

Safety Literature 23rd July 2023

'Maintaining balance in life'-exploring older adults' long-term engagement in self-managed digital fall prevention exercise

Pettersson B, Lundell S, Lundin-Olsson L, Sandlund M. Eur. Rev. Aging Phys. Activ. 2023; 20(1): e12.

(Copyright © 2023, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1186/s11556-023-00322-7 PMID 37464299

Abstract

BACKGROUND: Accidental falls are one of the greatest threats to older adults' health and well-being. The risk of falling can be significantly reduced with strength and balance interventions. However, there needs to be further knowledge into how older adults can be supported to achieve a maintained exercise behaviour. Therefore, the aim of this study was to explore factors that enabled older adults to maintain their exercise during a 1-year self-managed digital fall prevention exercise intervention.

METHODS: This study used a grounded theory methodology. Semi-structured individual interviews were conducted by phone or conference call. Eighteen community-dwelling older adults aged 70 years or more participated. The participants had a self-reported exercise dose of 60 min or more per week during the last three months of participation in a 12-months intervention of self-managed digital fall prevention exercise, the Safe Step randomized controlled trial. Open, axial, and selective coding, along with constant comparative analysis, was used to analyze the data.

RESULTS: The analysis resulted in a theoretical model. We found that the fall prevention exercise habits of adults were developed through three stages: Acting against threats to one's own identity, Coordinating strategies to establish a routine, and Forming habits through cues and evaluation. The main category of Maintaining balance in life encases the participants transition through the three stages and reflects balance in both physical aspects and in between activities in daily life. The process of maintaining balance in life and desire to do so were mediated both by intrinsic person-dependent factors and the Safe Step application acting as an external mediator.

CONCLUSION: This study identified three stages of how older adults developed self-managed fall prevention exercise habits, supported by a digital application. The generated theoretical model can inform future interventions aiming to support long-term engagement in digitally supported and self-managed fall prevention interventions.

Language: en

Keywords

Aged; eHealth; Exercise; Older adults; Behaviour change; Fall prevention; Grounded Theory; Habit formation; mHealth; Self-management

'My words become my hands': yoga instructors' experiences of adapting teleyoga in the SAGE fall prevention trial-a qualitative analysis

Gilchrist H, Haynes A, Oliveira JS, Sherrington C, Clementson L, Glenn J, Jones J, Sesto R, Tiedemann A. Digit. Health 2023; 9: e20552076231185273.

(Copyright © 2023, SAGE Publishing)

DOI 10.1177/20552076231185273 **PMID** 37434722

Abstract

OBJECTIVE: This research identifies practical lessons regarding the delivery of teleyoga. Our objectives are to (1) describe challenges and opportunities experienced by yoga instructors when moving the Successful AGEing (SAGE) yoga programme online, and (2) describe how yoga instructors adapted to manage the challenges and leverage opportunities presented by teleyoga.

METHODS: This study is a secondary analysis of the data from a previous realist process evaluation of the SAGE yoga trial. The SAGE yoga trial is testing the effect of a yoga-based exercise programme on falls among 700 community-dwelling people aged 60+ years. We draw on focus groups and interviews with four SAGE yoga instructors which we analysed using previously developed programme theories combined with inductive coding and an analytical workshop.

RESULTS: The concerns of the yoga instructors about teleyoga can be characterised into four broad issues: threats to safety, altered interpersonal dynamics, facilitating mind-body connection and difficulties with technology. The SAGE instructors identified eight modifications they used to manage these challenges: a 1:1 participant interview prior to programme commencement, more descriptive verbal instructions, increased focus on interoception, increased attention and support, slower more structured class flow, simplifying poses, adapting the studio environment and IT support.

CONCLUSIONS: We have created a typology of strategies for addressing challenges in the delivery of teleyoga for older people. As well as maximising engagement with teleyoga, these manageable strategies could be applied by other instructors to a wide range of telehealth classes, improving the uptake and adherence of beneficial online programmes and services.

Language: en

Keywords

physical activity; complementary therapies; experience; telehealth; videoconferencing; Yoga

A prospective cohort study of the impact of chronic disease on fall injuries in middle-aged and older adults

Yang X, Li L, Xie F, Wang Z. Open Med (Wars) 2023; 18(1): e20230748.

(Copyright © 2023, Walter de Gruyter)

DOI 10.1515/med-2023-0748 **PMID** 37465350

Abstract

This cohort study investigated the impact of chronic diseases on fall risk in middle-aged and older individuals, offering insights for fall prevention strategies. Analysing data from 4,670 participants aged 40+ years, we used a Cox proportional risk model to assess chronic disease types, numbers, and interactions with other factors on fall injury risk across age groups.

RESULTS showed that middle-aged adults with respiratory diseases had a 26% increased fall risk (hazard ratio [HR] = 1.26, 95% confidence interval [CI]: 1.05-1.48), and a linear dose-response relationship was observed between chronic disease number and fall risk ($p < 0.001$). The study also examined interaction effects of chronic diseases with gender, disability, and fall injury history. Female middle-aged and older adults with chronic diseases had a 67% higher fall risk than their male counterparts without chronic diseases (HR = 1.67, 95% CI: 1.36-1.88). In conclusion, chronically ill middle-aged and older adults have a higher fall risk, with high-risk groups including women, those with chronic diseases, and individuals with fall injury history. Fall prevention efforts should target middle-aged adults as well.

Language: en

Keywords

risk factors; cohort studies; chronic disease; fall injury; health management

An enhanced ensemble deep neural network approach for elderly fall detection system based on wearable sensors

Mohammad Z, Anwary AR, Mridha MF, Shovon MSH, Vassallo M. *Sensors* (Basel) 2023; 23(10): e4774.

(Copyright © 2023, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/s23104774 **PMID** 37430686

Abstract

Fatal injuries and hospitalizations caused by accidental falls are significant problems among the elderly. Detecting falls in real-time is challenging, as many falls occur in a short period. Developing an automated monitoring system that can predict falls before they happen, provide safeguards during the fall, and issue remote notifications after the fall is essential to improving the level of care for the elderly. This study proposed a concept for a wearable monitoring framework that aims to anticipate falls during their beginning and descent, activating a safety mechanism to minimize fall-related injuries and issuing a remote notification after the body impacts the ground. However, the demonstration of this concept in the study involved the offline analysis of an ensemble deep neural network architecture based on a Convolutional Neural Network (CNN) and a Recurrent Neural Network (RNN) and existing data. It is important to note that this study did not involve the implementation of hardware or other elements beyond the developed algorithm. The proposed approach utilized CNN for robust feature extraction from accelerometer and gyroscope data and RNN to model the temporal dynamics of the falling process. A distinct class-based ensemble architecture was developed, where each ensemble model identified a specific class. The proposed approach was evaluated on the annotated SisFall dataset and achieved a mean accuracy of 95%, 96%, and 98% for Non-Fall, Pre-Fall, and Fall detection events, respectively, outperforming state-of-the-art fall detection methods. The overall evaluation demonstrated the effectiveness of the developed deep learning architecture. This wearable monitoring system will prevent injuries and improve the quality of life of elderly individuals.

Language: en

Keywords

Aged; Humans; Algorithms; fall detection; deep learning; *Accidental Falls/prevention & control; *Wearable Electronic Devices; convolutional neural network; ensemble architecture; Neural Networks, Computer; pre-fall detection; Quality of Life; recurrent neural network

Burden of falls attributable to low bone mineral density among people aged 60 years and over in China from 1990 to 2019

Fu Y, Ba L, Lü N, Yang H, Hong X, Zhou J, Sun Z. *Front. Public Health* 2023; 11: e1204497.

(Copyright © 2023, Frontiers Editorial Office)

DOI 10.3389/fpubh.2023.1204497 **PMID** 37448662

Abstract

OBJECTIVE: Falls in older people have become a major public health, economic and societal problem. Osteoporosis predisposes older adults to high risk of falls, which were the most common outcome attributable to low bone mineral density (LBMD). In this study, we analyze the long-term trends in falls burden attributable to LBMD among people aged 60 years and over from 1990 to 2019, using data from the Global Burden of Diseases, Injuries, and Risk Factors Study 2019 (GBD 2019).

METHODS: Data from GBD 2019 were used to assess the long-term trends in mortality and disability-adjusted life-year (DALY) rates by Joinpoint regression. The age-period-cohort (APC) model was used to evaluate the effects of age, period and cohort on mortality rate of falls attributable to LBMD.

RESULTS: The mortality and DALYs rates of falls attributable to LBMD among people aged 60 years and over increased from 1990 to 2019, with average annual percentage changes (AAPCs) of 1.74% (95% CI: -1.47 to 2.01%) and 0.99% (95% CI: 0.80-1.19%), respectively. APC analysis revealed that the mortality rate due to LBMD significantly increased among the older people over the age of 75 years. The risk of falls mortality due to LBMD during the period of 1990-2019 initially declined but later elevated. An overall increasing risk for falls death attributable to LBMD was presented across birth cohorts, but in cohorts born after 1930, the upward trend has slowed down. The overall net drift per year attributable to LBMD was above 0. The corresponding results showed that the negative impact of period and cohort effects among males was more pronounced than those among females.

CONCLUSIONS: Falls attributable to LBMD remain an ongoing health burden in the older people in China, and the mortality has been on the rise from 1990 to 2019, especially among the older people aged 80+ years group. The prevention and treatment of LBMD should be emphasized, especially among males and oldest-old people. Furthermore, there is an urgent need to strengthen the implementation of system-wide, integrated and effective public health policies and other health interventions in China.

