Safety Literature 10th March 2024

Fear of falling and common symptoms of multiple sclerosis: physical function, cognition, fatigue, depression, and sleep - a systematic review

Abou L, Peters J, Freire B, Sosnoff JJ. Mult. Scler. Relat. Disord. 2024; 84: e105506.

DOI: 10.1016/j.msard.2024.105506 **PMID**: 38422635

Abstract

BACKGROUND: Fear of falling (FOF) is a common concern among persons with multiple sclerosis (MS) and affects the performance of their daily living activities. Falls may result in FOF, leading to worsening of symptoms of MS, physical deconditioning, and exposure to future falls. This may trigger a vicious cycle between FOF and falls. A better understanding of the relationship between FOF and symptoms of MS may be helpful to develop a conceptual model to guide fall prevention interventions.

OBJECTIVE: To synthesize the correlational and predictive relationships between FOF and common symptoms of MS.

METHODS: Databases including PubMed, Embase, Web of Science, Scopus, CINHAL, PsycINFO, and SPORTDiscuss were searched from inception to October 2023. Studies examining correlations and/or predictions between FOF and common MS symptoms that include measures of gait, postural control, fatigue, cognition, pain, sleep, depression, and anxiety were identified by two independent reviewers. Both reviewers also conducted the methodological quality assessment of the included studies.

RESULTS: Twenty-three studies with a total of 2819 participants were included in the review. Correlational findings indicated that increased FOF was significantly associated with greater walking deficits (lower gait speed, smaller steps), reduced mobility, and poorer balance. Increased FOF was also significantly correlated with higher cognitive impairments, more fatigue, sleep disturbances, and depression. Decreased gait parameters, reduced balance, lower physical functions, cognitive impairments, and sleep deficits were found as significant predictors of increased FOF.

CONCLUSION: Evidence indicates significant correlational and bidirectional predictive relationships exist between FOF and common MS symptoms. A comprehensive conceptual framework accounting for the interaction between FOF and MS symptoms is needed to develop effective falls prevention strategies.

Language: en

Keywords: Accidental falls; Fear of falling; Gait; Multiple sclerosis; Postural control; Symptoms

Retrospective analysis of circumstances of falls and related injuries across levels of care in older adult retirement home facilities

Cleworth TW, Perlman C, Killingbeck J, Laing AC. Can. J. Aging 2024; ePub(ePub): ePub.

DOI: 10.1017/S0714980824000047 **PMID**: 38419403

Abstract

Towards developing more effective interventions for fall-related injuries, this study analysed a novel database from six retirement home facilities over a 4-year period comprising 1,877 fallers and 12,445 falls. Falls were characterized based on location, activity, injury site, and type, and the database was stratified across four levels of care: Independent Living, Retirement Care, Assisted Care, and Memory care. Falls most occurred within the bedroom (62.8%), and during unknown (38.1%), walking (20.2%), and transfer tasks (14.6%). Approximately one in three (37%) of all falls resulted in an injury, most commonly involving the upper limb (31.8%), head (26.3%), and lower limb (22.2%), resulting in skin tears (35.3%), aches/pains (29.1%), or bruises (28.0%). While fall location, activity, and injury site were different across levels of care, injury type was not. The data from this study can assist in targeting fall-related injury prevention strategies across levels of care within retirement facilities.

Language: en

Keywords: aging; balance; blessure; chutes; équilibre; éretraite; falls; injury; mobilit; mobility; retirement; vieillissement

Physical exercise for treating the anxiety and depression symptoms of Parkinson's disease: systematic review and meta-analysis

Costa V, Prati JM, de Oliveira Barreto Suassuna A, Souza Silva Brito T, Frigo da Rocha T, Gianlorenço AC. J. Geriatr. Psychiatry Neurol. 2024; ePub(ePub): ePub.

DOI: 10.1177/08919887241237223 **PMID**: 38445606

Abstract

BACKGROUND: Depression and anxiety are non-motor symptoms of Parkinson's disease (PD). Physical exercise is a promising approach to reducing neuropsychological burden. We aimed to comprehensively synthesize evidence regarding the use of exercise for treating depression and anxiety symptoms in PD.

METHODS: Systematic review and meta-analysis following PRISMA recommendations. Searches on PubMed, Cochrane Library, Scopus, Web of Science, Embase, and Physiotherapy Evidence Database (PEDro) was conducted. The random-effects model was employed for all analyses with the standardized mean difference as the effect estimate.

RESULTS: Fifty records were retrieved, but only 17 studies met the criteria for the meta-analyses. A moderate to large effect was observed for depression (-.71 [95% CI = -.96 to -.46], 11 studies, 728 individuals), and a small to moderate effect for anxiety (-.39 [95% CI = -.65 to -.14], 6 studies, 241 individuals), when comparing exercise to non-exercise controls. Subgroup analysis revealed significant effects from aerobic (-.95 [95% CI = -1.60, -.31]), mind-body (-1.85 [95% CI = -2.63, -1.07]), and resistance modalities (-1.61 [95% CI = -2.40, -.83]) for depression, and from mind-body (-.67 [95% CI = -1.19 to -.15]) and resistance exercises (-1.00 [95% CI = -1.70 to -.30]) for anxiety.

