

## Safety Literature 3<sup>rd</sup> October 2021

### **A delicate balance: psychotropic polypharmacy and anti-cholinergic use are correlated with fall incidence in Australian inpatients with dementia**

Tan SX, Cameron SC, Sam LM, Eigeland H, Hay K, Eeles E, Natarajan K. Aging Med. (Milton) 2021; 4(3): 193-200.

(Copyright © 2021, John Wiley and Sons)

**DOI** 10.1002/agm2.12175 **PMID** 34553116

#### **Abstract**

**BACKGROUND:** Persons with dementia commonly experience a range of behavioural and psychological symptoms, including agitation, aggression, perceptual disturbances, and depression. While psychotropic medications are regularly prescribed to mitigate these symptoms, these agents also carry a broad adverse effect profile. This study aimed to characterize psychotropic medication use in patients with dementia, as well as identify prescribing factors associated with falls in this cohort.

**METHODS:** This retrospective study collected longitudinal demographic and medication data from all patients admitted to a neuro-cognitive unit at an Australian metropolitan hospital over a 2-year period. Psychotropic polypharmacy and psychotropic agent use per patient-fortnight were investigated for their association with inpatient falls.

**RESULTS:** All patients (n = 147) were prescribed at least one psychotropic medication, with 96% receiving anti-psychotic medications and 90% receiving benzodiazepines. Patient fall rate was significantly associated with anticholinergic drug use (Incidence rate ratio: 2.2; P < .001), as well as concomitant use of  $\geq 5$  daily psychotropic agents (Incidence rate ratio: 3.1; P = .001).

**CONCLUSIONS:** Patients with dementia are routinely prescribed a wide variety of psychotropic medications. Use of anticholinergic drugs and psychotropic polypharmacy are correlated with fall incidence in persons with dementia.

Language: en

#### **Keywords**

dementia; falls; antidepressant; neuropsychiatry; psychotropic

## **A safe mobilisation program to improve functional mobility and reduce fall risks in cognitively impaired older adults with higher level gait disorders: a pilot study**

Zhang W, Low LF, Gwynn JD, Beveridge AH, Harper E, Mills N, Clemson L. Dement. Geriatr. Cogn. Disord. 2021; ePub(ePub): ePub.

(Copyright © 2021, Karger Publishers)

**DOI** 10.1159/000519055 **PMID** unavailable

### **Abstract**

**BACKGROUND:** The association between gait and cognition, and their combined impact on postural stability may underlie the increased fall risk in older adults with dementia. However, there are few interventions to improve functional mobility and reduce fall risks in people with cognitive impairment.

**OBJECTIVES:** This study aims to investigate the feasibility and acceptability of a Safe Mobilisation Program for cognitively impaired older adults with higher level gait disorders. It also explores the potential effectiveness of the program on mobility and fall risks.

**METHODS:** Fifteen community-dwelling older adults participated in a 3-week pre-post intervention study. They were trained to take steady steps in transfers and mobilization using errorless learning and spaced retrieval teaching techniques.

**RESULTS:** The intervention program was feasible, all the participants completed the program and were able to mobilize safely. The program was acceptable and participants reported an increase in safety awareness, improvement in confidence while transferring and mobilising, and better quality of life. There was a trend of improvement in Falls Efficacy Scale-international (FES-I), 360° turn and Tinetti Performance Oriented Mobility Assessment (POMA), which may indicate improvement in balance and mobility.

**CONCLUSION:** The Safe Mobilisation Program was feasible and acceptable in older adults with cognitive impairment and gait disorders and warrants further evaluation.

Language: en

### **Keywords**

Cognitive impairment; Errorless learning; Fall risk; Functional mobility; Gait disorders; Spaced retrieval

## **App-based strength and balance self-test in older adults: an exploratory study from a user perspective**

Arkkukangas M. BMC Res. Notes 2021; 14(1): e379.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group - BMC)

**DOI** 10.1186/s13104-021-05792-5 **PMID** 34565455

### **Abstract**

**OBJECTIVES:** Falls are a common problem, especially in the older population. The number of older adults aged over 65 years is increasing globally, leading to a major challenge in providing effective fall prevention interventions to older adults requiring such interventions. This study aimed to explore the usability of an app-based strength and balance self-tests in a small sample of four older adults. This study is a side product of another project.

