Featured Falls Research – August

Interventions for preventing falls in older people in care facilities

Dyer SM, Kwok WS, Suen J, Dawson R, Kneale D, Sutcliffe K, Seppala LJ, Hill KD, Kerse N, Murray GR, van der Velde N, Sherrington C, Cameron ID. Cochrane Database Syst Rev. 2025 Aug 20;8(8):CD016064.

DOI: 10.1002/14651858.CD016064 **PMID:** 40832852 **PMCID:** PMC12365945

Abstract

Rationale: Falls in care facilities are common events, causing considerable morbidity and mortality for older people. This is an update of a review on interventions in care facilities and hospitals first published in 2010 and updated in 2012 and 2018 on interventions in care facilities and hospitals. This review has now been split into separate reviews for each setting.

Objectives: To assess the benefits and harms of interventions designed to reduce the incidence of falls in older people in care facilities.

Search methods: We searched the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, Embase, CINAHL, and two trial registers to 10 May 2024 and used reference checking, citation searching, and contact with authors to identify eligible trials and records.

Eligibility criteria: We included randomised controlled trials (RCTs) of any intervention for preventing falls in older people (aged over 65 years) in care facilities with any comparator. We excluded trials conducted in places of residence that do not provide residential health-related care or rehabilitative services. We excluded trials where falls were recorded as adverse events of the intervention and those recruiting participants post-stroke or living with Parkinson's disease.

Outcomes: Critical outcomes were rate of falls (number of falls per unit time) and number of fallers (risk of experiencing one or more falls). Important outcomes were risk of fracture, adverse events, and economic outcomes.

Risk of bias: We assessed risk of bias in the included studies against nine items (seven items from Cochrane's RoB 1 tool, plus method of ascertaining falls and baseline imbalance).

Synthesis methods: Two review authors independently performed study selection and data analysis. We calculated rate ratios (RaR) with 95% confidence intervals (CIs) for rate of falls and risk ratios (RRs) with 95% CIs for outcomes of risk of falling (number of people falling) and risk of fracture. We adjusted for clustering if not undertaken by trial authors. We grouped the results of trials with comparable interventions and participant characteristics, and pooled results where appropriate using the generic inverse variance method in RevMan. We conducted subgroup analyses according to intervention type, cognitive status, and informed by a qualitative comparative analysis where more than 10 trials were pooled and heterogeneity was high. Where pooling was precluded by the nature of the data, we presented trial data in tables for illustrative purposes or reported these in the text, or both. We used GRADE to assess the certainty of evidence. GRADE ratings of risk of bias were based on sensitivity analyses excluding trials at high risk of bias.

Included studies: We included 104 trials, 56 individually randomised and 48 cluster-randomised trials, with 68,964 participants. Thirty-three trials (27,492 participants) were added in this update. We assessed most of the included trials as at high risk of bias, often related to lack of blinding, which was rarely feasible for many intervention types. The certainty of evidence for the critical outcomes of falls ranged from high to very low. We have reported the critical outcomes for the main comparisons here. Regarding our important outcomes, adverse events were poorly reported, and the certainty of evidence was very low for all interventions; we have not reported these data here. The important outcomes of risk of fracture and cost-effectiveness are only reported here when the certainty of the evidence was stronger than very low.