CONCLUSION: Physical exercise has a relevant clinical impact on depression and anxiety in PD. We discuss the level of the evidence, the methodological limitations of the studies, and give recommendations.

Language: en

Keywords: anxiety; depression; meta-analysis; parkinson’s disease; physical exercise

AGS' response to the World Falls Guidelines

Fick DM. J. Gerontol. Nurs. 2024; 50(3): 51-52.

DOI: 10.3928/00989134-20240208-04 **PMID**: 38417071

Abstract

No abstract was provided. However, the first page of this response is available by following the DOI.

Language: en

Short physical performance battery is not associated with falls and injurious falls in older persons: longitudinal data of the SCOPE project

Freiberger E, Fabbietti P, Corsonello A, Lattanzio F, Sieber C, Tap L, Mattace-Raso F, Arnlöv J, Carlsson AC, Roller-Wirnsberger R, Wirnsberger G, Moreno-Gonzalez R, Formiga F, Martinez SL, Gil P, Kostka T, Guligowska A, Yehoshua I, Melzer I, Kob R. Eur. Geriatr. Med. 2024; ePub(ePub): ePub.

DOI: 10.1007/s41999-024-00941-y **PMID**: 38416398

Abstract

INTRODUCTION: Falls and fall-related injuries in older persons are a major public health problem. Our objective was to study the predictive value of the Short Physical Performance Battery (SPPB) in the cohort of the SCOPE project on falls, injurious falls, and possible difference of prediction between indoors and outdoors falls.

METHODS: For this sub-study of the SCOPE project participants reporting no falls at baseline, and survey data on falls at the 12-month and 24-month follow-up were included. Participant´s characteristics were assessed during the baseline interview and medical examinations. Falls as well as injurious falls and fall circumstances were obtained self-reported. SPPB and its association with fallers vs. no fallers at 12 and at 24 months were studied with logistic regression models.

RESULTS: The 1198 participants had a median age of 79 years (77-82), and a median SPPB of 10 (8-11), with a 52.5% of female. A total of 227 and 277 falls (12- and 24- month visits, respectively) were reported. In the crude model, the SPPB sum scores ($p < 0.001$) as well as most single item scores were significant different between fallers and non-fallers over time. However, the association was attenuated in models adjusted for age, sex, marital status, number of medications, quality of life, handgrip strength, and muscle mass [e.g., 12 months; OR 0.94 (0.87-1.02)]. While SPPB fails to differentiate between injurious and non-injurious falls ($p = 0.48$), a lower SPPB score was associated with falls at home ($p < 0.01$) after 24 months.

CONCLUSION: SBPP was not able to significantly predict the risk of falling as well as experiencing an injurious fall. TRIAL REGISTRATION: This study was registered prospectively on 25th February 2016 at clinicaltrials.gov (NCT02691546).

Language: en

Keywords: Falls; Injurious falls; Longitudinal study; Physical function; Short physical performance battery

Risk factors for falls in older adults with diabetes mellitus: systematic review and meta-analysis

Freire LB, Brasil-Neto JP, da Silva ML, Miranda MGC, de Mattos Cruz L, Martins WR, da Silva Paz LP. BMC Geriatr. 2024; 24(1): e201.

DOI: 10.1186/s12877-024-04668-0 **PMID**: 38413865 **PMCID**: PMC10900672

Abstract

AIM: To identify risk factors for falls in older adults with Type 2 Diabetes Mellitus (T2DM).

METHODS: The eligible studies identified factors associated with the risk of falls in older adults with T2DM. We searched PubMed, Cinahl, Web of Science, Scopus, and the Cochrane Library databases. The review has been updated and the last review date was November 30, 2023 (CRD42020193461).

RESULTS: Twelve studies met the inclusion criteria, and eight studies were included in the meta-analysis. These studies included a total of 40,778 older adults with T2DM, aged 60 to 101 years. The risk of developing the outcome falls in older adults with T2DM is 63% higher compared to the risk in older adults without T2DM (HR 1.63; 95% CI [1.30 - 2.05]). The overall chance of falling in older adults with T2DM is 59% higher than that of non-diabetic older adults (OR 1.59; 95% CI [1.36 -1.87]), and in older adults with T2DM who take insulin the chance of falling is 162% higher (OR 2.62; 95% CI [1.87 - 3.65]). No results on diabetic polyneuropathy were found in the studies.

CONCLUSION: Older adults with T2DM present a higher risk of falls compared to non-diabetics. Among the included older adults with T2DM, the most important factor associated with a higher risk of falls was insulin use.