Language: en

Keywords

burden; falls; age-period-cohort analysis; low bone mineral density; osteoporosis

Centrally acting antihypertensives and alpha-blockers in people at risk of falls: therapeutic dilemmas-a clinical review

Welsh TJ, Mitchell A. Eur. Geriatr. Med. 2023; ePub(ePub): ePub.

(Copyright © 2023, Elsevier Publishing)

DOI 10.1007/s41999-023-00813-x **PMID** 37436689

Abstract

PURPOSE: The aim of this clinical review was to summarise the existing knowledge on the adverse effects of alpha-blockers and centrally acting antihypertensives, the effect these may have on falls risk, and guide deprescribing of these medications.

METHODS: Literature searches were conducted using PubMed and Embase. Additional articles were identified by searching reference lists and reference to personal libraries. We discuss the place of alpha-blockers and centrally acting antihypertensives in the treatment of hypertension and methods for deprescribing.

RESULTS: Alpha-blockers and centrally acting antihypertensives are no longer recommended for the treatment of hypertension unless all other agents are contraindicated or not tolerated. These medications carry a significant falls risk and non-falls risk-associated side effects. Tools to aid and guide de-prescribing and monitoring of the withdrawal of these medication classes are available to assist the clinician including information on reducing the risk of withdrawal syndromes.

CONCLUSIONS: Centrally acting antihypertensives and alpha-blockers increase the risk of falls through a variety of mechanisms-principally by increasing the risk of hypotension, orthostatic hypotension, arrhythmias and sedation. These agents should be prioritised for de-prescribing in older frailer individuals. We identify a number of tools and a withdrawal protocol to aid the clinician in identifying and de-prescribing these medications.

Language: en

Keywords

Falls; Deprescribing; Geriatric; Hypertension

Clinical study of falls among inpatients with hematological diseases and exploration of risk prediction models

Wang J, Chen B, Xu F, Chen Q, Yue J, Wen J, Zhao F, Gou M, Zhang Y. *Front. Public Health* 2023; 11: e1150333.

(Copyright © 2023, Frontiers Editorial Office)

DOI 10.3389/fpubh.2023.1150333 **PMID** 37441635

Abstract

BACKGROUND: Falls are serious health events that can cause life-threatening injuries, especially among specific populations. This study assessed the risk factors associated with falls among inpatients with hematological diseases and explored the predictive value of fall risk assessment models.

METHODS: Clinical data from 275 eligible hematology disease patients who visited Mianyang Central Hospital with or without falls from September 2019 to August 2022 were retrospectively analyzed. Fall risk scores were determined in all included patients. Clinical characteristics were compared between patients with and without falls. Binary logistic regression models were used to screen for potential fall-specific risk factors among hospitalized patients with hematology diseases.

RESULTS: Falls occurred in 79 cases. Patients in the fall group had a higher Charlson Comorbidity Index (CCI), a higher incidence of diabetes mellitus, visual impairment, hematological malignancies, and maintenance of stable disease stage, higher glucose levels, and a greater proportion of dizziness, nocturnal defecation, and receipt of intensive chemotherapy than those in the non-fall group (all $P < 0.05$). Fall patients were also more likely to have used diuretics, laxatives, sedative-sleeping drugs, analgesics, albumin, and calcium, and to have had catheters placed. The Barthel Index, grade of nursing care, support of chaperones, body temperature, nutrition score, and pain score also differed significantly between the two groups (all $P < 0.05$). Multivariable logistic regression analysis showed that the maintenance of stable disease stage (OR = 4.40, 95% CI 2.11-9.18, $P < 0.001$), use of sedative and sleeping drugs (OR = 4.84, 95% CI 1.09-21.49, $P = 0.038$), use of diuretics (OR = 5.23, 95% CI 2.40-11.41, $P < 0.001$), and intensive chemotherapy (OR = 10.41, 95% CI 3.11-34.87, $P < 0.001$) were independent risk factors for falls. A high Barthel Index (OR = 0.95, 95% CI 0.93-0.97, $P < 0.001$), a high level of nursing care (OR = 0.19, 95% CI 0.04-0.98, $P = 0.047$), and availability of family accompaniment (OR = 0.15, 95% CI 0.06-0.34, $P < 0.001$) were protective factors for falls. A ROC curve analysis was used to evaluate the predictive value of different fall-specific risk scales among inpatients with hematological diseases. The Johns Hopkins Fall Risk Rating Scale had high sensibility and specificity with an area under the curve of 0.73 (95% CI 0.66-0.80, $P < 0.001$).

CONCLUSION: The Johns Hopkins Fall Risk Scale had a strong predictive value for falls among hospitalized patients with hematology diseases and can be recommended as a valid tool for clinical use. Language: en

Keywords falls; hematology; inpatient; risk factor; risk prediction

Combination of clinical and gait measures to classify fallers and non-fallers in Parkinson's disease

Araújo HAGO, Smaili SM, Morris R, Graham L, Das J, McDonald C, Walker R, Stuart S, Vitorio R. *Sensors* (Basel) 2023; 23(10): e4651.

(Copyright © 2023, MDPI: Multidisciplinary Digital Publishing Institute)

DOI

10.3390/s23104651

PMID

37430565

Abstract

Although the multifactorial nature of falls in Parkinson's disease (PD) is well described, optimal assessment for the identification of fallers remains unclear. Thus, we aimed to identify clinical and objective gait measures that best discriminate fallers from non-fallers in PD, with suggestions of optimal cutoff scores.

METHODS: Individuals with mild-to-moderate PD were classified as fallers ($n = 31$) or non-fallers ($n = 96$) based on the previous 12 months' falls. Clinical measures (demographic, motor, cognitive and patient-reported outcomes) were assessed with standard scales/tests, and gait parameters were derived from wearable inertial sensors (Mobility Lab v2); participants walked overground, at a self-selected speed, for 2 min under single and dual-task walking conditions (maximum forward digit span). Receiver operating characteristic curve analysis identified measures (separately and in combination) that best discriminate fallers from non-fallers; we calculated the area under the curve (AUC) and identified optimal cutoff scores (i.e., point closest-to-(0,1) corner).

RESULTS: Single gait and clinical measures that best classified fallers were foot strike angle (AUC = 0.728; cutoff = 14.07°) and the Falls Efficacy Scale International (FES-I; AUC = 0.716, cutoff = 25.5), respectively. Combinations of clinical + gait measures had higher AUCs than combinations of clinical-only or gait-only measures. The best performing combination included the FES-I score, New Freezing of Gait Questionnaire score, foot strike angle and trunk transverse range of motion (AUC = 0.85).

CONCLUSION: Multiple clinical and gait aspects must be considered for the classification of fallers and non-fallers in PD.

Language: en

Keywords

Humans; Walking; falls; Gait; *Gait Disorders, Neurologic/diagnosis; *Parkinson Disease/diagnosis; gait; Lower Extremity; Parkinson

Comparative analysis of fall risk assessment features in community-elderly and stroke survivors: insights from sensor-based data

Lee CH, Mendoza T, Huang CH, Sun TL. Healthcare (Basel) 2023; 11(13): e1938.

(Copyright © 2023, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/healthcare11131938 **PMID** 37444772

Abstract

Fall-risk assessment studies generally focus on identifying characteristics that affect postural balance in a specific group of subjects. However, falls affect a multitude of individuals. Among the groups with the most recurrent fallers are the community-dwelling elderly and stroke survivors. Thus, this study focuses on identifying a set of features that can explain fall risk for these two groups of subjects. Sixty-five community dwelling elderly (forty-nine female, sixteen male) and thirty-five stroke-survivors (twenty-two male, thirteen male) participated in our study. With the use of an inertial sensor, some features are extracted from the acceleration data of a Timed Up and Go (TUG) test performed by both groups of individuals. A short-form berg balance scale (SFBBS) score and the TUG test score were used for labeling the data. With the use of a 100-fold cross-validation approach, Relief-F and Extra Trees Classifier algorithms were used to extract sets of the top 5, 10, 15, 20, 25, and 30 features. Random Forest classifiers were trained for each set of features. The best models were selected, and the repeated features for each group of subjects were analyzed and discussed. The results show that only the stand duration was an important feature for the prediction of fall risk across all clinical tests and both groups of individuals.

Language: en

Keywords

random forest; community-dwelling; fall risk; feature selection; inertial sensor; stroke-survivors

Comparison of physical performance, gait, balance, falls efficacy, and step reaction time in individuals with multiple sclerosis

Özden F, Özkeskin M, Tümtürk, Yüceyar N. Clin. Neurol. Neurosurg. 2023; 232: e107872.

(Copyright © 2023, Elsevier Publishing)

DOI 10.1016/j.clineuro.2023.107872 PMID 37451088

Abstract

OBJECTIVE: The study aimed to investigate the physical performance, gait, balance, falls efficacy, and step reaction time in individuals with MS.

METHODS: A total of 60 individuals (30 individuals with MS and 30 age and sex-matched healthy controls) were enrolled. Individuals' physical performance was evaluated with the Timed Up and Go Test (TUG) and Five-Times-Sit-to-Stand Test (FTSTS). Activities-specific Balance Confidence (ABC) Scale, 12-item Multiple Sclerosis Walking Scale (MSWS-12v2) and Falls Efficacy Scale International (FES-I) were used to assess the balance, gait and fall efficacy of the participants. Individuals' step reaction time (SRT) was calculated with video-based software. The time between the step command and the first contact of the foot with the ground in the first step was recorded.

