (vibration time + reaction accuracy/2 + lateral plank time), were associated with UST (adjusted R^2 = 0.66 and 0.65, respectively) for the entire group, and for diabetic neuropathy, cirrhosis, and no known disease groups separately (adjusted R^2 = 0.59, 0.60, and 0.68, respectively). The composite variable also classified participants into those with UST > and < 15 s (receiver operator characteristics area under the curve (AUC) = 0.92 (95% CI = 0.88, 0.96)).

Discussion: These findings allow clinicians to identify specific physiologic deficits and develop targeted intervention strategies to improve UST.

Conclusion: Clinical estimates of three physiologic capacities predict almost 2/3 of UST variability in middle/older people, rendering age, BMI, sex, and medication number less relevant.

Keywords: Clinical medicine; Muscle strength; Postural balance; Processing speed; Proprioception.

Balancing on the edge of age: neuroendocrine, mental health and functional fitness correlates of fear of falling in older women

Rodrigues RN, Pereira DMM, Brito-Costa S, Souza-Gomes AF, Cezar NOC, Greve JMD, Alonso AC, Marques FS, Ferreira JP, Teixeira AM, Furtado GE. Clinics (Sao Paulo). 2025 Oct 15;80:100792.

DOI: 10.1016/j.clinsp.2025.100792 **PMID:** 41100975

Abstract

Introduction: Fear of Falling (FOF) is a common and natural behavior experienced by most of the elderly population during aging. It is thought to be caused by previous falls, dizziness, depression, and neuromotor impairments. However, the association between FOF and salivary biomarkers such as Cortisol (COR), Testosterone (TT), Dehydroepiandrosterone (DHEA), and alpha-amylase activities has not been consistently explored.

Objective: To explore the association between FOF and general health status, Functional Fitness (FF), and salivary-related stress biomarkers in institutionalized older women.

Materials and method: A total of 278 older women were assessed and grouped as having Higher (n = 176) or Lower FOF (n = 102), according to the Falls Efficacy Scale. Saliva samples were collected.

Results: The Higher FOF group had superior scores in the depressive state and comorbidity scale ($p \leq 0.05$). Participants with Lower FOF showed better FF scores. Salivary levels of cortisol were higher, and DHEA levels were lower in the High FOF group ($p \leq 0.05$). Spearman's Rank test showed that FOF was inversely correlated with DHEA, alpha-amylase, and FF, whereas COR was directly associated with the FOF scale. Regression analysis indicated that functional fitness indicators were significantly associated with variations in FOF. However, after adjusting for covariates, the influence of physical-functional fitness was reduced, while depressive symptoms and DHEA levels remained statistically significant in the model, suggesting their stronger association with FOF. The observed associations between FOF and biomarkers, especially DHEA, add important evidence to the growing body of literature exploring the multifactorial nature of FOF. These findings contribute to a deeper understanding of the biological components involved and may help inform fall-risk monitoring strategies in institutionalized older populations.

Keywords: Aging; Brain health; Fall risk; Neuroendocrine system; Saliva; Sex steroids hormones; Stress.

Multicomponent exercise intervention for preventing falls and improving physical functioning in older adult nursing home residents: study protocol for a randomised controlled trial

Sadaqa M, Debes WA, Németh Z, Bera-Baka Z, Vachtler-Szepesi M, Földes LN, Prémusz V, Hock M.
BMC Public Health. 2025 Oct 2;25(1):3296.

DOI: 10.1186/s12889-025-24606-y **PMID:** 41039429 **PMCID:** PMC12492614

Abstract

Background: Falls are a global problem for older people, as they are among the main reasons for injury and death in this population. Falls incidence is about three times higher among older adults in long-term care facilities than in the community. Globally in the recent decades we witnessed advances in medicine and public health, and that the older population is leading an active and a healthier lifestyle. Yet, ageing is still associated with diminished functional ability, reduced mobility, limited independency, as well as falls. Among the risk factors of these are loss of muscle mass, function, and strength (sarcopenia and dynapenia), in addition to balance and cognitive impairments. Fortunately, these risk factors are modifiable and preventable through exercises. Thus, we aim to evaluate the effect of a multicomponent exercise programme on the number of falls and physical function in nursing homes residents aged 65 years and over. Additionally, we aim to investigate potential risk factors of falls.