TRIAL REGISTRATION: Registered in the International Prospective Register of Systematic Reviews (CRD42020193461).

Language: en

Keywords: *Diabetes Mellitus, Type 2/complications/diagnosis/epidemiology; Accidental falls; Accidental Falls/prevention & control; Aged; Falls; Humans; Insulin; Older adults; Risk Factors; Risk of falls; Type 2 diabetes mellitus

Factors associated with concerns about falling and activity restriction in older adults after hip fracture: a mixed-methods systematic review

Guerra S, Ellmers T, Turabi R, Law M, Chauhan A, Milton-Cole R, Godfrey E, Sheehan KJ. Eur. Geriatr. Med. 2024; ePub(ePub): ePub.

DOI: 10.1007/s41999-024-00936-9 **PMID**: 38418713

Abstract

PURPOSE: To investigate factors contributing to concerns about falling and activity restriction in the community among older adults who had a hip fracture.

METHODS: A mixed method systematic review with a convergent segregated approach. We searched Medline, Embase, PsycInfo, PEDRo, CINAHL and the Cochrane library.

RESULTS were synthesised narratively considering physical, psychological, environmental, care, and social factors and presented in tables. Critical appraisal was completed in duplicate.

RESULTS: We included 19 studies (9 qualitative, 9 observational, 1 mixed methods) representing 1480 individuals and 23 factors related to concerns about falling and activity restriction. Physical factors included falls history, comorbidities, balance, strength, mobility and functionality. Psychological factors included anxiety and neuroticism scores, perceived confidence in/control over rehabilitation and abilities, and negative/positive affect about the orthopaedic trauma, pre-fracture abilities and future needs. Environmental factors included accessibility in the home, outdoors and with transport. Social and care factors related to the presence or absence of formal and informal networks, which reduced concerns and promoted activity by providing feedback, advice, encouragement, and practical support.

CONCLUSION: These findings highlight that to improve concerns about falling and activity restriction after hip fracture, it is important to: improve physical and functional abilities; boost self-confidence; promote positive affect; involve relatives and carers; increase access to clinicians, and; enhance accessibility of the home, outdoors and transport. Most factors were reported on by a small number of studies of varying quality and require replication in future research.

Language: en

Keywords: Activity avoidance; Balance confidence; Fear avoidance; Fear of falling; Fragility fracture

Risk of falls is associated with 30-day mortality among older adults in the emergency department

Hamilton MP, Bellolio F, Jeffery MM, Bower SM, Palmer AK, Tung EE, Mullan AF, Carpenter CR, Oliveira J E Silva L. Am. J. Emerg. Med. 2024; 79: 122-126.

DOI: 10.1016/j.ajem.2024.02.020 **PMID**: 38422753

Abstract

OBJECTIVE: Falls in older adults correlate with heightened morbidity and mortality. Assessing fall risk in the emergency department (ED) not only aids in identifying candidates for prevention interventions but may also offer insights into overall mortality risk. We sought to examine the link between fall risk and 30-day mortality in older ED adults.

METHODS: Observational cohort study of adults aged ≥ 75years who presented to an academic ED and who were assessed for fall risk using the Memorial Emergency Department Fall Risk Assessment Tool (MEDFRAT), a validated, ED-specific screening tool. The fall risk was classified as low (0-2 points), moderate (3-4 points), or high (≥5) risk. The primary outcome was 30-day mortality. Hazard ratios (HR) with 95% confidence intervals (CIs) were calculated.

RESULTS: A total of 941 patients whose fall risk was assessed in the ED were included in the study. Median age was 83.7 years; 45.6% were male, 75.6% lived in private residences, and 62.7% were admitted. Mortality at 30 days among the high fall risk group was four times that of the low fall risk group (11.8% vs 3.1%; HR 4.00, 95% CI 2.18 to 7.34, $p < 0.001$). Moderate fall risk individuals had nearly double the mortality rate of the low-risk group (6.0% vs 3.1%), but the difference was not statistically significant (HR 1.98, 95% CI 0.91 to 4.32, $p = 0.087$).

CONCLUSION: ED fall risk assessments are linked to 30-day mortality. Screening may facilitate the stratification of older adults at risk for health deterioration.

Language: en

Keywords: Accidental falls; Aged; Delirium; Fall; Fracture; Frailty; Injuries; Major trauma; Mortality; Older adult; Trauma

A novel wearable biofeedback system to prevent trip-related falls

Jacob S, Fernie G, Roshan Fekr A. Heliyon 2024; 10(4): e26291.