**RESULTS:** The results from this study indicated that self-test of strength and balance by using a smartphone application is a challenge for older adults. Basic test measures, such as start and stop and counts of sit-to-stand, were difficult to self-administer. However, from a user perspective, the possibility of independently performing these measures was considered important and needed to be further developed and evaluated in future studies.

Language: en

### **Keywords**

\*Mobile Applications; Accidental Falls/prevention & control; Balance; Older population; Self-assessment; Self-Testing; Smartphone application; Strength

## **Effect of virtual reality exercises on balance and fall in elderly people with fall risk: a randomized controlled trial**

Zahedian-Nasab N, Jaber A, Shirazi F, Kavousipor S. BMC Geriatr. 2021; 21(1): e509.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group - BMC)

DOI 10.1186/s12877-021-02462-w PMID unavailable

### **Abstract**

**BACKGROUND:** Deficient balance and fear of falling in elderly people can lead to disturbed daily activities, falling, and finally reduced quality of life. Therefore, evaluation of low-risk methods that might partially improve balance in this group of people is of utmost importance. The present study aimed to investigate the impact of Virtual Reality (VR) exercises based on Xbox Kinect on balance and fear of falling among elderly people.

**METHODS:** This clinical trial was performed on 60 elderly individuals living in nursing homes divided into two groups of control and Xbox. The participants in the intervention group received VR exercises based on Xbox Kinect in form of two 30-45-min sessions held on a weekly basis for 6 weeks. The individuals in the control group, on the other hand, received routine exercises of the nursing homes. The research tools used in this study included a demographic questionnaire, the Berg Balance Scale (BBS), the Timed Up and Go (TUG) test, and the Falling Efficacy Scale (FES).

**RESULTS:** The findings of the current study demonstrated that the scores of BBS and TUG test as the indices of balance among elderly people improved significantly in the Xbox group after the intervention ( $p < 0.001$  for both BBS and TUG test). Moreover, the score of fear of falling diminished significantly in the intervention group compared to the control group ( $p < 0.001$ ).

**CONCLUSION:** According to the results of the present investigation, 6 weeks of VR balance exercises could enhance balance and fear of falling among elderly people living in nursing homes. **TRIAL REGISTRATION:** Code: IRCT20190727044347N1 , Date: 17-8-2019.

Language: en

### **Keywords**

Aged; Exercise; Virtual reality; Fall; Nursing homes; Postural balance; Xbox

## **Falls efficacy: extending the understanding of self-efficacy in older adults towards managing falls**

Soh SLH, Tan CW, Thomas JI, Tan G, Xu T, Ng YL, Lane J. J. Frailty Sarcopenia Falls 2021; 6(3): 131-138.

(Copyright © 2021, Hylonome Publications)

DOI 10.22540/JFSF-06-131 PMID 34557612

### **Abstract**

Falls efficacy is a widely studied construct. The understanding of falls efficacy has evolved over time. Falls efficacy was initially perceived to be suitably used as a measure of fear of falling. However, further research suggested that falls efficacy and fear of falling are distinct constructs, and therefore, would be inappropriate to be used as a proxy. Instead, some researchers posited that falls efficacy is synonymous with balance confidence. Falls efficacy has been conventionally understood as the perceived ability of individuals to perform activities without losing balance or falling. A recently conducted systematic review by the authors on existing falls efficacy related measures had revealed a fresh perspective of recognising falls efficacy as a perceived ability to manage a threat of a fall. Falls efficacy, with a broadened interpreted construct, relates to the individual's perceived self-efficacy of performing necessary actions needed in different scenarios, including pre-fall, near-fall, fall-landing and completed fall. The conventional interpretation of falls efficacy needs a rethinking of perspective. An extended understanding of falls efficacy would provide an integral approach towards improving the agency of individual to deal with falls and would enhance person-centred care.

Language: en

### **Keywords**

Rehabilitation; Falls efficacy; Older Adults; Person-centred care; Physiotherapy

## Identification of fall-related injuries in nursing home residents using administrative claims data

Mintz J, Duprey MS, Zullo AR, Lee Y, Kiel DP, Daiello LA, Rodriguez KE, Venkatesh AK, Berry SD. *J. Gerontol. A Biol. Sci. Med. Sci.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Gerontological Society of America)

DOI 10.1093/gerona/glab274 PMID unavailable

### Abstract

**BACKGROUND:** Fall-related injuries (FRIs) are a leading cause of morbidity, mortality, and costs among nursing home (NH) residents. Carefully defining FRIs in administrative data is essential for improving injury-reduction efforts. We developed a series of novel claims-based algorithms for identifying FRIs in long-stay NH residents.