Methods: A single-blind, parallel randomized controlled trial of 12 weeks will be conducted. Older people aged 65 years and over, will be recruited from nursing homes. Participants will be randomised to either intervention group or control group through stratified randomization, based on age, gender, and baseline values of Short Physical Performance Battery using a random generator, then baseline assessments will be performed to avoid a long interval between participant assessment and the beginning of the interventions. Primary outcome will be number of all falls during the intervention. Secondary outcomes will include Short Physical Performance Battery, Six-minute Walking Test, Timed Up and Go Test, Single Leg Stance Test, and Functional Reach Test. Within groups differences will be analysed using either paired sample t-test, or Wilcoxon test. Poisson Regression to predict number of falls based on baseline data.

Discussion: This trial will address the inconsistence and inconclusive evidence about the effect of multicomponent exercise programme on falls in long-term care facility older residents and will investigate the gap in evidence of the effects of exercise at moderate intensity on the residents.

Trial registration: ClinicalTrials.gov Identifier: NCT05835297, registered on 28 April 2023.

Keywords: Aerobic exercise; Balance exercise; Falls; Long-term care facility; Multicomponent exercise; Nursing home; Older adults; Physical function; Randomized controlled trial.; Strength exercise.

Person-centered falls prevention and management in neurological post-operative patients: a best practice implementation project

Wang CC, Liang CC, Teng MY, Chia PF, Lee YW, Chang SC, Shwu-Feng T, Jin-Hung L, Mu PF. JBI Evid Implement. 2025 Oct 1;23(4):462-473.

DOI: 10.1097/XEB.0000000000000527 **PMID:** 41070764

Abstract

Background: Accidental falls among inpatients are a significant cause of hospital-acquired injury. Appropriate evidence-based strategies to prevent falls and standard operating procedures for fall prevention and management are vital to mitigate the risk of falls in hospitals.

Objective: The objective of this study was to improve fall prevention practices among health care practitioners and post-operative patients in a neurology ward through the implementation of evidence-based practices.

Methods: This project followed the seven-phase JBI Evidence Implementation Framework, which uses a pre- and post-test audit methodology. A baseline audit was conducted of fall management practices among 60 health care staff and 40 patients in a hospital in Taiwan. Using the baseline audit results, barriers to best practices were identified and improvement strategies were developed to address the barriers. A follow-up audit was conducted to measure improvements.

Results: Post-implementation audit compliance rates improved from baseline. Specifically, the compliance rate for Criteria 1, 3, 5, and 10 increased to 100%. Compliance also increased for Criteria 2 (90%), 4 (93%), 6 (95%), 7 (95%), 8 (88%), 9 (88%), and 11 (97%).

Conclusion: This study used best practices to reduce the incidence of falls, which did not exceed 0.08%. Key factors contributing to the success of the project included a democratic approach to leadership, multidisciplinary interventions, the Plan-Do-Study-Act cycle, and on-the-job training for nurses.

Spanish abstract: http://links.lww.com/IJEBH/A409.

Keywords: evidence-based practice; falls; neurosurgery; prevention.

Effects of a 12-week intrinsic foot muscle strengthening program (STIFF) on gait, balance and concerns about falling in physically active older adults: An assessor-blinded randomized-controlled trial

Willemse L, Wouters EJM, Pisters MF, Vanwanseele B. Gait Posture. 2025 Oct 20;123:110018.

DOI: 10.1016/j.gaitpost.2025.110018 **PMID:** 41130122

Abstract

Background: Falling is a major concern in the ageing population. Strengthening the plantar intrinsic foot muscles (PIFM) may improve gait and balance in older adults and, therefore, may have potential for fall prevention.

Research question: The aim of the present study is to examine the effect of a PIFM strengthening program on gait, balance and functional outcomes in older adults.