DOI: 10.1016/j.heliyon.2024.e26291 **PMID**: 38434031 **PMCID**: PMC10906283

Abstract

Real-time gait monitoring of older adults and gait-impaired individuals while providing real-time biofeedback has the potential to help reduce trip-related falls. A low or unsuccessful Minimum Toe Clearance (MTC) is considered a predictor of tripping risk. Thus, increasing the MTC can be a key component in minimizing the likelihood of tripping. This paper discusses a proof-of-concept wearable system that estimates the MTC in real-time using two Time-of-Flight (ToF) sensors and provides auditory biofeedback to alert users if they have a low MTC during everyday walking activities. Ten healthy female adults were asked to perform two experiments: 1) walk at a predetermined speed to evaluate the proposed real-time MTC detection algorithm, and 2) walk in four conditions: baseline, biofeedback with no distraction, biofeedback with distraction 1 (talking on the phone), and biofeedback with distraction 2 (playing a simple mobile game). The average MTC values were significantly greater during all feedback conditions than the baseline, indicating that the proposed system could successfully warn users to increase their MTC in real-time.

Language: en

Keywords: Biofeedback; Fall prevention; Foot clearance; Gait analysis; Time-of-flight sensor; Tripping; Wearable

Short-term outcomes of prehospital opioid pain management for older adults with fall-related injury

Jarman MP, Jin G, Chen A, Losina E, Weissman JS, Berry SD, Salim A. J. Am. Geriatr. Soc. 2024; ePub(ePub): ePub.

DOI: 10.1111/jgs.18830 **PMID**: 38418369

Abstract

BACKGROUND: Opioids are recommended for pain management in patients being cared for and transported by emergency medical services, but no specific guidelines exist for older adults with fall-related injury. Prior research suggests prehospital opioid administration can effectively manage pain in older adults, but less is known about safety in this population. We compared short-term safety outcomes, including delirium, disposition, and length of stay, among older adults with fall-related injury according to whether they received prehospital opioid analgesia.

METHODS: We linked Medicare claims data with prehospital patient care reports for older adults (≥65) with fall-related injury in Illinois between January 1, 2014 and December 31, 2015. We used weighted regression models (logistic, multinomial logistic, and Poisson) to assess the association between prehospital opioid analgesia and incidence of inpatient delirium, hospital disposition, and length of stay.

RESULTS: Of 28,150 included older adults, 3% received prehospital opioids. Patients receiving prehospital opioids (vs. no prehospital opioids) were less likely to be discharged home from the emergency department (adjusted probability = 0.30 [95% CI: 0.25, 0.34] vs. 0.47 [95% CI: 0.46, 0.48]), more likely to be discharged to a non-home setting after an inpatient admission (adjusted probability = 0.43 [95% CI: 0.39, 0.48] vs. 0.30 [95% CI: 0.30, 0.31]), had inpatient length of stay 0.4 days shorter ($p < 0.001$) and ICU length of stay 0.7 days shorter ($p = 0.045$). Incidence of delirium did not vary between treatment and control groups.

CONCLUSIONS: Few older adults receive opioid analgesia in the prehospital setting. Prehospital opioid analgesia may be associated with hospital disposition and length of stay for older adults with fall-related injury. However, our findings do not provide evidence of an association with inpatient delirium. These findings should be considered when developing guidelines for prehospital pain management specific to the older adult population.

Language: en

Keywords: emergency medical services; geriatric care; pain management; traumatic injury

Risk of fall or fracture with concomitant use of prescription opioids and other medications in osteoarthritis patients

Khan NF, Bykov K, Katz JN, Glynn RJ, Vine SM, Kim SC. Pharmacoepidemiol. Drug Saf. 2024; 33(3): e5773.

DOI: 10.1002/pds.5773 **PMID**: 38419165

Abstract

BACKGROUND: Osteoarthritis (OA) patients taking prescription opioids for pain are at increased risk of fall or fracture, and the concomitant use of interacting drugs may further increase the risk of these events. AIMS: To identify prescription opioid-related medication combinations associated with fall or fracture. MATERIALS & METHODS: We conducted a case-crossover-based screening of two administrative claims databases spanning 2003 through 2021. OA patients were aged 40 years or older with at least 365 days of continuous enrollment and 90 days of continuous prescription opioid use before their first eligible fall or fracture event. The primary analysis quantified the odds ratio (OR) between fall and non-opioid medications dispensed in the 90 days before the fall date after adjustment for prescription opioid dosage and confounding using a case-time-control design. A secondary analogous analysis evaluated medications associated with fracture. The false discovery rate (FDR) was used to account for multiple testing.

RESULTS: We identified 41 693 OA patients who experienced a fall and 24 891 OA patients who experienced a fracture after at least 90 days of continuous opioid therapy. Top non-opioid medications by ascending p-value with OR > 1 for fall were meloxicam (OR 1.22, FDR = 0.08), metoprolol (OR 1.06, FDR >0.99), and celecoxib (OR 1.13, FDR > 0.99). Top non-opioid medications for fracture were losartan (OR 1.20, FDR = 0.80), alprazolam (OR 1.14, FDR > 0.99), and duloxetine (OR 1.12, FDR = 0.97).