RESULTS: The mean age of the individuals with MS and the control group was 38.5 ± 9.4 years and 33.9 ± 11.7 years, respectively. Significant differences existed between the groups in SRT, FES-I, ABC, and FTSTS ($p < 0.05$). There was no significant correlation between SRT with any other parameter ($p > 0.05$). TUG was moderately correlated with MSWS-12 and FES-I ($r(1) = 0.426$, $r(2) = 0.495$, $p < 0.05$). Besides, there was a moderate correlation between ABC with TUG and FTSTS ($r(1) = -0.605$, $r(2) = -0.468$, $p < 0.05$). A high degree correlation was found between MSWS-12 with FES-I and ABC ($r(1) = 0.843$, $r(2) = -0.834$, $p < 0.05$).

CONCLUSION: Individuals with MS have decreased SRTs. However, this condition was not found to be related to physical performance. Further studies should focus on the association of SRT with cognitive and psychosocial parameters.

Language: en

Keywords

Walking; Performance tests; Balance; Falling; Step reaction time

Diagnostic accuracy of frailty screening instruments validated for use among older adults attending emergency departments: a systematic review and meta-analysis

Moloney E, O'Donovan MR, Sezgin D, Flanagan E, McGrath K, Timmons S, O'Caoimh R. *Int. J. Environ. Res. Public Health* 2023; 20(13).

(Copyright © 2023, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/ijerph20136280 **PMID** 37444127

Abstract

Early identification of frailty can prevent functional decline. Although multiple frailty screens exist for use in Emergency Departments (EDs), few are validated against diagnostic standards such as comprehensive geriatric assessment. To examine the diagnostic accuracy of ED screens for frailty, scientific databases were searched for prospective diagnostic accuracy test studies from January 2000 to September 2022. Studies were assessed for risk of bias using QUADAS-C. Psychometric properties were extracted and analysed using R. Six studies involving 1,663 participants describing seven frailty screening instruments (PRISMA-7, CFS, VIP, FRESH, BPQ, TRST, and ISAR), representing 13 unique data points, were included. The mean age of participants ranged from 76 to 86 years. The proportion that was female ranged from 45 to 60%. The pooled prevalence rate of frailty was high at 59%. The pooled estimate for sensitivity was 0.85 (95% CI: 0.76-0.91) versus 0.77 (95% CI: 0.62-0.88) for specificity. Pooled accuracy based on area under the ROC curve was 0.89 (95% CI: 0.86-0.90). Although few studies were found, limiting the ability to conduct a meta-analysis of individual instruments, available frailty screens can accurately diagnose frailty in older adults attending the ED. As specificity was comparatively low, additional assessment may be required to identify those requiring inpatient management or onward community referral. Further study is therefore required.

Language: en

Keywords

emergency department; instrument; frailty; systematic review; screening; meta-analysis; older adult; diagnostic test accuracy; tool

Diagnostic value of protein S100b as predictor of traumatic intracranial haemorrhage in elderly adults with low-energy falls: results from a retrospective observational study

Wania R, Lampart A, Niedermeier S, Stahl R, Trumm C, Reidler P, Kammerlander C, Böcker W, Klein M, Pedersen V. Eur. J. Trauma Emerg. Surg. 2023; ePub(ePub): ePub.

(Copyright © 2023, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s00068-023-02324-7 **PMID** 37442831

Abstract

PURPOSE: The objectives of this study were to analyse the clinical value of protein S100b (S100b) in association with clinical findings and anticoagulation therapy in predicting traumatic intracranial haemorrhage (tICH) and unfavourable outcomes in elderly individuals with low-energy falls (LEF).

METHODS: We conducted a retrospective study in the emergency department (ED) of the LMU University Hospital, Munich by consecutively including all patients aged ≥ 65 years presenting to the ED following a LEF between September 2014 and December 2016 and receiving an emergency cranial computed tomography (cCT) examination. Primary endpoint was the prevalence of tICH. Multivariate logistic regression models and receiver operating characteristics were used to measure the association between clinical findings, anticoagulation therapy and S100b and tICH.

RESULTS: We included 2687 patients, median age was 81 years (60.4% women). Prevalence of tICH was 6.7% (180/2687) and in-hospital mortality was 6.1% (11/180). Skull fractures were highly associated with tICH (odds ratio OR 46.3; 95% confidence interval CI 19.3-123.8, $p < 0.001$). Neither anticoagulation therapy nor S100b values were significantly associated with tICH (OR 1.14; 95% CI 0.71-1.86; OR 1.08; 95% CI 0.90-1.25, respectively). Sensitivity of S100b (cut-off: 0.1 ng/ml) was 91.6% (CI 95% 85.1-95.9), specificity was 17.8% (CI 95% 16-19.6), and the area under the curve value was 0.59 (95% CI 0.54 - 0.64) for predicting tICH.

CONCLUSION: In conclusion, under real ED conditions, neither clinical findings nor protein S100b concentrations or presence of anticoagulation therapy was sufficient to decide with certainty whether a cCT scan can be bypassed in elderly patients with LEF. Further prospective validation is required.

Language: en

Keywords

Anticoagulation therapy; Computed tomography; Low-energy fall; Older adult; Protein S100b; Traumatic intracranial haemorrhage

Effect of a Baduanjin intervention on the risk of falls in the elderly individuals with mild cognitive impairment: a study protocol for a randomized controlled trial

Wu Z, Kuang Y, Wan Y, Shi J, Li S, Xia R, Wan M, Chen S. BMC Complement. Med. Ther. 2023; 23(1): e233.

(Copyright © 2023, Holtzbrinck Springer Nature Publishing Group - BMC)

DOI 10.1186/s12906-023-04050-4 **PMID** 37442990

Abstract

BACKGROUND: Falls are a global public problem and may be an important cause of death in older adults. However, older adults with mild cognitive impairment(MCI) are more likely to fall and suffer more damage than older adults with normal cognitive function, which shows the importance of preventing falls. More and more evidence shows that Baduanjin can improve the balance function of the elderly and reduce the risk of falls in the elderly with MCI, but the mechanism is still unclear. The main purpose of this study is to verify the intervention effect of Baduanjin training on the risk of falls in elderly people with MCI and to elucidate the underlying mechanism of Baduanjin training in reducing the risk of falls in MCI patients.

METHODS: In this prospective study, outcome assessor-blind, three-arm randomized controlled trial, a total of 72 eligible participants will be randomly allocated (1:1:1) into the 12-week Baduanjin exercise intervention (60 min per session, three sessions per week), the 12-week brisk walking group(60 min per session, three sessions per week) or the 12-week health education group. Primary outcome is the Fall-Risk Self-Assessment Questionnaire(FRQ), and secondary outcomes are fall efficacy index, gait assessment, balance function, lower limb muscle strength, cognitive function, activities of daily living(ADL) and MRI scans. In addition to the MRI scans, which will be measured before and after the intervention, other primary and secondary outcomes will be assessed at baseline, 6 weeks, and 12 weeks (at the end of the intervention) and after an additional 12-week follow-up period. The mixed linear model will be conducted to observe the intervention effects.

DISCUSSION: This trial will investigate the effect of Baduanjin exercise on the prevention of falls in elderly individuals with MCI, explore the imaging mechanism of Baduanjin exercise to reduce the risk of falls in elderly individuals with MCI from the perspective of vestibular neural network, and provide strong evidence for Baduanjin exercise to reduce the risk of falls in elderly individuals with MCI, as well as provide new ideas and approaches for the central mechanism of Traditional Chinese Medicine(TRC) rehabilitation methods to intervene in falls in elderly. **TRIAL REGISTRATION:** Chictr.org.cn, ID:

ChiCTR2200057520. Registered on 14 March 2022, <https://www.chictr.org.cn/showproj.html?proj=146592>.

Language: en

Keywords: Falls; Baduanjin; MCI; Randomized controlled trial; RCT protocol

Effects of physical activity interventions on strength, balance and falls in middle-aged adults: a systematic review and meta-analysis

Adams M, Gordt-Oesterwind K, Bongartz M, Zimmermann S, Seide S, Braun V, Schwenk M. Sports Med. Open 2023; 9(1): e61.

(Copyright © 2023, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1186/s40798-023-00606-3 PMID 37466877

Abstract

BACKGROUND: Weak lower body strength and balance impairments are fundamental risk factors for mobility impairments and falls that can be improved by physical activity (PA). Previous meta-analyses have focused on these risk factors in adults aged ≥ 65 years. Yet, the potential of PA for improving these risk factors in middle-aged populations has not been systematically investigated. This systematic review and meta-analysis aim to examine the effect of general and structured PA on lower limb strength, postural balance and falls in middle-aged adults.

METHODS: A computerized systematic literature search was conducted in the electronic databases MEDLINE, CINAHL, Web of Science and Cochrane Library. PA intervention types were classified according to the ProFaNE taxonomy. Randomized controlled trials exploring the effects of PA on strength (e.g., leg press one-repetition-maximum), balance (e.g., single limb stance) and falls (e.g., fall rates) in adults aged 40-60 years were systematically searched and included in a network analysis. Moderator analyses were performed for specific subgroups (age, sex, low PA). The methodological quality of the included studies was assessed using the Physiotherapy Evidence Database (PEDro) Scale.