Methods: For this assessor-blinded RCT, older adults (> 65 years) with potentially increased fall risk were recruited at functional exercise classes and randomly assigned to an intervention (12-week supervised and progressive PIFM strengthening program) and a control group. The trial outcomes were between-group differences in mean change from baseline in maximum gait speed (primary outcome), balance during gait, foot and ankle biomechanics during gait and concerns about falling and within-group differences in capacity and strength of foot muscles.

Results: Thirty-three participants were included. No between group differences were found for change in maximum gait speed. However, the intervention group showed a larger reduction in concerns about falling. In addition, the intervention group showed increased capacity and strength of foot muscles, but this was not related to other findings.

Significance: This study did not show an effect of PIFM strengthening training on maximum gait speed in older adults who are involved in a functional exercise program. However, it seems to reduce concerns about falling. This advocates further research on the benefits of integrating PIFM strengthening exercises in functional exercise programs. In addition, future studies are needed to unravel the mechanism behind the reduction in concerns about falling.

Keywords: Exercise; Fear of falling; Foot muscles; Gait; Older adults.

A novel electronic-health-record based, machine-learning model to predict 1-year risk of fall hospitalisation in older adults: a Hong Kong territory-wide cohort and modelling study

Yang A, Shi M, Lau ESH, Yu J, Luk AOY, Ma RCW, Kong APS, Wong R, Chan JCM, Chan JCN, Chow E. Age Ageing. 2025 Aug 29;54(10):afaf285.

DOI: 10.1093/ageing/afaf285 **PMID:** 41066674 **PMCID:** PMC12510402

Abstract

Objective: Older adults face high risk of falls. We developed an electronic-health-record (EHR) based machine-learning (ML) model to predict 1-year risk of fall in older adults for pre-emptive intervention.

Methods: We included 4 902 161 records from 1 142 000 adults aged ≥65 years who attended the Hong Kong Hospital Authority (HA) facilities in 2013-2017. We included 260 predictors including demographics, in-patient/out-patient admissions, emergency department (ED) attendance, complications, medications and laboratory tests during 1-year period to predict fall events based on diagnostic codes in the ensuing 12 months. The cohort was randomly split into training, testing and internal validation sets in a 7:2:1 ratio. We evaluated the performance of six ML-algorithms.

Results: 67 163 fall events were accrued with the XGBoost model having the best performance in the validation set (area-under-the-receiver-operating-characteristic-curve [AUROC] = 0.979, area-under-the-precision-recall-curve [AUPRC] = 0.764; positive-predictive-value [PPV] = 0.614) versus logistic-regression model (AUROC = 0.885, AUPRC = 0.169; PPV = 0.210). The top 30 predictors included number of ED attendance, fasting plasma glucose, number and types of outpatient appointments, ED triage category of 'urgent', number of admissions and stay, age, residential districts, history of fall and medication use with an AUROC of 0.939 in a validation cohort of patients with diabetes. In an age- and sex-matched sub-cohort, compared to the widely-used Morse Fall Score, XGBoost model had higher sensitivity (0.569-versus-0.139) with optimal balance of identifying positive cases whilst simultaneously minimising false positives and false negative (F1 score: 0.626-versus-0.555).

Conclusions: Our ML-model highlights the utility of EHR in identifying high-risk individuals for falls, supporting integrating into the EHR system for targeted preventive actions

Keywords: electric health records; fall; machine learning; older adults; risk prediction.

Effects of exercise intervention on falls and balance function in older adults: a systematic review and meta-analysis

Yu H, Zhong J, Li M, Chen S. PeerJ. 2025 Oct 17;13:e20190.

DOI: 10.7717/peerj.20190 **PMID:** 41122235 **PMCID:** PMC12536800

Abstract

Objective: To systematically review the effects of an exercise intervention on falls and balance function in older adults (aged > 60 years) without diagnosed diseases.