CONCLUSION: Clinicians may seek to monitor patients who are co-prescribed drugs that act on the central nervous system, especially in individuals with OA.

Language: en

Keywords: *Fractures, Bone/etiology/chemically induced; *Osteoarthritis/drug therapy/epidemiology/chemically induced; *Prescription Drugs; Analgesics, Opioid/adverse effects; drug-drug interactions; epidemiology; fall; fracture; Humans; opioids; pharmacoepidemiology; Prescriptions

Performance of digital technologies in assessing fall risks among older adults with cognitive impairment: a systematic review

Koh V, Xuan LW, Zhe TK, Singh N, B Matchar D, Chan A. Geroscience 2024; ePub(ePub): ePub.

DOI: 10.1007/s11357-024-01098-z **PMID**: 38436792

Abstract

Older adults with cognitive impairment (CI) are twice as likely to fall compared to the general older adult population. Traditional fall risk assessments may not be suitable for older adults with CI due to their reliance on attention and recall. Hence, there is an interest in using objective technology-based fall risk assessment tools to assess falls within this population. This systematic review aims to evaluate the features and performance of technology-based fall risk assessment tools for older adults with CI. A systematic search was conducted across several databases such as PubMed and IEEE Xplore, resulting in the inclusion of 22 studies. Most studies focused on participants with dementia. The technologies included sensors, mobile applications, motion capture, and virtual reality. Fall risk assessments were conducted in the community, laboratory, and institutional settings; with studies incorporating continuous monitoring of older adults in everyday environments. Studies used a combination of technology-based inputs of gait parameters, socio-demographic indicators, and clinical assessments. However, many missed the opportunity to include cognitive performance inputs as predictors to fall risk. The findings of this review support the use of technology-based fall risk assessment tools for older adults with CI. Further advancements incorporating cognitive measures and additional longitudinal studies are needed to improve the effectiveness and clinical applications of these assessment tools. Additional work is also required to compare the performance of existing methods for fall risk assessment, technology-based fall risk assessments, and the combination of these approaches.

Language: en

Keywords: Cognitive impairment; Digital technologies; Fall prediction; Falls risk assessment; Older adults

Predicting the future fall risk using challenging tasks: importance of sensor-based quantitative measurements of gait in Parkinson's disease

Kwon DY. J. Clin. Neurol. 2024; 20(2): 117-118.

DOI: 10.3988/jcn.2024.0051 **PMID**: 38433483

Abstract

Normal gait is dependent on the proper functioning of the peripheral, musculoskeletal, and psychological body systems as well as of the neural network of the brain. Gait function can serve as a decisive factor for evaluating health conditions in clinical settings.1

Parkinson's disease (PD) is a progressive neurodegenerative disorder affecting the central nervous system, with gait impairment being one of its characteristic symptoms. Falls mostly occur in the advanced stages of PD, but they can also appear in the early stages. Extensive research is underway into how to predict falls from the early stages of PD, since their occurrence have a significant impact on the quality of life, socioeconomic burden, and mortality rates. However, assessing the fall risk is challenging due to the complex interplay of both disease-specific and generic factors. Moreover, falls and freezing of gait in PD can be influenced by psychological factors that render these events episodic and highly variable.

Previous research aimed at predicting the risk of falls has employed strategies that go beyond simple gait analysis, using multiple tasks while walking to increase the sensitivity and yield. However, the results when using such complex tasks are difficult to interpret accurately since the outcomes are influenced by factors other than gait itself, which restricts the effectiveness of these approaches. Indeed, a recent study that identified a direct association between fall scores and visual hallucinations in PD highlighted the intricate interplay of various factors in fall prediction.2

Technology-based objective measurements (TOMs) have recently been adopted to visualize, quantify, and temporally record subtle changes of the body movements. TOMs are increasingly employed in the field of neurology, especially in movement disorders, including in gait analysis.3 This technology has made gait analysis more objective and precise, allowing for the widespread adoption of temporal analyses and diagnostic processes. This approach facilitates the analysis of baseline clinical parameters that in turn enables its use in various risk-prediction applications.

In this context, the study by Kwon et al.4 reported in the current issue has demonstrated the relationship between baseline gait parameters from quantitative analysis and falls in individuals with drug-naïve PD, and also identified key gait parameters for predicting falls. A major strength of that study was the analysis of gait patterns during backward walking, a behavior not commonly performed in routine gait assessments, which could be helpful in revealing subtle abnormalities and facilitate sensitive risk predictions.

Language: en

The effect of Tai Chi lower extremity exercise on the balance control of older adults in assistant living communities

Mao M, Mercer VS, Li F, Gross MT, Blackburn T, Yu B. BMC Complement. Med. Ther. 2024; 24(1): e112.