RESULTS: Out of 7170 articles screened, 66 studies (median PEDro score 5) with 3387 participants were included. Strong, significant effects on muscle strength were found for strength (SMD = 1.02), strength-aerobic (SMD = 1.41), strength-endurance (SMD = 0.92) and water-based (SMD = 1.08) training (52 studies, $I(2) = 79.3\%$). Strength training (SMD = 1.16), strength-aerobic (SMD = 0.98) and 3D training (SMD = 1.31) improved postural balance (30 studies, $I(2) = 88.1\%$). Moderator analyses revealed significant effects of specific intervention types on certain subgroups and subdomains of strength and balance. No studies were found measuring falls.

CONCLUSIONS: Structured PA interventions in middle-aged adults improve strength and balance outcomes related to functional impairments and falls. Strength training increases both strength and balance and can be recommended to prevent age-related functional decline. However, the interpretability of the results is limited due to considerable heterogeneity and the overall low methodological quality of the included studies. Long-term trials are needed to determine the preventive potential of PA on strength, balance and falls. This meta-analysis may inform guidelines for tailored training during middle age to promote healthy aging. Prospero registration: CRD42020218643. Language: en

Keywords: Prevention; Review; Physical activity; Falls; Exercise; Balance; Middle age; Middle-aged; Strength

European position paper on polypharmacy and fall-risk-increasing drugs recommendations in the World Guidelines for Falls Prevention and Management: implications and implementation

van der Velde N, Seppala LJ, Hartikainen S, Kamkar N, Mallet L, Masud T, Montero-Odasso M, van Poelgeest EP, Thomsen K, Ryg J, Petrovic M. Eur. Geriatr. Med. 2023; ePub(ePub): ePub.

(Copyright © 2023, Elsevier Publishing)

DOI 10.1007/s41999-023-00824-8 **PMID** 37452999

Abstract

Falls prevention and management in older adults is a critical global challenge. One of the key risk factors for falls is the use of certain medications. Therefore, to prevent medication-related falls, the following is recommended in the recent World Guidelines for Falls Prevention and Management: (1) assess for fall history and the risk of falls before prescribing potential fall-risk-increasing drugs (FRIDs), (2) use a validated, structured screening and assessment tool to identify FRIDs when performing a medication review, (3) include medication review and appropriate deprescribing of FRIDs as a part of the multifactorial falls prevention intervention, and (4) in long-term care residents, if multifactorial intervention cannot be conducted due to limited resources, the falls prevention strategy should still always include deprescribing of FRIDs. In the present statement paper, the working group on medication-related falls of the World Guidelines for Falls Prevention and Management, in collaboration with the European Geriatric Medicine Society (EuGMS) Task and Finish group on FRIDs, outlines its position on how to implement and execute these recommendations in clinical practice. Preferably, the medication review should be conducted as part of a comprehensive geriatric assessment to produce a personalized and patient-centered assessment. Furthermore, the major pitfall of the published intervention studies so far is the suboptimal implementation of medication review and deprescribing. For the future, it is important to focus on gaining which elements determine successful implementation and apply the concepts of implementation science to decrease the gap between research and practice.

Language: en

Keywords

Implementation; Deprescribing; Adverse drug reactions; Fall-risk-increasing drugs; Falls prevention; Medication review; Polypharmacy

Exergames in older adult community centers and nursing homes to improve balance and minimize the risk of falls in older adults: a systematic review and meta-analysis

Leal JC, Belo VS, Santos IM, Ferreira RV, de Melo SN, da Silva ES. Healthcare (Basel) 2023; 11(13): e1872.

(Copyright © 2023, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/healthcare11131872 **PMID** 37444706

Abstract

There is a substantial gap in our knowledge regarding the efficacy of exergames on the reduction of fall risk in older adults. This systematic review analyzes the findings of clinical trials describing the efficacy of exergames to improve balance or reduce the risk of falls in individuals above 60 years of age who are residents in community centers or nursing homes. We searched Google Scholar, PubMed, and Embase up to January 2023. Initially, 52,294 records were screened. After applying the inclusion and exclusion criteria, 20 studies were included in this systematic review. Meta-analyses revealed statistically significant reductions in the risk of falls and improvements in balance. Exergaming tended to produce positive benefits according to the results obtained using different instruments (TUG, PPA, BBS, and others), control groups, and times of intervention. Nevertheless, a substantial proportion of studies exhibited a high risk of bias and only one had a long follow-up period. Although a large body of evidence supports the view that exergaming is suitable for reducing fall risk and improving balance in older adults, some gaps remain in our knowledge about such benefits.

Language: en

Keywords

exergame; gait function; health benefits; older population; physical exercise

Factors associated with falls among hospitalized and community-dwelling older adults: the APPCARE study

Bally ELS, Ye L, van Grieken A, Tan SS, Mattace-Raso F, Procaccini E, Alhambra-Borrás T, Raat H. *Front. Public Health* 2023; 11: e1180914.

(Copyright © 2023, Frontiers Editorial Office)

DOI 10.3389/fpubh.2023.1180914 **PMID** 37457268

Abstract

BACKGROUND: Falls are a leading cause of disability. Previous studies have identified various risk factors for falls. However, contemporary novel research is needed to explore these and other factors associated with falls among a diverse older adult population. This study aims to identify the factors associated with falls among hospitalized and community-dwelling older adults.

METHODS: Cross-sectional data from the 'Appropriate care paths for frail elderly people: a comprehensive model' (APPCARE) study were analyzed. The study sample consisted of hospitalized and community-dwelling older adults. Falling was assessed by asking whether the participant had fallen within the last 12 months. Multivariable logistic regression models were used to evaluate associations between socio-demographic characteristics, potential fall risk factors and falls.

RESULTS: The sample included 113 hospitalized (mean age = 84.2 years; 58% female) and 777 community-dwelling (mean age = 77.8 years; 49% female) older adults. Among hospitalized older adults, loneliness was associated with an increased risk of falls. Associations between female sex, secondary education level or lower, multimorbidity, a higher score on limitations with activities of daily living (ADL), high risk of malnutrition and falling were found among community-dwelling participants.

CONCLUSION: The results of this study confirm the multi-factorial nature of falling and the complex interaction of risk factors. Future fall prevention programs could be tailored to the needs of vulnerable subpopulations at high risk for falls.

Language: en

Keywords

Aged; Humans; Female; Male; Cross-Sectional Studies; prevention; Aged, 80 and over; risk factors; older adults; aging; Activities of Daily Living; *Accidental Falls/prevention & control; *Independent Living; accidental falls; Frail Elderly

Fear of falling as a mediator in the association between social frailty and health-related quality of life in community-dwelling older adults

Wu KY, Chen DR, Chan CC, Yeh YP, Chen HH. BMC Geriatr. 2023; 23(1): e421.

(Copyright © 2023, Holtzbrinck Springer Nature Publishing Group - BMC)

DOI 10.1186/s12877-023-04144-1 **PMID** 37430231

Abstract

BACKGROUND: Social frailty is associated with Fear of Falling (FoF) and health-related quality of life (HrQoL). However, how social frailty simultaneously influences FoF and HrQoL remains unclear. The study aims to understand the links between social frailty, FoF, and HrQoL in older adults and the mediating role of FoF in the relations between social frailty and HrQoL.

METHODS: In this cross-sectional survey, 1,933 community-dwelling older adults from Changhua County, Taiwan, were interviewed using a self-administrated questionnaire. In total, 1,251 participants with complete data were included for analysis. Data were analyzed using the SPSS PROCESS macro. A simple mediation was employed using social frailty as the independent variable, FoF as the mediator variable, and HrQoL as the outcome variable.

RESULTS: Social frailty was associated with HrQoL and indirectly with HrQoL through FoF, and FoF was directly associated with HrQoL. Of the 5-item social frailty index, "going out less frequently" was correlated with HrQoL and indirectly with HrQoL through FoF. Individuals who felt unhelpful toward family or friends had the worst physical HrQoL and did not talk to someone daily had the most negative influence on mental HrQoL.

CONCLUSIONS: Social frailty can directly and indirectly, through FoF decrease HrQoL. It also emphasizes the importance of social connectivity in reducing the risk of falls. This study points to the need for social connectivity and fall prevention programs as essential components of strategies to enhance the health and well-being of community-dwelling older adults.

Language: en

Keywords

Health-related quality of life; Community-dwelling older adults; Fear of falling; Social frailty

Identifying priorities for balance interventions through a participatory co-design approach with end-users

Benn NL, Jervis-Rademeyer H, Benson K, Chan K, Lee JW, Inness EL, Wolfe DL, Alizadeh-Meghbrazi M, Masani K, Musselman KE. BMC Neurol. 2023; 23(1): e266.

(Copyright © 2023, Holtzbrinck Springer Nature Publishing Group - BMC)

DOI 10.1186/s12883-023-03312-5 PMID 37442947

Abstract

BACKGROUND: Most individuals living with spinal cord injuries/diseases (SCI/D) or stroke experience at least one fall each year; hence, the development of interventions and technologies that target balance control is needed. The purpose of this study was to identify and explore the priorities for balance-focused interventions and technologies from the perspectives of end-users to assist with the design of an intervention that combines functional electrical stimulation (FES) with visual feedback training for standing balance.