Synthesis of results: Multifactorial interventions. Overall, multifactorial interventions (i.e. two or more categories of intervention delivered based on individual risk profile) probably have little or no effect on the rate of falls (RaR 0.87, 95% CI 0.68 to 1.12; I^2 = 89%; 12 trials; 4843 participants; moderate-certainty evidence), but probably reduce the risk of falling (RR 0.91, 95% CI 0.83 to 1.00; I^2 = 19%; 11 trials; 4557 participants; moderate-certainty evidence). Multifactorial interventions may be cost-effective in reducing falls (GBP 20,889 per quality-adjusted life year, UK health and social care perspective; 1 trial; 1657 participants; low-certainty evidence). A subgroup analysis informed by qualitative comparative analysis indicated that multifactorial interventions delivered in a tailored manner according to resident individual circumstances (e.g. living with dementia) with facility staff engagement have greater effects (P < 0.001) than those not delivered in this manner, and probably result in a large reduction in rate of falls (RaR 0.61, 95% CI 0.54 to 0.69; I^2 = 0%; 7 trials; 3553 participants; moderate-certainty evidence) and risk of falling (RR 0.81, 95% CI 0.71 to 0.92; I^2 = 0%; 5 trials; 2993 participants; moderate-certainty evidence). All trials included assessment of environmental and personal risk factors (including medication optimisation and assessment of need for assistive aids) and exercise interventions. Exercise. As a single intervention, exercise was compared with usual care in 28 trials. At the end of the intervention period, active exercise probably reduces the rate of falls (RaR 0.68, 95% CI 0.51 to 0.91; I^2= 84%; 14 trials; 2215 participants; moderate-certainty evidence) and risk of falling (RR 0.86, 95% CI 0.75 to 1.00; I^2 = 37%; 13 trials; 2408 participants; moderate-certainty evidence), but may have little or no effect on risk of any fracture (RR 1.01, 95% CI 0.58 to 1.78; 3 trials; 927 participants; low-certainty evidence). After a period of post-intervention follow-up, if active exercise is not sustained there is no effect on rate of falls (RaR 1.02, 95% CI 0.78 to 1.32; I^2 = 64%; 7 trials; 1354 participants; high-certainty evidence) and probably no effect on risk of falling (RR 1.06, 95% CI 0.92 to 1.23; I^2 = 17%; 7 trials; 1443 participants; moderate-certainty evidence). Active exercise may be cost-effective in reducing falls (AUD 18 per fall avoided, Australian health service perspective; 1 trial; 221 participants; low-certainty evidence). A subgroup analysis based on level of cognition indicated that active exercise may reduce the risk of falling in residents with cognitive impairment (RR 0.72, 95% CI 0.57 to 0.91; 4 trials; 451 participants; low-certainty evidence). Medication optimisation. As a single intervention, medication optimisation interventions were diverse, but overall may make little or no difference to rate of falls (RaR 0.92, 95% CI 0.75 to 1.13; I^2 = 86%; 13 trials; 4314 participants; low-certainty evidence) and probably make little or no difference to risk of falling (RR 0.96, 95% CI 0.89 to 1.03; I^2 = 0%; 12 trials; 6209 participants; moderate-certainty evidence). We are uncertain of the impact of medication review/deprescribing on falls outcomes (RaR 0.94, 95% CI 0.76 to 1.18; I^2 = 86%; 12 trials; 4125 participants; very low-certainty evidence; RR 0.90, 95% CI 0.80 to 1.01; I^2 = 0%; 9 trials; 1934 participants; very low-certainty evidence). Medication review/deprescribing as a single intervention may not be cost-effective (intervention had higher costs and falls, UK National Health Service and care home perspective; 1 trial; 826 participants; low-certainty evidence). Vitamin D supplementation. Vitamin D supplementation (with or without calcium supplementation, alone or within a multivitamin)

probably reduces the rate of falls (RaR 0.63, 95% CI 0.46 to 0.86; I^2 = 72%; 5 trials; 4603 participants; moderate-certainty evidence) but probably makes little or no difference to the risk of falling (RR 0.99, 95% CI 0.90 to 1.08; I^2 = 12%; 6 trials; 5186 participants; moderate-certainty evidence). The population in these trials had low vitamin D levels. Nutrition: dairy food supplementation. Increasing servings of dairy to residents through dietitian assistance with menu design to enhance protein and calcium through provision of dairy foods may decrease the risk of falling and fractures from falls (RR 0.89, 95% CI 0.79 to 1.00; RR fracture 0.67, 95% CI 0.48 to 0.93; 1 trial; 7195 participants; low-certainty evidence).

Authors' conclusions: Multifactorial interventions implemented with facility staff engagement and tailored intervention delivery according to individual residents' circumstances probably reduce the rate of falls and risk of falling and may be cost-effective. Regarding single interventions, exercise probably reduces the rate of falls and the risk of falling, but if exercise is not sustained it has no ongoing effect on the rate of falls and probably no effect on the risk of falling. Active exercise may reduce the risk of falling in residents with cognitive impairment and may be cost-effective. Medication optimisation interventions were diverse overall and may make little or no difference to the rate of falls and probably little or no difference to the risk of falling. We are very uncertain of the effectiveness of medication review/deprescribing as a single intervention at reducing falls. Vitamin D supplementation probably reduces the rate of falls but probably makes little or no difference to the risk of falling. Addressing nutrition, increasing servings of dairy through dietitian assistance with menu design may decrease the risk of falling and risk of fractures.