DOI: 10.1186/s12906-024-04382-9 **PMID**: 38448853

Abstract

BACKGROUND: Although Tai Chi (TC) is an evidence-based fall prevention training for older adults, its effective movements remain unclear, which may limit the practice of TC. The purpose of this study was to compare the effectiveness of TC lower extremity exercise (TC LEE), the 8-form Tai Chi (8-form TC), and a stretching control intervention for improving balance and functional mobility among older adults.

METHODS: This was a randomized controlled trial. A total of 102 participants (79 ± 6 years old) were recruited from assisted living facilities. All participants were randomly assigned to the TC LEE (n = 40), 8-form TC (n = 31), and stretching (n = 31) groups in which they received the respective interventions for 16 weeks. The Berg Balance Scale (BBS), Timed Up and Go (TUG) test, and center of pressure (COP) measurements during quiet stance were collected prior to and following the 16-week interventions. Comparisons on all measurements were conducted among all groups.

RESULTS: Significant improvements were found in BBS (P = 0.002), TUG test (P = 0.001), root mean square amplitude of COP displacement in the anterior-posterior (P = 0.001) and medial-lateral (P = 0.001) directions, and average COP speed in the anterior-posterior (P = 0.001) and medial-lateral (P = 0.001) directions after training in the TC intervention groups compared with the stretching group. The upper limit of the 95% confidence interval (CI) of differences in change scores on the BBS (-0.8 - 1.3 points) between the TC LEE group and the 8-form TC group was within equivalence margins (1.8 points), while the upper limit of the 95% CI of differences in change scores on the TUG test (0.1 - 2.1 s) exceeded the equivalence margin (0.7 s) with the TC LEE group having the larger change scores.

CONCLUSION: TC LEE can improve balance and functional mobility in older adults, and may have greater effect than the 8-form TC on improving functional mobility as measured by the TUG test. TRIAL REGISTRATION: ChiCTR2300070600 retrospectively registered.

Language: en

Keywords: Aged; Physical functional performance; Postural balance; Tai Ji

Improving safety and preventing falls using an evidence-based, front-line staff huddling practice: protocol for a pragmatic trial to increase quality of care in State Veterans Homes

Nash P, Clark V, McConnell E, Mills W, Morgan R, Pimentel C, Ritchey K, Levy C, Snow AL, Hartmann C. BMJ Open 2024; 14(2): e084011.

DOI: 10.1136/bmjopen-2024-084011 **PMID**: 38413157 **PMCID**: PMC10900326

Abstract

INTRODUCTION: Falls in nursing homes are a major cause for decreases in residents' quality of life and overall health. This study aims to reduce resident falls by implementing the LOCK Falls Programme, an evidence-based quality improvement intervention. The LOCK Falls Programme involves the entire front-line care team in (1) focusing on evidence of positive change, (2) collecting data through systematic observation and (3) facilitating communication and coordination of care through the practice of front-line staff huddles.

METHODS AND ANALYSIS: The study protocol describes a mixed-methods, 4-year hybrid (type 2) effectiveness-implementation study in State Veterans Homes in the USA. The study uses a pragmatic stepped-wedge randomised trial design and employs relational coordination theory and the Reach, Effectiveness, Adoption, Implementation and Maintenance framework to guide implementation and evaluation. A total of eight State Veterans Homes will participate and data will be collected over an 18-month period. Administrative data inclusive of all clinical assessments and Minimum Data Set assessments for Veterans with a State Veterans Home admission or stay during the study period will be collected (8480 residents total). The primary outcome is a resident having any fall. The primary analysis will be a partial intention-to-treat analysis using the rate of participants experiencing any fall. A staff survey (n=1200) and qualitative interviews with residents (n=80) and staff (n=400) will also be conducted. This research seeks to systematically address known barriers to nursing home quality improvement efforts associated with reducing falls. ETHICS AND DISSEMINATION: This study is approved by the Central Institutional Review Board (#167059-11). All participants will be recruited voluntarily and will sign informed consent as required. Collection, assessment and managing of solicited and spontaneously reported adverse events, including required protocol alterations, will be communicated and approved directly with the Central Institutional Review Board, the data safety monitoring board and the Office of Research and Development. Study results will be disseminated through peer-reviewed publications and conference presentations at the Academy Health Annual Research Meeting, the Gerontological Society of America Annual Scientific Meeting and the American Geriatrics Society Annual Meeting. Key stakeholders will also help disseminate lessons learnt. TRIAL REGISTRATION NUMBER: NCT05906095.

Language: en

Keywords: *Quality of Life; *Veterans; Aging; Humans; Implementation Science; Nursing Care; Nursing Homes; Quality Improvement

Physical-activity interventions to reduce fear of falling in frail and pre-frail older adults: a systematic review of randomized controlled trials

Savvakis I, Adamakidou T, Kleisiaris C. Eur. Geriatr. Med. 2024; ePub(ePub): ePub.