METHODS: Two individuals with SCI/D, one individual with stroke, two physical therapists (PT) and one hospital administrator were recruited. Participants attended three focus group meetings that followed a participatory co-design approach. A semi-structured interview guide, developed from the FAME (Feasibility, Appropriateness, Meaningfulness, Effectiveness, Economic Evidence) framework, was used to lead the discussion, querying participants' experiences with balance deficits and interventions, and FES. Meetings were audio-recorded and transcribed verbatim. An iterative and reflexive inductive thematic analysis was applied to the transcripts by three researchers.

RESULTS: Four themes were identified: (1) Balance is meaningful for daily life and rehabilitation. Participants acknowledged various factors influencing balance control and how balance deficits interfered with participation in activities. End-users stressed the importance of continuing to work on one's balance after discharge from hospital-based rehabilitation. (2) Desired characteristics of balance interventions. Participants explained that balance interventions should be tailored to an individual's unique needs and goals, relevant to their lives, balance their safety and risk, and be engaging. (3) Prior experiences with FES to inform future therapeutic use. Participants with stroke or SCI/D described initial apprehension with FES, but experienced numerous benefits that motivated them to continue with FES. Challenges with FES were mentioned, including wires, cost, and time of set up. (4) Potential role of FES in balance interventions. Participants felt that FES would complement balance interventions; however, they had not experienced this combination of therapies previously.

CONCLUSIONS: End-users described how their experiences with balance deficits, rehabilitation, and FES informed their priorities for balance interventions. The findings inform the design and implementation of future balance interventions for individuals with SCI/D or stroke, including an intervention involving FES and visual feedback training.

Language: en

Keywords: Balance control; Spinal cord injury; Rehabilitation; Functional electrical stimulation; Healthcare professionals; Participatory research; Qualitative research; Stroke

Incidence and risk factors of falls among older people in nursing homes: systematic review and meta-analysis

Shao L, Shi Y, Xie X, Wang Z, Wang ZA, Zhang JE. J. Am. Med. Dir. Assoc. 2023; ePub(ePub): ePub.

(Copyright © 2023, Lippincott Williams and Wilkins)

DOI 10.1016/j.jamda.2023.06.002 **PMID** 37433427

Abstract

OBJECTIVES: Falls are common among older people in nursing homes, and the assessment of fall risk factors is critical for the success of fall prevention interventions. This study aimed to systematically assess the incidence and risk factors of falls in older people living in nursing homes.

DESIGN: Systematic review and meta-analysis. **SETTING AND PARTICIPANTS:** Older people living in nursing homes.

METHODS: Literature searches were conducted independently by 2 researchers in 8 databases. Qualities of included studies were assessed using the Newcastle-Ottawa Scale. The prevalence and risk factors of falls were analyzed with a random effects model. All analyses were performed by R software, x64 4.2.2.

RESULTS: In 18 prospective studies addressing older adults living in nursing homes, the pooled incidence of falls was 43% (95% CI 38%-49%), and the meta-regression analysis indicated that the incidence generally decreased from 1998 to 2021. The following risk factors had a strong association with all falls: fall history, impaired ADL performance, insomnia, and depression. Risk factors with low to moderate correlation were vertigo, walking aids, poor balance, use of antidepressants, use of benzodiazepines, use of antipsychotics, use of anxiolytics, polypharmacy, dementia, unsteady gait, hearing problems, and gender (being male). Having bed rails was identified as a protective environmental factor.

CONCLUSIONS AND IMPLICATIONS: The results from our meta-analysis suggest that the incidence of falls of older adults living in nursing homes is high, and the risk factors for falls are various. Assessments of balance and mobility, medical condition, and use of medications should be included as key elements in the fall risk assessments of older people in nursing homes. Environmental risk factors still need to be explored in future studies. Tailored fall prevention strategies should be implemented by addressing the modifiable risk factors.

Language: en

Keywords

incidence; Falls; meta-analysis; risk factor; nursing home

Interventions to reduce falls in community-dwelling adults with intellectual disability: a systematic review

Lalor A, Callaway L, Koritsas S, Curran-Bennett A, Wong R, Zannier R, Hill K. J. *Intellect. Disabil. Res.* 2023; ePub(ePub): ePub.

(Copyright © 2023, John Wiley and Sons)

DOI 10.1111/jir.13066 **PMID** 37435852

Abstract

BACKGROUND: People with intellectual disability have a high risk of falls and falls-related injuries. Although people with intellectual disability are at increased risk of falls, there is a need to better understand the efficacy of interventions that can help reduce falls and address risk factors in this population. This systematic review aimed to evaluate the type, nature and effectiveness of interventions undertaken to reduce falls with community-dwelling adults with intellectual disability and the quality of this evidence.

METHOD: Four electronic databases were searched: Ovid MEDLINE, PsycINFO, CINAHL Plus and the Cochrane Library. Studies were included if they involved people aged 18 years or over, at least 50% of study participants had intellectual disability, participants were community-dwelling, and the study evaluated any interventions aiming to reduce falls. Study quality was assessed using the National Institutes of Health study quality assessment tools. Reporting of the review followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

RESULTS: Seven studies were eligible for review, with a total of 286 participants and mean age of 50.4 years. As only one randomised trial was identified, a narrative synthesis of results was undertaken. Five studies evaluated exercise interventions, one evaluated a falls clinic programme, and one evaluated stretch fabric splinting garments.

METHODological quality varied (two studies rated as good, four as fair, and one as poor). Exercise interventions varied in terms of exercise type and dosage, frequency and intensity, and most did not align with recommendations for successful falls prevention exercise interventions reported for older people. While the majority of studies reported reduced falls, they differed in methods of reporting falls, and most did not utilise statistical analyses to evaluate outcomes.

CONCLUSION: This review identified a small number of falls prevention intervention studies for people with intellectual disability. Although several studies reported improvements in fall outcomes, ability to draw conclusions about intervention effectiveness is limited by small sample sizes and few studies. Further large-scale research is required to implement and evaluate falls prevention interventions specifically for adults with intellectual disability. Language: en

Keywords

Falls; Exercise; Intellectual disability; Intervention studies

Investigation of injuries sustained from falls down stairs

Legaspi C, Hickey T, Pickup M, Han Y. J. Forensic Leg. Med. 2023; 98: e102561.

(Copyright © 2023, Elsevier Publishing)

DOI 10.1016/j.jflm.2023.102561 **PMID** 37453343

Abstract

Interpretation of injuries sustained from fatal falls involving stairs is a challenge encountered by death investigation teams regularly. The high incidence of this occurrence is because stairs are a common entity in society. Without a medical evaluation of an individual's injuries, it is difficult to determine whether a fall from stairs contributed to how the individual died.

The purpose of this study is to characterize the injuries of individuals that were sustained from a confirmed fatal fall involving stairs within our jurisdiction (Ontario, Canada) during 2014-2020. In a retrospective cross-sectional observation study, we examined 159 cases using both postmortem imaging and routine autopsy approaches. Our findings showed the head was the most common anatomical region injured. The most common injuries observed in the head included skull fracture(s) (most commonly the temporal, parietal and occipital bones), subarachnoid hemorrhages, and brain contusions. Anatomical regions less commonly injured included the extremities, thorax, and pelvis. This study identified an association between the presence of intracranial hemorrhage and those 65-years-old and younger; brain injury in the absence of pre-existing medical conditions; and brain injury for individuals that had a blood alcohol concentration between 0 and 80mg/100 mL. Extracranial skeletal trauma, as defined by skeletal trauma apart from the head region, was observed in 62% of cases. Extracranial skeletal trauma was also found to be strongly associated with individuals over 65-years-old.

Overall, our study affirms that traumatic head injury is the primary cause of death from falls down stairs. Also, we provide information on rare injuries from falls down stairs, and indirectly, identify which body locations appear protected from injury during falls. These findings may aid in the interpretation of whether injuries in this setting are compatible with accidental or non-accidental trauma.

Language: en

Keywords

Injuries; Autopsy; Death; Accidental falls; Head trauma; Stairs

Investigation of the relationship between BPPV with anxiety, sleep quality and falls

Cengiz DU, Demir, Demirel S, Can Çolak S, Emekçi T, Bayındır T. Turk. Arch. Otorhinolaryngol. 2022; 60(4): 199-205.

(Copyright © 2022, Galenos Publishing)

DOI 10.4274/tao.2022.2022-8-6 PMID 37456598

Abstract

OBJECTIVE: To investigate the effects of dizziness on sleep quality and psychological status in patients with benign paroxysmal positional vertigo (BPPV) and to evaluate its relationship with falls.

METHODS: A Demographic Data Form, a Visual Vertigo Analog Scale, the Falls Efficacy Scale - International (FES-I), the Hospital Anxiety and Depression Scale (HADS), and the Pittsburgh Sleep Quality Index (PSQI) were administered in 102 individuals diagnosed with BPPV by videonystagmography test. The same scales were applied to 75 healthy volunteers as the control group, and the two groups were compared. The BPPV group was divided into two groups as posterior canal and lateral canal BPPV. These two groups were compared among themselves and with the control group.

RESULTS: A statistically significant difference was found between the BPPV and control groups, the lateral canal BPPV and posterior canal BPPV groups, the lateral canal BPPV and control groups, and the posterior canal BPPV and control groups in terms of total scores of the PSQI, the FES-I, and the HADS ($p < 0.001$). In the regression model, the FES-I score was fully explained by the PSQI and HADS scores ($p < 0.001$).