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Registration: Protocol (2023): Open Science Framework osf.io/y2nra Original review (2010): doi: 10.1002/14651858.CD005465.pub2 Review update (2012): doi: 10.1002/14651858.CD005465.pub3 Review update (2018): doi: 10.1002/14651858.CD005465.pub4.

Features of successful medication review and deprescribing interventions for fall prevention in residential aged care facilities: an intervention component analysis of an updated systematic review

Suen J, Narayan S, Seppala LJ, van der Velde N, Sherrington C, Sutcliffe K, Cameron ID, Kneale D, Dyer SM. Age Ageing. 2025 Aug 1;54(8):afaf230.

DOI: 10.1093/ageing/afaf230 **PMID:** 40853045

Abstract

Background: Medication review and deprescribing are common fall prevention strategies, as falls risk increasing drugs and polypharmacy are potentially modifiable falls risk factors. We sought to understand why some trials in residential aged care facilities (RACFs) testing medication review/deprescribing reduced falls whilst others did not. We used intervention component analysis (ICA) to develop a theory of the key feature(s) from the trialists' perspective.

Methods: Randomised controlled trials (RCTs) evaluating medication review/deprescribing as a single falls prevention intervention in RACFs, were identified via a Cochrane review and additional database searches to 1 April 2025. ICA was conducted with inductive thematic analysis of the Discussion sections of trial publications. Alignment between themes/subthemes and trial outcomes were examined.

Results: Thirteen trials from six countries were included. Trialists perceived that medication review/deprescribing interventions should include a tool (i.e. algorithm/list of medications) to facilitate decisions between clinicians on the appropriateness of resident's prescriptions, with at least one prescriber from the residents' usual care team involved in decisions and implementation of medication changes, reviewing medications together at least 6 monthly. These features were present in 100% (3/3) successful trials and 20% (2/10) unsuccessful trials.

Conclusions: ICA indicated using a tool as a guide amongst clinicians, at least six monthly and including at least one prescriber from the usual care team, could be an important combination of features to improve intervention success. This approach which aligns with recent World Falls Guidelines should be tested in future RCTs of medication optimisation for people living in RACFs.

Keywords: deprescription; falls; homes for the aged; long-term care; medication review; older people; systematic review.

Falls Research – August

Feedback-based perturbation balance training during stationary cycling improves reactive and proactive balance among older adults: a single-blinded randomised controlled trial

Batcir S, Livne K, Lehman RL, Berdichevsky Y, Maoz S, Shkedy LW, Adar R, Rabaev E, Bachner YG, Shani G, Lubovsky O, Shapiro A, Alexander NB, Melzer I. Age Ageing. 2025 Aug 1;54(8):afaf215.

DOI: 10.1093/ageing/afaf215 **PMID:** 40794910 **PMCID:** PMC12341863

Abstract

Background: Perturbation balance training (PBT) is an effective regime that reduces fall rates by triggering and improving balance recovery skills. Controlling trunk movements consistently reflects effective reactive stepping, as it enhances proximal stability, providing a stable base for limb movements.

Objective: To demonstrate the effect of PBT during seated hands-free stationery cycling on objective balance parameters of reactive and proactive balance control in standing.

Design: Two-arm parallel-group, single-blinded randomised controlled trial with concealed allocation, blinded assessors and data analysers, with intention-to-treat analyses.

Participants: Fifty-six community-dwelling older adults, 70+ years of age (mean ± standard deviation: 76.43 ± 4.76 years, 39.3% of men and 60.7% of women), walking independently without assistive devices.

Interventions: The two groups performed twenty sessions of seated stationary cycling, 20 minutes each, over 12 weeks, while performing concurrent cognitive tasks: (i) cycling hands free, received perturbations with real-time implicit sensorimotor feedback (PBT during hands-free stationary cycling, n = 29); (ii) standard cycling training (SCT, n = 27) cycled using hands without perturbations.