Methods: PubMed, Web of Science, Embase, Cochrane Library, and CNKI databases were searched for randomized controlled trials about exercise intervention on falls and balance function in older adults. Use Review Manager 5.4 to test the risk bias in the included literature, and use Stata17 for publication bias test, sensitivity analysis, combining effect sizes, forest plots, and subgroup analysis.

Results: A total of 37 randomized controlled trials were included, and meta-analysis showed that after the exercise intervention in the intervention group, there was a significant increase in the Modified Fall Efficacy Scale (MFES) score (g = 1.01, 95% confidence interval (CI) [0.63-1.40], *P* = 0.00), the number of falls (odds ratio (OR) = 0.32, 95% CI [0.20-0.51], *P* = 0.00), the Berg Balance Scale (BBS) score (g = 0.92, 95% CI [0.63-1.21], *P* = 0.00) and Timed Up and Go Test (g = -0.62, 95% CI [-0.80, -0.45], *P* = 0.00) indices improved better than the control group. Subgroup analysis showed that single exercise time > 30 min, 3 times per week for 12-23 weeks was the better intervention for fall efficacy in older adults, and single exercise time ≤ 30 min, 3 times per week for ≥ 24 weeks was the better intervention for balance function in older adults.

Conclusion: Exercise intervention can enhance fall efficacy, reduce the number of falls, and improve balance function in older adults, and have a certain preventive effect on falls. Single exercise time, exercise frequency and exercise cycle are important factors affecting the effectiveness of exercise intervention. Systematic review registration: https://www.crd.york.ac.uk/PROSPERO/, identifier: CRD42024590937.

Keywords: Balance function; Exercise intervention; Falls; Meta-analysis; Older adults.

Effects of core training on balance performance in older adults: a systematic review and meta-analysis

Zhong Y, Guo W, Chen P, Wang Y. Front Public Health. 2025 Oct 9;13:1661460.

DOI: 10.3389/fpubh.2025.1661460 **PMID:** 41142736 **PMCID:** PMC12548199

Abstract

Background: Core training (CT) has been increasingly recognized as a promising intervention for improving balance in older adults, a demographic particularly susceptible to falls and fall-related injuries. This systematic review and meta-analysis sought to evaluate the efficacy of CT on balance in older adults, providing substantial evidence to establish its role in fall prevention strategies.

Methods: A comprehensive and systematic search of multiple databases, including PubMed, Cochrane Library, Web of Science, EBSCOhost, Embase and Google Scholar, was conducted to identify relevant studies. Eligible studies included single-group trials or randomized controlled trials that assessed the impact of CT on balance outcomes in healthy older adults (aged ≥60 years). It utilized the Cochrane Risk of Bias 2 (RoB 2) tool to assess the risk of bias across all included studies. Data were extracted from eleven studies and analyzed using Review Manager software version 5.4 and Stata 17.0, evaluating both dynamic and static balance parameters.

Results: The findings revealed statistically significant improvements in both dynamic and static balance metrics, including Gait Test (GT) (SMD = 0.32; 95% CI = 0.02, 0.63; $p < 0.05$), Functional Reach Test (FRT) (SMD = 0.82; 95% CI = 0.50, 1.24; $p < 0.00001$), Timed Up and Go (TUG) test (SMD = -0.81; 95% CI = -1.62, 0.00; $p = 0.05$), and One-Leg Stance Test (OLST) (MD = 3.19; 95% CI = 1.74, 4.64; $p < 0.001$). Subgroup analyses further indicated that CT had the most significant effect on dynamic balance, particularly in FRT. Additionally, longer intervention durations (≥45 min) resulted in more pronounced benefits for dynamic balance compared to shorter sessions. CT demonstrated superior effects on GT compared to Pilates Training (PT).

Conclusion: CT is a highly effective intervention for enhancing balance in older adults, supporting its integration into fall prevention programs. However, given the heterogeneity across studies, further rigorously designed trials with standardized intervention protocols and outcome measures are necessary to confirm the long-term benefits and optimal parameters for balance enhancement.

Systematic review registration: Inplasy.com, INPLASY202412006.

Keywords: balance; core training; fall prevention; meta-analysis; older adults.