CONCLUSION: BPPV significantly affects sleep quality, psychological state, and the risk of fall. The negative effects of BPPV restrict daily living activities, affect the prognosis of the disease, and increase the risk of falling. Considering that psychiatric issues and sleep problems increase the risk of falling in individuals with BPPV, counseling services on this issue would reduce the incidence of falls and related injuries.

Language: en

Keywords

falls; anxiety; Benign paroxysmal positional vertigo; sleep quality

Obese adolescents have higher risk for severe lower extremity fractures after falling

González N, Nahmias J, Schubl S, Swentek L, Smith BR, Nguyen NT, Grigorian A. *Pediatr. Surg. Int.* 2023; 39(1): e235.

(Copyright © 2023, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s00383-023-05524-9 **PMID** 37466766

Abstract

INTRODUCTION: Reports vary on the impact of obesity on the incidence of lower extremity fractures after a fall. We hypothesized that obese adolescents (OA) presenting after a fall have a higher risk of any and severe lower extremity fractures compared to non-OAs.

METHODS: A national database was queried for adolescents (12-17 years old) after a fall. Primary outcome included lower extremity fracture. Adolescents with a body mass index (BMI) ≥ 30 (OA) were compared to adolescents with a BMI < 30 (non-OA).

RESULTS: From 20,264 falls, 2523 (12.5%) included OAs. Compared to non-OAs, the rate of any lower extremity fracture was higher for OAs (51.5% vs. 30.7%, $p < 0.001$). This remained true for lower extremity fractures at all locations (all $p < 0.05$). After adjusting for sex and age, associated risk for any lower extremity fracture (OR 2.41, CI 2.22-2.63, $p < 0.001$) and severe lower extremity fracture (OR 1.31, CI 1.15-1.49, $p < 0.001$) was higher for OAs. This remained true in subset analyses of ground level falls (GLF) and falls from height (FFH) (all $p < 0.05$).

CONCLUSIONS: Obesity significantly impacts adolescents' risk of all types of lower extremity fractures after FFH or GLF. Hence, providers should have heightened awareness for possible lower extremity fractures in OAs. **LEVEL OF EVIDENCE:** IV.

Language: en

Keywords

Falls; Adolescent obesity; Lower extremity fractures

Older people living alone: a predictive model of fall risk

Lage I, Braga F, Almendra M, Meneses F, Teixeira L, Araujo O. *Int. J. Environ. Res. Public Health* 2023; 20(13).

(Copyright © 2023, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/ijerph20136284 **PMID** 37444131

Abstract

Falls in older people are a result of a combination of multiple risk factors. There are few studies involving predictive models in a community context. The aim of this study was to determine the validation of a new model for predicting fall risk in older adults (65+) living alone in community dwellings ($n = 186$; $n = 117$) with a test-retest reliability study. We consider in the predictive model the significant factors emerged from the bivariate analysis: age, zone, social community resources, physical exercise, self-perception of health, difficulty to keep standing, difficulty to sit and get up from a chair, strain to see, use of technical devices, hypertension and number of medications. The final model explained 28.5% of the risk of falling in older adults living alone in community dwellings. The AUC = 0.660 (se = 0.065, IC 95% 0.533-0.787, $p = 0.017$). The predictive model developed revealed a satisfactory discriminatory performance of the model and can contribute to clinical practice, with respect to the evaluation of risk of falling in this frailty group and preventing falls.

Language: en

Keywords

nursing; falls prediction; living alone; older people; risk of falling

Position statement: Exercise guidelines for osteoporosis management and fall prevention in osteoporosis patients

Bae S, Lee S, Park H, Ju Y, Min SK, Cho J, Kim H, Ha YC, Rhee Y, Kim YP, Kim C. J. Bone Metab. 2023; 30(2): 149-165.

(Copyright © 2023, Korean Society for Bone and Mineral Research)

DOI 10.11005/jbm.2023.30.2.149 **PMID** 37449348

Abstract

BACKGROUND: The effectiveness of exercise for improving osteoporosis and fall prevention in patients diagnosed with osteoporosis or osteopenia has not been fully summarized. The Korean Society for Bone and Mineral Research and the Korean Society of Exercise Physiology has developed exercise guidelines for patients with osteoporosis or osteopenia and provide evidence-based recommendations.

METHODS: A systematic review identified randomized controlled trials (RCT) assessing the effect of resistance, impact, balance, aerobic training, and physical activity in osteoporosis and osteopenia on bone quality, physical performance, quality of life, and fall prevention. PubMed, Embase, KoreaMed, and RISS were searched from January 2000 to August 2022. Ten key questions were established to review the evidence and formulate recommendations.

RESULTS: The 50 RCTs reported that even with osteoporosis and osteopenia, resistance and impact training consistently maximized bone strength, improved body strength and balance, and eventually reduced fall incidences. Resistance exercise combining 3 to 10 types of free weight and mechanical exercise of major muscle groups performed with an intensity of 50% to 85% 1-repetition maximum, 5 to 12 repetitions/set, 2 to 3 days/week, for 3 to 12 months is recommended. Impact exercises such as jumping chin-ups with drop landings and jump rope performed 50 jumps/session for at least 6 months with 3 or more days/week are recommended.

CONCLUSIONS: A multi-component exercise mainly comprised of resistance and impact exercise seems to be an effective strategy to attenuate the risk factors of osteoporosis and osteopenia. The integration of exercise guidelines and individualized exercise plans has significant potential to reduce the morbidity and mortality of osteoporosis.

Language: en

Keywords

Exercise; Accidental falls; Bone density; Osteoporosis

Psychometric properties of Fullerton Advanced Balance Scale in patients with stroke

Kızılkaya E, Köse N, Ünsal Delialioğlu S, Karakaya J, Fil Balkan A. Top. Stroke Rehabil. 2023; ePub(ePub): ePub.

(Copyright © 2023, Informa - Taylor and Francis Group)

DOI 10.1080/10749357.2023.2235800 PMID 37463033

Abstract

BACKGROUND: Patients experience falls frequently after stroke. Preserved or acquired balance skills decrease fall risk and improve independence. Feasibility of Fullerton Advanced Balance Scale (FAB) has been shown in balance assessment in some neurological diseases except stroke.

OBJECTIVES: The purpose of this study was to investigate the reliability and validity of Turkish version of FAB (FAB-T) in patients with stroke (PwS).

METHODS: This cross-sectional study included 51 PwS (60.64 ± 7.66 years). Reliability analyses were conducted with Cronbach's alpha, intraclass correlation coefficient (ICC), and Spearman correlation analysis. Intra-rater and inter-rater reliability were assessed with three raters. FAB-T, Stroke Rehabilitation Assessment of Movement (STREAM), Brunnstrom Recovery Stages (BRS), Barthel Index (BI), and 36-Item Short Form Health Survey (SF-36) were used for convergent validity. Correlations of FAB-T with Berg Balance Scale (BBS) and Mini-Balance Evaluation Systems Test (Mini-BESTest) were measured for concurrent validity. Spearman correlation analysis was used for convergent and concurrent validity. For predictive validity patients' self-reports of falling were analyzed with ROC.

RESULTS: Intra-rater (ICC = 0.998) and inter-rater reliability (ICCs = 0.984; 0.984; 0.990), and internal consistency (Cronbach's alpha = 0.930) were excellent. FAB-T had good correlations with STREAM ($\rho = 0.677$) and BI ($\rho = 0.628$), moderate correlations with BRS ($\rho = 0.504$ and $\rho = 0.579$) and physical function of SF-36 ($\rho = 0.436$). FAB-T excellently correlated with Mini-BESTest and BBS ($\rho = 0.928$ and $\rho = 0.942$). The cutoff score of FAB-T was determined to be 21.5 points, with sensitivity of 84% and specificity of 61% (AUC = 0.749).

CONCLUSIONS: FAB-T is a reliable and valid balance assessment tool with an acceptable accuracy of fall prediction in PwS.

Language: en

Keywords

reliability; validity; stroke; Fullerton Advanced Balance Scale; rehabilitation

Refining and psychometric evaluation of the falling risk assessment tool in ophthalmology inpatients

Li M, Li C, Huang Q, Zhou H, Xie L, Chen F, Lin S, Yang J. Nurs. Open 2023; ePub(ePub): ePub.

(Copyright © 2023, John Wiley and Sons)

DOI 10.1002/nop2.1945 **PMID** 37458186

Abstract

AIMS: The aim of this study was to refine the Falling Risk Assessment Tool in Ophthalmology Inpatients (FRAT) and assess its psychometric properties.

DESIGN: A cross-sectional design was used.

METHODS: A convenience sample of 730 patients in the ophthalmology department was recruited in a level A tertiary hospital in Guangdong Province from July 2021 to January 2022. Data were analysed using item analysis, interrater reliability, content validation, internal consistency reliability and exploratory factor analysis.

RESULTS: Five factors were extracted, accounting for 63.039% of the variance. The interrater reliability of the tool was 0.97. Cronbach's α was 0.658. The I-CVI was 0.75-1.00, the S-CVI/UA was 0.95 and the adjusted mean values of Kappa for indicators ranged from 0.72 to 1.00, as evaluated by the expert group. The FRAT showed satisfactory reliability and validity, and can be used to measure the fall risk assessment in ophthalmology inpatients.