Outcome measures: The primary outcome measures were the reactive balance measures in standing, e.g. single-step threshold, multiple-step threshold and the probability of stepping. Secondary outcomes were voluntary stepping Test and 6-Minute Walk Test (6MWT). Measures were taken at baseline and immediately postinterventions.

Results: The group-by-time interactions indicate that PBT during hands-free stationary cycling improved balance reactive responses i.e. increased single- and multiple-step thresholds in mediolateral perturbations (P = .001, effect size [ES] = 0.88, and P = .001, ES = 0.64, respectively) and multiple-step threshold in anteroposterior perturbations (P = .022, ES = 0.34) and decreased the probability of stepping compared to standard cycling training. PBT during hands-free stationary cycling also resulted in faster voluntary step reaction (P = .011, ES = -0.84) and foot contact times (P = .037, ES = -0.56). Both groups significantly improved their 6MWT results.

Conclusion: Feedback-based PBT during hands-free stationary cycling has the potential to improve reactive and proactive balance measures in standing.

Registration: clinicaltrials.gov, NCT03636672, https://clinicaltrials.gov/study/NCT03636672.

Keywords: balance control; fall prevention; older adults; perturbation-based balance training; proactive balance; reactive balance.

Development of a multifaceted implementation plan to guide falls prevention in residential aged care facilities

Belaen G, Poels J, Vandervelde S, Leysens G, van Achterberg T, Dobbels F, Milisen K, Vlaeyen E. BMC Geriatr. 2025 Aug 23;25(1):653.

DOI: 10.1186/s12877-025-05969-8 **PMID:** 40849453 **PMCID:** PMC12374483

Abstract

Background: Due to their serious consequences, falls are a well-documented problem in residential aged care facilities (RACFs). Although clinical practice guidelines (CPGs) on falls prevention in RACFs have been developed in many countries, their implementation remains challenging. Therefore, this study aimed to describe the development of a multifaceted plan for the implementation of a guideline on multifactorial falls prevention interventions in RACFs.

Methods: An implementation plan was developed as part of a large-scale falls prevention implementation initiative in Flanders (Belgium). The development process was guided by prior research and Intervention Mapping, which includes six stages: 1) logic model of the problem, 2) logic model of change, 3) programme design, 4) programme production and testing, 5) programme implementation plan, and 6) evaluation plan. A stakeholder group of nine experts actively participated in this development process. The implementation plan was pretested in six RACFs and adjusted to better align with their context.

Results: A three-phase implementation plan divided into seven steps was finalised. The first phase is preparation (steps 1 to 3), during which RACFs undertake the necessary preparations to start the implementation process by enabling broad support within their organisation, mapping the baseline situation, defining objectives, and setting priorities. The second phase (steps 4 and 5) concerns the actual implementation, which outlines the development and performance of implementation actions. In the third phase (steps 6 and 7), RACFs evaluate and adjust actions, and aim to sustainably anchor the implemented falls prevention policy in their daily practice and quality management system.

Conclusion: We were able to develop a comprehensive implementation plan for falls prevention in RACFs. This plan supports RACFs in the implementation of tailored falls prevention interventions and maximise sustainability. Future research should further focus on larger-scale implementation and evaluating the effectiveness of the implementation plan in combination with the support of an external implementation facilitator. This includes assessing its impact on determinants, and implementation and clinical outcomes.

Keywords: Clinical practice guideline; Falls prevention; Implementation plan; Implementation science; Residential aged care facilities.

Yearlong Evaluation of Fall Risk Determinants Among 40 Older Adults in Two Residential Assisted Living Facilities

Dziubek W, Filon T, Rogowski Ł, Stefańska M, Kowalska J. Med Sci Monit. 2025 Aug 4;31:e948717.

DOI: 10.12659/MSM.948717 **PMID:** 40754796 **PMCID:** PMC12333457

Abstract

BACKGROUND Falls among the elderly, the second leading cause of death from unintentional injury globally, represent significant social and economic challenges. We evaluated the relationship between physical activity, physical performance, falls, and cognitive functioning at 1 year in 40 older adults living in 2 residential assisted living facilities in 2 communities in Wisconsin, USA.