DOI: 10.1007/s41999-024-00944-9 **PMID**: 38411771

Abstract

BACKGROUND: Frailty in older adults leads to progressive deterioration of their physical condition and makes them prone to develop Fear of Falling (FoF). Physical-activity interventions appear to be effective in managing the components of frailty but there is no clear evidence to determine whether physical-activity may affect FoF in frail and pre-frail older adults.

OBJECTIVE: This systematic literature review aims to synthesize evidence on the relationship between the physical interventions to ameliorate balance, strength, and mobility and FoF reduction in frail and pre-frail older adults.

METHODS: Studies assessing physical-activity interventions for frail and pre-frail older adults aged 60 years and older were identified in English through searches in PubMed, ScienceDirect, and Cochrane Central Register of Controlled Trials databases till February 2023. Study quality was assessed, and a qualitative synthesis of results was performed.

RESULTS: A total of 13 studies published were included. All of them were Randomized Control Trials and the most frequent assessment tool used to assess FoF (10 of 13 studies) was the Fall Efficacy Scale-International (FES-I). Six studies were assessed as having a low risk of bias. Cumulatively, the findings of this review indicate that physical-activity interventions are effective in reducing the FoF of frail and pre-frail older adults.

CONCLUSION: The results are encouraging and recapitulate the positive role of physical interventions in FoF reduction. However, future research would benefit from longer follow-up periods, longer intervention duration, and participation of interdisciplinary teams.

Language: en

Keywords: Fear of falling; Frailty; Older adults; Physical activity

Effects of a fall prevention exercise regimen on physical and psychosocial outcomes in elderly community dwellers: a randomized comparative study

Sim JY, Koo JW, Jeong YG. Physiother. Theory Pract. 2024; ePub(ePub): ePub.

DOI: 10.1080/09593985.2024.2325561 **PMID**: 38440857

Abstract

BACKGROUND: There is a need for comprehensive programs that address both the physical and psychosocial aspects of fall prevention for the elderly.

OBJECTIVE: This study assessed the efficacy of the exercise regimen on various health metrics for elderly community dwellers.

METHODS: Forty-four participants were divided into experimental and control groups. The experimental group adhered to a 9-step core exercise regimen for fall prevention, practicing three times a week for 30 minutes across 10 weeks, while the control group maintained their regular daily activities without any specific exercise program. Before and after the intervention, participants underwent the timed up-and-go t est to evaluate the physical function, the berg balance scale (BBS) and one-legged stance test (OLST) for balance assessment, the activity-specific balance confidence scale for fall-related self-efficacy, and measures for health-related quality of life.

RESULTS: Participants in the experimental group showed significant improvements in physical function ($p = .04$, Cohen's effect size (d) = 0.2). and balance ability on BBS ($p < .01$, $d = 0.2$) and OLST ($p < .01$, $d = 1.3$) compared to the control group. Furthermore, there was a notable enhancement in the quality of life indicators for this group, especially in areas such as physical function ($p = .04$, $d = 0.2$), physical-role limitation ($p = .04$, $d = 0.2$), mental health ($p = .01$, $d = 0.3$), vitality ($p = .02$, $d = 0.4$), body pain ($p = .04$, $d = 0.5$), and general health ($p = .04$, $d = 0.4$).

CONCLUSION: These findings highlight the potential of the fall prevention exercise program in improving physical health aspects, but its influence on specific psychosocial elements remains to be determined.

Language: en

Keywords: Elderly; exercise program; fall prevention; physical function; quality of life

Impact of sensory reweighting strategies on postural control using the sensory organization test in older adults with and without fall risks

Sung P, Rowland P. Physiother. Res. Int. 2024; 29(2): e2075.

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Abstract

BACKGROUND: The Sensory Organization Test (SOT), an integral part of computerized dynamic posturography, plays a crucial role in evaluating postural stability under various altered sensory conditions. Despite its importance, there have been noted inconsistencies in the results pertaining to equilibrium and sensory system evaluations. This study aimed to compare four sensory analysis scores and equilibrium indices between older adults with and without fall risks.

METHODS: The study included 34 participants identified as being at risk of falls and 42 control subjects. To categorize individuals between the two groups, we performed area under the receiver operating characteristic curve analyses. This classification was based on scores from the Modified Falls Efficacy Scale (MFES) and the composite scores obtained from the SOT. In addition, we used the Tampa Scale for Kinesiophobia (TSK) as well as the level of disability.

RESULTS: The fall risk group demonstrated significantly higher TSK scores (39.39 ± 15.24 for control group vs. 54.65 ± 10.70 for fall risk group; $t = -5.09$, $p = 0.001$). The groups demonstrated a significant interaction on the equilibrium index ($F = 4.59$, $p = 0.03$), which was lower in the fall risk group in Condition 6 with a moving surface and surround and eyes open ($t = 2.29$, $p = 0.01$). The fall risk group demonstrated a higher somatosensory score ($t = -1.73$, $p = 0.04$).