**METHODS:** This is a retrospective cohort of residents of NH residing there for  $\geq 100$  days who were continuously enrolled in Medicare Parts A and B in 2016. FRIs were identified using four claims-based case-qualifying (CQ) definitions [Inpatient (CQ1), Outpatient and Provider with Procedure (CQ2), Outpatient and Provider with Fall (CQ3), or Inpatient or Outpatient and Provider with Fall (CQ4)]. Correlation was calculated using phi correlation coefficients.

**RESULTS:** Of 153,220 residents (mean [SD] age 81.2 [12.1], 68.0% female), we identified 10,104 with at least one FRI according to one or more CQ definition. Among 2,950 residents with hip fractures, 1,852 (62.8%) were identified by all algorithms. Algorithm CQ4 (n=326 to 2,775) identified more FRIs across all injuries while CQ1 identified less (n=21 to 2,320). CQ2 identified more intracranial bleeds (1,028 v. 448) than CQ1. For non-fracture categories, few FRIs were identified using CQ1 (n= 20 to 488). Of the 2,320 residents with hip fractures identified by CQ1, 2,145 (92.5%) had external cause of injury codes. All algorithms were strongly correlated, with phi coefficients ranging from 0.82-0.99.

**CONCLUSIONS:** Claims-based algorithms applied to outpatient and provider claims identify more non-fracture FRIs. When identifying risk factors, stakeholders should select the algorithm(s) suitable for the FRI and study purpose.

Language: en

### Keywords

accidental falls; algorithms; fractures; healthcare administrative claims; nursing home

## **Ladder use in older people: type, frequency, tasks and predictors of risk behaviours**

Hicks C, Pliner EM, Lord SR, Sturnieks DL. *Int. J. Environ. Res. Public Health* 2021; 18(18): e9799.

(Copyright © 2021, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/ijerph18189799 PMID unavailable

### **Abstract**

Ladder fall and injury risk increases with age. People who present to a hospital after an injurious ladder fall have been surveyed, but little is known about ladder use in the community. The purpose of this study was to: (1) document salient factors related to ladder safety, and (2) determine physical, executive function, psychological and frequency-of-use factors associated with unsafe ladder use in older people. One hundred and two older people (aged 65+ years) were recruited. Participants completed questionnaires on demographics, health, and ladder use (type, frequency, task, behaviours) and underwent assessments of physical and executive function ability.

RESULTS showed both older men and women commonly use step ladders (61% monthly, 96% yearly), mostly inside the home for tasks such as changing a lightbulb (70%) and decorating (43%). Older men also commonly use straight ladders (27% monthly, 75% yearly), mostly outside the home for tasks such as clearing gutters (74%) and pruning trees (40%). Unsafe ladder use was more common in males and individuals with greater ladder use frequency, greater quadriceps strength, better upper limb dexterity, better balance, better stepping ability, greater self-reported everyday risk-taking, a lower fear of falling, and fewer health problems compared to their counterparts (all  $p < 0.05$ ). These findings document ladder use by older people and provide insight into unsafe ladder behaviours that may be amenable to interventions to reduce ladder falls and associated injuries.

Language: en

### **Keywords**

aged; risk factors; safety; risk; accidental falls; behaviour

## **Physical exercise and fall prevention: a systematic review and meta-analysis of experimental studies included in Cochrane reviews**

Caristia S, Campani D, Cannici C, Frontera E, Giarda G, Pisterzi S, Terranova L, Payedimarri AB, Faggiano F, Dal Molin A. *Geriatr. Nurs.* 2021; 42(6): 1275-1286.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.gerinurse.2021.06.001 PMID unavailable

### **Abstract**

The aim of this systematic review (SR) and meta-analysis was to assess what type of exercise is associated with fall risk reduction among apparently healthy adults aged 50 and older. We conducted a SR by searching for randomized controlled trials (RCTs) included in Cochrane SRs published until October 2019. Five SRs that compared exercise versus any type of control included 32 RCTs. The outcomes examined were falls, fallers, fractures, and fear of falling. A random effects-based meta-analysis by type of exercise was performed. Almost all the interventions were effective for fall rate reduction, with a major effect for three-dimensional exercise, strength/resistance exercises, and mixed exercises. The number of fallers was reduced by three-dimensional exercise and mixed exercises. Fall-related fractures were generally reduced by all types of exercises considered all together, but none singly resulted in statistically effective fracture prevention. Fear of falling was slightly decreased with endurance exercises.