MATERIAL AND METHODS Forty participants took part in the study, including 25 women and 15 men, with a mean age of 86.6 (±6.3) years. The Montreal Cognitive Assessment (MoCA) assessed cognitive functions, Hospital Anxiety and Depression Scale assessed depression, and Fall Efficacy Scale (FES) assessed fear of falling. Physical performance tests included the 10-meter walking test, 2-minute step test (2MST), and lower extremity strength and hand grip strength using a dynamometer. Additionally, posturography, using a portable Wii platform, Timed Up and Go test (TUG) test, and Performance Oriented Mobility Assessment (POMA) assessed balance.

RESULTS As many as 40% participants had at least 1 fall in 6 months. Significant deterioration in gait speed ($P<0.0001$) and mood ($P=0.0137$) over 1 year was noted. A significant correlation was found between number of falls and the 2MST (rho=-0.48), POMA and gait speed (rho=0.63), and the TUG (rho=-0.62), FES, and 2MST (rho=-0.54). The 2MST was the only significant parameter affecting the risk of falls in the study group ($P=0.0118$).

CONCLUSIONS Among assisted living facility residents, a higher risk of falling was associated with decreased gait speed, impaired balance, decreased mood, increased fear of falling, and fewer repetitions performed in the 2MST.

Activities of daily living mediate the association between balance and falls in middle aged and older adults

Jiang J, Zhou Q, Zhang C, Cong K. Sci Rep. 2025 Aug 6;15(1):28694.

DOI: 10.1038/s41598-025-14608-6 **PMID:** 40770416 **PMCID:** PMC12328578

Abstract

Falls constitute a significant public health issue affecting middle-aged and older adults.The consequences of falls extend beyond physical injuries and compromised quality of life to encompass psychological and socioeconomic dimensions. Investigate the mediating role of Activities of Daily Living (ADL) in the relationship between balance ability and falls. This study utilized data from the 2015 China Health and Retirement Longitudinal Study (CHARLS). Balance ability was assessed using the Short Physical Performance Battery (SPPB), while ADL were evaluated through the CHARLS ADL questionnaire. Demographic factors and health-related indicators were incorporated as covariates. Data analysis was conducted in StataMP 17, employing chi-square tests, independent samples t-tests, correlation analysis, and parallel mediation analysis. Results revealed significant between-group differences in gender, marital status, and education level (all $p < 0.001$) between fallers and non-fallers.Females accounted for 67.6% of fall incidents, surpassing the male proportion (32.3%). Mediation analysis identified a significant direct effect of balance ability on falls ($c' = 0.002$, $p < 0.05$), with ADL demonstrating partial mediation ($a*b = 0.019$, 95% CI: 0.014-0.026). Our findings demonstrates significant associations between falls, balance ability, and ADL disability. Activities of daily living (ADL) disability partially mediates the association between balance ability and falls. However, the observed associations were modest in strength, and the study's cross-sectional design, reliance on self-reported data, and high baseline balance scores in the sample limit causal inference and generalizability. These results highlight the multifactorial nature of falls and underscore the importance of integrated prevention strategies that address both physical function and other potential mediators.

Keywords: ADL disability; Balance ability; Falls; Mediating effect.

A systematic review of multicomponent vs. single-component training programs for fall prevention in older adults

Kasicki K, Piskorz EK, Rydzik Ł, Ambroży T, Ceranowicz P, Błach W. Front Public Health. 2025 Jul 28;13:1636439.

DOI: 10.3389/fpubh.2025.1636439 **PMID:** 40791619 **PMCID:** PMC12336026

Abstract

Background: Falls among adults aged 60 years and older often result in serious injury, yet studies evaluating single-component exercise interventions have not been directly compared with those incorporating multiple modalities. This review set out to assess whether multicomponentl training programs combining strength, balance, and aerobic exercises are more effective at preventing falls in older adults than single-component regimens.

Methods: A systematic search of PubMed, Scopus, Web of Science and EBSCO yielded 284 records, of which six randomized controlled trials (*n* = 40-670; age range 60-80 years) met inclusion criteria. All interventions lasted at least 6 weeks. We narratively synthesized data on functional outcomes (Timed Up and Go [TUG], Star Excursion Bal-ance Test [SEBT], 30-Second Chair Stand [CS-30], gait speed), physiological measures (VO_2max, lean body mass, bone mineral density) and fall incidence rate ratios (IRR).