PATIENT OR PUBLIC CONTRIBUTION: After explaining the purpose, the patients received our fall risk assessment and answered the corresponding questionnaire questions.

Language: en

Keywords

risk assessment; reliability; validity; falls; instrument development; ophthalmology inpatients

Reliability of the 44-question Home Fall Hazard Assessment Tool and personal characteristics associated with home hazards among the Thai elderly

Wittayapun Y, Nawarat J, Lapmanee S, Mackenzie L, Lektip C. F1000Res. 2023; 12: e8.

(Copyright © 2023, F1000 Research)

DOI 10.12688/f1000research.126690.3 **PMID** 37448858

Abstract

BACKGROUND: The 44-question Thai Home Fall Hazard Assessment Tool (Thai-HFHAT) was developed to assist healthcare professionals in identifying the risk of falls among community-dwelling older adults from their home environment. However, the reliability of this tool has not been studied. This study aimed to examine the reliability of the 44-question Thai-HFHAT and determine the demographic characteristics associated with home hazards.

METHODS: A descriptive cross-sectional study design was used to evaluate inter-rater reliability. The participants in this study were 51 older people from various types of Thai houses: a one-story elevated house, a one-story non-elevated house, and a house with two or more floors, 51 caregivers of older patients, and 5 village health volunteers (VHV). A prospective design was used to evaluate test-retest reliability with older people at different times in their homes. All participants answered 44 Thai-HFHAT questions to determine inter-rater and test-retest reliabilities. The reliabilities were analyzed using an intra-class correlation coefficient (ICC). Demographic characteristics including sex, occupation, and education were used to identify the factors affecting home hazards, and linear regression was used to analyze.

RESULTS: The ICC of inter-rater reliability of the 44-question Thai-HFHAT was 0.74 (95% CI: 0.57-0.84) and the test-retest reliability was 0.80 (95% CI: 0.64-0.88) for the older adults, 0.80 (95% CI: 0.65-0.89) for the caregivers and 0.70 (95% CI: 0.477-0.83) for the VHV. In demographic variables, personal business career and education level (grades 1-3) had significant relations with the total number of home hazards in the 44-questions Thai-HFHAT.

CONCLUSIONS: The 44-question Thai-HFHAT is suitable for home hazard assessment among older adults in Thailand. Further studies are needed to investigate changes in the house environment after using the 44-question Thai-HFHAT to determine which changes can reduce fall risk.

Language: en

Keywords

prevention; elderly; reliability; falling; hazard control

Shared-medical appointment for screening and risk assessment for fall prevention

Moran R, Ramirez M, Woods G, Hofflich H, Wing Ms D, Nichols J. Gerontol. Geriatr. Med. 2023; 9: e23337214231186460.

(Copyright © 2023, The Author(s), Publisher SAGE Publishing)

DOI 10.1177/23337214231186460 **PMID** 37435005

Abstract

BACKGROUND: The median age of Americans is rising and fall risk increases with age. While the causes of falls are multifactorial, falls risk can be reduced. Only a small percentage of older-adults report being asked about fall risk or falls. The CDC has initiated a Stopping Elderly Accidents, Deaths and Injuries (STEADI) toolkit, but penetration into practice has been slow. To address this, we implemented a Falls Prevention Shared Medical Appointment (SMA) at an academic internal medicine clinic.

METHODS: Patients were referred to the SMA and scheduled per their preference virtually or in-person. Patients attended a nurse visit for appropriate fallrisk related screening, followed by the SMA with two physicians for review of medical history, fall screening results and implementation of fall reduction strategies. Follow-up survey of the patients assessed program effectiveness.

RESULTS: Fifty-two patients were seen/assessed between November 2021 and February 2023 with SMAs ranging from 3 to 5 patients with an average age of 77 (\pm 6.7). Questionnaire self-reported risk factors, self-reported strength, and polypharmacy were associated with objective markers of increased fall risk. Survey results indicate acceptability of this model.

CONCLUSION: Falls prevention SMAs can be effective. More work is needed to further delineate and refine cohort selection.

Language: en

Keywords

preventive medicine; geriatrics; falls; primary care; screening

Standing blood pressure and risk of falls, syncope, coronary heart disease, and mortality

Kondo JK, Earle W, Turkson-Ocran RAN, Ngo LH, Cluett JL, Lipsitz LA, Daya NR, Selvin E, Lutsey PL, Coresh J, Windham BG, Kendrick KN, Juraschek SP. Am. J. Hypertens. 2023; ePub(ePub): ePub.

(Copyright © 2023, Elsevier Publishing)

DOI 10.1093/ajh/hpad064 **PMID** 37458702

Abstract

BACKGROUND: ACC/AHA guidelines caution against the use of antihypertensive therapy in the setting of low standing systolic BP (SBP) <110 mmHg due to unclear benefits.

METHODS: The Atherosclerosis Risk in Communities (ARIC) Study measured supine and standing SBP in adults aged 45-64 years between 1987-1989. We used Cox regression to evaluate the associations of low standing SBP (<110 mmHg) with risk of falls, syncope, coronary heart disease (CHD), and mortality through December 31, 2019. Falls and syncope were ascertained by hospitalization and outpatient claims; CHD events were adjudicated. Associations were examined overall and in strata of hypertension stage, 10-year atherosclerotic cardiovascular disease (ASCVD) risk, age, and sex.

RESULTS: Among 12,467 adults followed a median of 24 years (mean age at enrollment 54.1±5.8 years, 55% women, 26% Black adults), 3000 (24%) had a standing SBP <110 mmHg. A standing SBP <110 mmHg compared to standing SBP ≥110 mmHg was not significantly associated with falls or syncope, and was associated with a lower risk of CHD events and mortality with HRs of 1.02 (95% CI 0.94, 1.11), 1.02 (0.93, 1.11), 0.88 (0.80, 0.97), and 0.91 (0.86, 0.97), respectively. There were no clinically meaningful differences when stratified by hypertension stage, 10-year ASCVD risk, age, and sex.

CONCLUSIONS: In this community-based population, low standing SBP was common and not significantly associated with falls or syncope, but was associated with a lower risk of CHD and mortality. These findings do not support screening for low standing BP as a risk factor for adverse events.

Language: en

Keywords

Mortality; Falls; Syncope; Coronary Heart Disease; Standing Blood Pressure

The association of cognitive frailty and the risk of falls among older adults: a systematic review and meta-analysis

Wang S, Wang M, Leung ISH, Ge S, Xu X, Chen S, Yin Y. *Int. J. Nurs. Pract.* 2023; ePub(ePub): ePub.

(Copyright © 2023, John Wiley and Sons)

DOI 10.1111/ijn.13181 **PMID** 37435848

Abstract

BACKGROUND: Falls lead to numerous negative health outcomes and jeopardize the physical function and quality of life in older adults. Cognitive impairment and physical frailty were found to be associated with the risk of falls, but there was no systematic review that estimated the association between cognitive frailty and the risk of falls.

METHODS: A systematic literature search of the cross-sectional, cohort, and case-control studies in Cochrane library, Scopus, CINAHL, EMBASE and PsycINFO was conducted on 3 September 2021. Study quality was assessed by using the Joanna Briggs Institute critical appraisal tool. A random effects meta-analysis was performed to estimate the odds ratio of the incidence of falls in older adults with cognitive frailty.

RESULTS: Seven studies were included. The overall quality of the included studies was acceptable. The meta-analysis of cohort studies showed older adults aged 60 and above with cognitive frailty had a pooled odds ratio of 1.45 (95% confidence interval 1.30, 1.61) for at least one fall compared with those without cognitive frailty. The meta-analysis of cross-sectional studies showed that the odds of older adults with cognitive frailty experiencing at least one fall was 1.64 times (95% confidence interval 1.51, 1.79) higher than those without cognitive frailty.

CONCLUSION: The association between cognitive frailty and the risk of falls is statistically significant. Timely detection of cognitive frailty is essential especially in the community nursing level for preventing falls.

Language: en

Keywords

falls; systematic review; cognitive frailty; meta-analysis; nursing

The association of pain with incident falls in people with chronic obstructive pulmonary disease: evidence from the English Longitudinal Study of Ageing

Loughran KJ, Tough D, Ryan CG, Wellburn S, Martin D, Dixon J, Harrison SL. *Int. J. Environ. Res. Public Health* 2023; 20(13).

(Copyright © 2023, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/ijerph20136236 **PMID** 37444084

Abstract

People with chronic obstructive pulmonary disease (COPD) have a higher prevalence of pain and a greater risk of falls than their healthy peers. As pain has been associated with an increased risk of falls in older adults, this study investigated the association between pain and falls in people with COPD compared to healthy controls. Data from the English Longitudinal Study of Ageing were used to establish an association between pain and falls when modelled with a generalised ordinal logistic regression and adjusted for sex, age, wealth, and education (complete case analysis only; $n = 806$ COPD, $n = 3898$ healthy controls). The odds were then converted to the predicted probabilities of falling. The predicted probability of falling for people with COPD was greater across all pain categories than for healthy controls; for COPD with (predicted probability % [95%CI]), no pain was 20% [17 to 25], with mild pain was 28% [18 to 38], with moderate pain was 28% [22 to 34] with severe pain was 39% [30 to 47] and for healthy controls with no pain was 17% [16 to 18], mild pain 22% [18 to 27], moderate pain 25% [20 to 29] and severe pain 27% [20 to 35]. The probability of falling increased across pain categories in individuals with COPD, with the most severe pain category at a nearly 40% probability of falling, indicating a potential interaction between COPD and pain.