CONCLUSIONS: The fall risk group had a lower equilibrium index score in Condition six of the SOT, which was useful for identifying deficits in vestibular function to integrate sensory information under challenging conditions for postural adaptation. This strategy suggested that the fall risk group could compensate for their risk of falls by utilizing more effective somatosensory reweighting strategies compared with the control group.

Language: en

Keywords: compensation; equilibrium index; fall efficacy scale; kinesiophobia; sensory organization test

Trends and age-period-cohort effect on the incidence of falls from 1990 to 2019 in BRICS

Xie Z, Chen S, He C, Cao Y, Du Y, Yi L, Wu X, Wang Z, Yang Z, Wang P. Heliyon 2024; 10(5): e26771.

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Abstract

BACKGROUND: The increasing burden of falls in BRICS countries warrants a comprehensive investigation to understand the dynamics and trends. This study utilized data from the Global Burden of Disease Study (GBD) 2019 to assess fall incidence rates in Brazil, Russia, India, China, and South Africa (BRICS) to provide valuable insights for the development of targeted prevention and management strategies.

METHODS: Data from the GBD 2019 were employed to estimate fall incidence rates. The study utilized age-period-cohort (APC) model analysis, implemented using R 4.3.0 software and the R package apc, to examine fall incidence trends from 1990 to 2019.

RESULTS: In 2019, the BRICS nations collectively reported 32.32 million fall cases. The overall fall incidence rate increased from 2681.7 per 100,000 people in 1990-2896.3 per 100,000 people in 2019. China and India exhibited escalating trends, with China experiencing the highest growth rate at 21%, followed by India at 5.8%. South Africa displayed a comparatively lower overall incidence rate increase. Notably, the 90-94 age group in China exhibited the most significant deterioration, with men and women experiencing annual increases of 4.23% and 1.77%, respectively. Age effects indicated a higher susceptibility to falls among preschool children and the elderly. Period effects revealed no improvement in the fall state for India (2005-2019) and China (2015-2019). Cohort effects adversely impacted the incidence rate for individuals born earlier in South Africa.

CONCLUSION: The present study highlights a consistent upward trend in fall incidence rates across BRICS countries from 1990 to 2019. With an aging population, the burden of fall-related diseases is on the rise in these nations. Our results underscore the necessity of formulating evidence-based disease prevention and management approaches tailored to the distinctive demographic attributes of each nation. Addressing these trends is crucial for mitigating the growing impact of falls on public health in BRICS countries.

Language: en

Keywords: Age-period-cohort analysis; BRICS; Disease burden; Falls

Tai Chi counteracts age-related somatosensation and postural control declines among older adults

Zhang T, Li L, Hondzinski JM, Mao M, Sun W, Song Q. J. Exerc. Sci. Fit. 2024; 22(2): 152-158.

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Abstract

OBJECTIVE: To investigate the effect of a 16-week Tai Chi practice on strength, tactile sensation, kinesthesia, and static postural control among older adults of different age groups.

METHODS: This is a quasi-experimental study. Thirteen participants aged 60-69 years (60-69yr), 11 aged 70-79 years (70-79yr), and 13 aged 80-89 years (80-89yr) completed 16 weeks of 24-form Tai Chi practice. Their ankle and hip peak torque, tactile sensation, ankle and knee kinesthesia, and the root mean square of the center of pressure (Cop-RMS) were measured before (week 0) and after (week 17) practice.

RESULTS: 80-89yr showed less ankle plantar/dorsiflexion and hip abduction peak torques ($p = 0.003$, $p < 0.001$, $p = 0.001$), and a greater ankle plantar/dorsiflexion kinesthesia ($p < 0.001$, $p = 0.002$) than 60-69yr and 70-79yr. Greater ankle plantar/dorsiflexion and hip abduction torques ($p = 0.011$, $p < 0.001$, $p = 0.045$), improved arch and heel tactile sensation ($p = 0.040$, $p = 0.009$), and lower knee flexion/extension kinesthesia ($p < 0.001$, $p = 0.044$) were observed at week 17. The significant group*practice interaction for the fifth metatarsal head tactile sensation ($p = 0.027$), ankle plantar/dorsiflexion kinesthesia ($p < 0.001$, $p = 0.004$), and the CoP-RMS in the mediolateral direction ($p = 0.047$) only in 80-89yr revealed greater improvement at week 17.

CONCLUSION: Tai Chi practice increased strength, tactile sensation, kinesthesia, and static postural control among older adults. Tai Chi practice improved tactile, kinesthesia sensations, and static postural control among older adults over 80, who presented with worse strength and kinesthesia than their younger counterparts. Tai Chi practice offers a safe exercise option for those aged over 80 to encourage improvements in sensorimotor control.

Language: en

Keywords: Balance control; Elderly adults; Plantar sensitivity; Sensorimotor integration; Tai chi chuan