Results: Multicomponent programs surpassed single-component interventions, producing a ~ 1-s faster TUG, an 8-20% improvement in SEBT reach, and a 55% increase in CS-30 repetitions. Physiologically, VO_2max rose by 154 mL/min, lean body mass by 1.2 kg, and BMD by 0.02 g/cm^2. The greatest reduction in fall risk was observed in the Tai Ji Quan group (IRR 0.42), compared with 0.60 in the standard multicomponent program.

Conclusion: Protocol heterogeneity precluded quantitative meta-analysis. Based on limited and heterogeneous data from six RCTs, MULTI programs appear to improve selected functional parameters and reduce fall risk; however, the effectiveness of the single-component UNI program (Tai Ji Quan) was comparable to-or even greater than-that of MULTI in reducing actual falls.

Systematic review registration: https://www.crd.york.ac.uk/PROSPERO/view/CRD420251045931.

Keywords: fall risk; functional parameters; functional training; older adults; training programs.

The world falls guidelines: how is implementation progressing globally?

Seppala LJ, Lord SR, Masud T, Montero-Odasso M, Ryg J, Tan MP, van der Velde N. Age Ageing. 2025 Aug 1;54(8):afaf214.

DOI: 10.1093/ageing/afaf214 **PMID:** 40794908

Abstract

The World guidelines for falls prevention and management for older adults (WFG), from 2022, represent a global initiative to address the rising incidence of falls and related injury. WFG provides evidence-based recommendations across various settings, including community, hospital, and care home environments. A recent report highlighted a large variation in the implementation progress of the WFG across Europe. However, to date, a comprehensive global overview of the WFG implementation status has not been undertaken. To address this gap, we reached out to experts who took part in WFG to inquire about the implementation status of WFG in their countries. The responses from experts from 18 countries (one from Africa, six from Asia, one from Europe, three from North America, one from Oceania and six from South America) revealed that efforts to implement the WFG are underway in many of them, with differing degrees of progress varying from advanced integration into guidelines/policies to no/minimal actions. While the global implementation status of WFG is encouraging, significant barriers remain, including limited resources, competing health priorities, and cultural differences in care models. Adapting the WFG to diverse healthcare systems and integrating falls prevention into national policies and health priorities is essential to enable effective implementation. Furthermore, strengthening global collaboration, sharing best practices, prioritisation of the most effective and feasible falls prevention components in low resource settings, and advocating for falls prevention as a public health priority will help accelerate progress across the world for the benefit of older patients at risk of falling.

Keywords: accidental falls; aged; guidelines; implementation; older people.

Protective Factors for Falls Among Independent Older Adults: A Cross-Sectional Study

Srimoke W, Thanapop C, Sangchart P, Chitpong S, Hnoophet J, Rueangkhanap N, Jantep K. Int J Environ Res Public Health. 2025 Jul 31;22(8):1202.

DOI: 10.3390/ijerph22081202 **PMID:** 40869789 **PMCID:** PMC12386102

Abstract

As Thailand transitions into a super-aged society, falls are a rising public health issue. However, limited research focuses specifically on independent older adults in rural areas. This study examined intrinsic and extrinsic factors associated with falls among independent older adults in a rural district of southern Thailand, contributing to localized fall prevention strategies. A cross-sectional study was conducted using multi-stage probabilistic sampling with 325 older adults aged 60-79 years residing in Nakhon Si Thammarat. Data were collected through structured interviews, and multivariate logistic regression was used to identify fall predictors. A fall was defined as an unintended fall to a lower level within the previous 12 months. The fall prevalence was 29.8%, with the majority resulting in minor injuries. Multivariate analysis revealed protective factors, including sociodemographic factors such as higher monthly income (adjusted OR = 0.47; 95% CI: 0.30-0.74) and agricultural employment (adjusted OR = 0.50; 95% CI: 0.27-0.95), as well as the extrinsic factor of pet ownership (adjusted OR = 0.53; 95% CI: 0.35-0.81), were significantly associated with reduced fall risk. The study highlights context-specific protective factors that could inform community-based interventions. Future research should assess causality and intervention effectiveness in broader populations.