Language: en

Keywords

falls; pain; chronic obstructive pulmonary disease

The casual association inference for the chain of falls risk factors-falls-falls outcomes: a Mendelian randomization study

Wu JX, Deng FY, Lei SF. Healthcare (Basel) 2023; 11(13): e1889.

(Copyright © 2023, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/healthcare11131889 PMID 37444723

Abstract

Previous associations have been observed not only between risk factors and falls but also between falls and their clinical outcomes based on some cross-sectional designs, but their causal associations were still largely unclear. We performed Mendelian randomization (MR), multivariate Mendelian randomization (MVMR), and mediation analyses to explore the effects of falls. Our study data are mainly based on White European individuals (40-69 years) downloaded from the UK Biobank. MR analyses showed that osteoporosis ($p = 0.006$), BMI ($p = 0.003$), sleeplessness ($p < 0.001$), rheumatoid arthritis ($p = 0.001$), waist circumference ($p < 0.001$), and hip circumference ($p < 0.001$) have causal effects on falls. In addition, for every one standard deviation increase in fall risk, the risk of fracture increased by 1.148 ($p < 0.001$), the risk of stroke increased by 2.908 ($p = 0.003$), and a 1.016-fold risk increase in epilepsy ($p = 0.009$). The MVMR found that sleeplessness is an important risk factor for falls. Finally, our mediation analyses estimated the mediation effects of falls on the hip circumference and fracture ($p < 0.001$), waist circumference and epilepsy ($p < 0.001$), and sleeplessness and fracture ($p = 0.005$). Our study inferred the causal effects between risk factors and falls, falls, and outcomes, and also constructed three causal chains from risk factors \rightarrow falls \rightarrow falls outcomes.

Language: en

Keywords

falls; causal relationship; Mendelian randomization

The perceived control model of falling: developing a unified framework to understand and assess maladaptive fear of falling

Ellmers TJ, Wilson MR, Kal EC, Young WR. Age Ageing 2023; 52(7).

(Copyright © 2023, Oxford University Press)

DOI 10.1093/ageing/afad093 **PMID** 37466642

Abstract

BACKGROUND: fear of falling is common in older adults and can have a profound influence on a variety of behaviours that increase fall risk. However, fear of falling can also have potentially positive outcomes for certain individuals. Without progressing our understanding of mechanisms underlying these contrasting outcomes, it is difficult to clinically manage fear of falling.

METHODS: this paper first summarises recent findings on the topic of fear of falling, balance and fall risk-including work highlighting the protective effects of fear. Specific focus is placed on describing how fear of falling influences perceptual, cognitive and motor process in ways that might either increase or reduce fall risk. Finally, it reports the development and validation of a new clinical tool that can be used to assess the maladaptive components of fear of falling.

RESULTS: we present a new conceptual framework-the Perceived Control Model of Falling-that describes specific mechanisms through which fear of falling can influence fall risk. The key conceptual advance is the identification of perceived control over situations that threaten one's balance as the crucial factor mediating the relationship between fear and increased fall risk. The new 4-item scale that we develop-the Updated Perceived Control over Falling Scale (UP-COF)-is a valid and reliable tool to clinically assess perceived control.

CONCLUSION: this new conceptualisation and tool (UP-COF) allows clinicians to identify individuals for whom fear of falling is likely to increase fall risk, and target specific underlying maladaptive processes such as low perceived control

Language: en

Keywords

anxiety; older people; activity avoidance; balance confidence; concerns about falling; psychology

The relationship of cervicothoracic mobility restrictions to fall risk and fear of falling in ankylosing spondylitis

Johnston JL, Harms SL, Thomson GTD. Front. Med. (Lausanne) 2023; 10: e1159015.

(Copyright © 2023, Frontiers Media)

DOI 10.3389/fmed.2023.1159015 PMID 37441687

Abstract

OBJECTIVE: The objective of this study is to determine whether restricted cervical mobility in ankylosing spondylitis (AS) is associated with increased fall frequency or fear of falling.

METHODS: A total of 134 AS patients and 199 age- and gender-matched control subjects (CS) with soft-tissue cervicothoracic pain were prospectively evaluated for fall risk. Subjects were divided into non-fallers, single fallers, and multiple fallers. Dynamic cervical rotations and static cervicothoracic axial measurements were compared between the groups. In total, 88 AS patients were reviewed more than once; Kaplan-Meier plots were constructed for fall risk as a function of cervical rotation amplitudes. Falls Efficacy Scale-International (FES-I) questionnaire measured the fear of falling.

RESULTS: In total, 34% of AS patients and 29% of CS fell ($p = 0.271$) in the year prior to evaluation. In AS, static anatomical measurements were unrelated to fall occurrence. The trends of multiple AS fallers to greater flexed forward postures and reduced dynamic cervical rotations were not statistically significant. Cervicothoracic pain ($p = 0.0459$), BASDAI ($p = 0.002$), and BASFI ($p = 0.003$) scores were greater in multiple fallers. FES-I scores were greater in fallers ($p = 0.004$). Of the 88 AS patients reviewed (or seen) on more than one occasion, 46.5% fell over the 9-year observation period, including all multiple fallers and 71.4% of single fallers. Survival curves showed increased fall risk as cervical rotational amplitudes decreased.

CONCLUSION: In AS, decreased cervical rotations increase fall risk and fear of falling. In multiple fallers, falls were associated with greater disease activity. Cervical muscle stiffness in AS may cause non-veridical proprioceptive inputs and contribute to increased fall frequency similar to individuals with soft-tissue cervicothoracic pain.

Language: en

Keywords

ankylosing spondylitis; biomechanics; cervical vertebrae; neck pain; range of motion

The use of the World Guidelines for Falls Prevention and Management's risk stratification algorithm in predicting falls in The Irish Longitudinal Study on Ageing (TILDA)

Hartley P, Forsyth F, Rowbotham S, Briggs R, Kenny RA, Romero-Ortuno R. Age Ageing 2023; 52(7).

(Copyright © 2023, Oxford University Press)

DOI 10.1093/ageing/afad129 **PMID** 37463283

Abstract

BACKGROUND: the aim of this study was to retrospectively operationalise the World Guidelines for Falls Prevention and Management (WGFP) falls risk stratification algorithm using data from The Irish Longitudinal Study on Ageing (TILDA). We described how easy the algorithm was to operationalise in TILDA and determined its utility in predicting falls in this population.

METHODS: participants aged ≥ 50 years were stratified as 'low risk', 'intermediate' or 'high risk' as per WGFP stratification based on their Wave 1 TILDA assessments. Groups were compared for number of falls, number of people who experienced one or more falls and number of people who experienced an injury when falling between Wave 1 and Wave 2 (approximately 2 years).

RESULTS: 5,882 participants were included in the study; 4,521, 42 and 1,309 were classified as low, intermediate and high risk, respectively, and 10 participants could not be categorised due to missing data. At Wave 2, 17.4%, 43.8% and 40.5% of low-, intermediate- and high-risk groups reported having fallen, and 7.1%, 18.8% and 18.7%, respectively, reported having sustained an injury from falling.

CONCLUSION: the implementation of the WGFP risk assessment algorithm was feasible in TILDA and successfully differentiated those at greater risk of falling. The high number of participants classified in the low-risk group and lack of differences between the intermediate and high-risk groups may be related to the non-clinical nature of the TILDA sample, and further study in other samples is warranted.

Language: en

Keywords

prediction; longitudinal; risk; falls; older people; stratification

Towards multimodal boosting of motivation for fall-preventive physical activity in seniors: an iterative development evaluation study

Revenäs, Ström L, Cicchetti A, Ehn M. Digit. Health 2023; 9: e20552076231180973.

(Copyright © 2023, SAGE Publishing)

DOI 10.1177/20552076231180973 **PMID** 37426584

Abstract

BACKGROUND: Many seniors need to increase their physical activity (PA) and participation in fall prevention exercise. Therefore, digital systems have been developed to support fall-preventive PA. Most of them lack video coaching and PA monitoring, two functionalities that may be relevant for increasing PA.

OBJECTIVE: To develop a prototype of a system to support seniors' fall-preventive PA, which includes also video coaching and PA monitoring, and to evaluate its feasibility and user experience.

METHODS: A system prototype was conceived by integrating applications for step-monitoring, behavioural change support, personal calendar, video-coaching and a cloud service for data management and co-ordination. Its feasibility and user experience were evaluated in three consecutive test periods combined with technical development. In total, 11 seniors tested the system at home for four weeks with video coaching from health care professionals.

RESULTS: Initially, the system's feasibility was non-satisfactory due to insufficient stability and usability. However, most problems could be addressed and amended. In the third (last) test period, both seniors and coaches experienced the system prototype to be fun, flexible and awareness-raising. Interestingly, the video coaching which made the system unique compared to similar systems was highly appreciated. Nonetheless, even the users in the last test period highlighted issues due to insufficient usability, stability and flexibility. Further improvements in these areas are needed.

CONCLUSIONS: Video coaching in fall-preventive PA can be valuable for both seniors and health care professionals. High reliability, usability and flexibility of systems supporting seniors are essential.

Language: en

Keywords

Aged; behavioural medicine; distance counselling; exercise; feasibility study; telemedicine