Keywords: aged; cross-sectional studies; falls; independent living; protective factors.

Directional postural sway tendencies and static balance among community-dwelling older adults with depression and without cognitive impairment

Suarez JRM, Decker VB, Park JH, Lighthall NR, Dino MJS, Thiamwong L. Aging Clin Exp Res. 2025 Aug 21;37(1):255.

DOI: 10.1007/s40520-025-03144-y **PMID:** 40839173

Abstract

Background: Depression is prevalent among older adults and is known to negatively affect balance, ultimately leading to falls. However, few studies have investigated the effect of depression on static balance metrics beyond postural sway distance and area of older adults without mild cognitive impairment (MCI).

Aims: To investigate if postural sway distance, sway area, medial-lateral (ML) sway range, anterior-posterior (AP) sway range, and center-of-pressure (COP) sway speed variability differed between non-cognitively impaired older adults with minimal-to-no depression (Minimally Depressive group) and mild-to-severe depression (Mildly-to-Severely Depressive group).

Methods: A total of 204 community-dwelling older adults were included. Depression was measured using the Patient Health Questionnaire-9 (PHQ-9), MCI using the Rowland Universal Dementia Assessment Scale (RUDAS), and static balance metrics using the Balance Tracking System (BTrackS). Mann-Whitney U tests determined differences between groups.

Results: Sway area, AP sway range, and ML sway range were significantly greater in the Mildly-to-Severely Depressive group than the Minimally Depressive group ($p = 0.010$, $p = 0.016$, and $p = 0.031$, respectively). Sway distance ($p = 0.445$) and COP sway speed variability ($p = 0.193$) were not significantly different between groups.

Discussion: The findings revealed greater sway area, as well as greater ranges in the AP and ML directions, in the Mildly-to-Severely Depressive group when compared to the Minimally Depressive Group. Reduced concentration and affected postural stabilization mechanisms driven by depression may have attributed to these results.

Conclusions: This study highlights the need for further understanding of how static balance metrics, such as directional sway, are affected by depression, thereby creating interventions tailored to individual's postural sway characteristics to help reduce fall risk and improve balance.

Trial registration: ClinicalTrials.gov (NCT05778604).

Keywords: BTrackS; Balance; Ellipse area; Mental health.

Examining the Relationship Between Balance and Functional Status in the Geriatric Population

Vermisso E, Stamou E, Tsichli G, Foteinou I, Christakou A. Med Sci (Basel). 2025 Aug 2;13(3):110.

DOI: 10.3390/medsci13030110 **PMID:** 40843732 **PMCID:** PMC12372022

Abstract

Background/objectives: Aging is associated with a gradual decline in physical capabilities, often leading to impaired balance and reduced functional status, which are major contributors to falls in older adults. Although many studies have assessed these variables independently, a limited amount of research has explored the direct relationship between balance and functional status in a healthy geriatric population. The aim of this study was to investigate the relationship between balance and functional capacity and to assess the influence of demographic factors such as age, comorbidities, smoking status, and history of falls.

Methods: A sample of community-dwelling older adults (19 women, 16 men) (n = 35), aged 60 years and above (M = 78 years; SD = 9.23) from Sparta, Greece, took part in the present study. Participants were assessed using three validated tools: (a) the Five Times Sit-to-Stand test, (b) the Timed Up-and-Go test, and (c) the Berg Balance Scale. Spearman's rank correlation coefficient was used for statistical analysis ($\alpha = 0.05$).

Results: Age was positively correlated with poorer performance in the Five Times Sit-to-Stand (r = 0.40; $p < 0.01$) and the Timed Up-and-Go test (r = 0.47; $p < 0.01$) and negatively correlated with Berg Balance Scale scores (r = -0.51; $p < 0.01$). Comorbidities and smoking were also associated with the Berg Balance Scale. A strong negative correlation was observed between balance and the other two functional tests (Five Times Sit-to-Stand: r = -0.51; Timed Up-and-Go: r = -0.66; both $p < 0.01$).

Conclusions: The findings highlight the importance of evaluating both balance and functional capacity in older adults as interrelated factors that can significantly influence quality of life and fall risk. Future research with larger and more diverse populations is recommended to confirm the present findings and to use exercise programs to prevent falls in the geriatric population.

Keywords: assessment; balance; functional status; geriatric population; physiotherapy.

Anticholinergic medication use and falls in Australian residential aged care: a retrospective multisite cohort study

Xu Y, Raban MZ, Li L, Nguyen AD, Silva SSM, Huang G, Arnolda G, Westbrook JI, Wabe N. Aging Clin Exp Res. 2025 Aug 27;37(1):257.

DOI: 10.1007/s40520-025-03147-9 **PMID:** 40864229 **PMCID:** PMC12390879

Abstract

Background: Associations between anticholinergic load and falls remain understudied in residential aged care facilities (RACFs).

Aims: To examine associations between anticholinergic load and falls in the first year after entry to an RACF.

Methods: We aggregated routinely collected data from 27 RACFs in New South Wales, Australia. Anticholinergic load and falls were repeatedly measured for one year after residents first entered an RACF. Thirteen 28-day review periods were set. Associations between anticholinergic load in a review period and any falls in the next review period were examined, comprising 12 repeated measurements of associations. We included new residents aged ≥ 65 years, who entered an RACF between 1 July 2014 and 2 September 2021. Six scales were used: Anticholinergic Cognitive Burden (ACB), Anticholinergic Drug Scale (ADS), Anticholinergic Loading Scale (ALS), Anticholinergic Risk Scale (ARS), Chew's list, and Clinician-rated Anticholinergic Score (CrAS). We used mixed-effect logistic regression models, adjusting for potential confounders. Facility was used as a cluster variable.

Results: For the 2300 residents (67.7% females), there were steady increases in mean anticholinergic load from the first to the 12th review period. Per one-point higher anticholinergic load was associated with an increased risk of falls, adjusted odds ratios: 1.08 (95% confidence interval[CI] 1.04, 1.12) using ACB, 1.11 (95%CI 1.06, 1.15) using ADS, 1.15 (95%CI 1.10, 1.21) using ALS, 1.10 (95%CI 1.04, 1.17) using ARS, 1.18 (95%CI 1.09, 1.27) using Chew's list, and 1.14 (95%CI 1.10, 1.19) using CrAS.

Conclusion: Anticholinergic scales may be useful to inform falls prevention programs for new RACF residents.

Keywords: Anticholinergic; Falls; Long-term care; Medication management; Nursing homes; Residential aged care.

The dual impact of physical exercise on depression and fall risk in older Chinese adults - evidence from CHARLS 2020

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Abstract

Introduction: Rapid population aging in China has elevated concerns regarding the mental and physical well-being of older adults. This study investigates the interrelationships among physical exercise, depression, and fall risk using data from the 2020 wave of the China Health and Retirement Longitudinal Study (CHARLS).

Methods: We analyzed a sample of 3,694 older adults. An ordinary least squares regression model was employed to assess the impact of physical exercise on depression, while a logistic regression model was used to examine the effect on fall risk. Key control variables included age, biological sex, income, marital status, and major accident history. Mediation analyses were then conducted to test the indirect effect of exercise on fall risk through depression, with subgroup analyses comparing urban and rural respondents.

Results: Results from the depression model revealed that physical exercise significantly reduced depression scores ($\beta=-0.3156$; $p=0.002$), and males exhibited lower scores relative to females. The falls model indicated a trend toward reduced fall risk with increased exercise ($\beta=-0.0738$;$OR\approx0.929$;$p=0.061$), while older age and female gender are associated with elevated risk. Mediation analysis demonstrated a significant indirect effect in the urban group (mean indirect effect = -0.0338), but not in the rural group (mean indirect effect = -0.0056).

Discussion: These findings suggest that physical exercise not only directly improves mental health but also indirectly reduces fall risk through alleviating depressive symptoms in urban older adults. The lack of a significant mediating effect in rural areas suggests that local contextual factors may alter the exercise-depression-fall pathway. The results support integrated public health interventions tailored to local settings to enhance both mental and physical outcomes among China's aging population.

Keywords: CHARLS 2020; depression; falls; mediation analysis; older adults; physical exercise; public health; urban-rural differences.