Language: en

### **Keywords**

Older adult; Exercise; Aging; Accidental falls; Fall prevention

## **Qualitative research to inform economic modelling: a case study in older people's views on implementing the NICE falls prevention guideline**

Kwon J, Lee Y, Young T, Squires H, Harris J. BMC Health Serv. Res. 2021; 21(1): e1020.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group - BMC)

DOI 10.1186/s12913-021-07056-1 PMID unavailable

### **Abstract**

**BACKGROUND:** High prevalence of falls among older persons makes falls prevention a public health priority. Yet community-based falls prevention face complexity in implementation and any commissioning strategy should be subject to economic evaluation to ensure cost-effective use of healthcare resources. The study aims to capture the views of older people on implementing the National Institute for Health and Care Excellence (NICE) guideline on community-based falls prevention and explore how the qualitative data can be used to inform commissioning strategies and conceptual modelling of falls prevention economic evaluation in the local area of Sheffield.

**METHODS:** Focus group and interview participants (n = 27) were recruited from Sheffield, England, and comprised falls prevention service users and eligible non-users of varying falls risks. Topics concerned key components of the NICE-recommended falls prevention pathway, including falls risk screening, multifactorial risk assessment and treatment uptake and adherence. Views on other topics concerning falls prevention were also invited. Framework analysis was applied for data analysis, involving data familiarisation, identifying themes, indexing, charting and mapping and interpretation. The qualitative data were mapped to three frameworks: (1) facilitators and barriers to implementing the NICE-recommended pathway and contextual factors; (2) intervention-related causal mechanisms for formulating commissioning strategies spanning context, priority setting, need, supply and demand; and (3) methodological and evaluative challenges for public health economic modelling.

**RESULTS:** Two cross-component factors were identified: health motives of older persons; and professional competence. Participants highlighted the need for intersectoral approaches and prioritising the vulnerable groups. The local commissioning strategy should consider the socioeconomic, linguistic, geographical, legal and cultural contexts, priority setting challenges, supply-side mechanisms spanning provider, organisation, funding and policy (including intersectoral) and health and non-health demand motives.

**METHODological and evaluative challenges identified included:** incorporating non-health outcomes and societal intervention costs; considering dynamic complexity; considering social determinants of health; and conducting equity analyses.

**CONCLUSIONS:** Holistic qualitative research can inform how commissioned falls prevention pathways can be feasible and effective. Qualitative data can inform commissioning strategies and conceptual modelling for economic evaluations of falls prevention and other geriatric interventions. This would improve the structural validity of quantitative models used to inform geriatric public health policies.

Language: en

### **Keywords**

Aged; Humans; Aged, 80 and over; Risk Assessment; Focus Groups; Falls; Public health; Implementation; Qualitative research; \*Accidental Falls/prevention & control; \*Motivation; Economic model; Facilitators and barriers; Falls prevention; Falls risk; National Institute for health and care excellence guideline; Qualitative Research

## **Reliability and fall-risk predictability of the short form of the Fullerton advanced balance scale in Iranian older adults**

Sinaei E, Rose DJ, Javadpour S, Yoosefinejad AK. *J. Aging Phys. Act.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Human Kinetics Publishers)

DOI 10.1123/japa.2021-0137 PMID unavailable

### **Abstract**

Recently, a short form of the Fullerton Advanced Balance (SF-FAB) scale was reported as a good predictor of falls in older adults. However, we found no evidence regarding its reliability in non-American older adults. Therefore, we aimed to analyze the reliability and homogeneity of the SF-FAB scale to measure postural balance in Iranian older adults. Eighty-five community-dwelling older adults ( $70.75 \pm 4.97$  years) performed the SF-FAB test on two occasions 1 week apart. In both instances, four raters assessed the performance on the test. The SF-FAB scale (mean total score:  $12.46 \pm 3.53$ ) revealed acceptable internal consistency (Cronbach's  $\alpha = .77$ ), excellent intrarater reliability (intraclass correlation coefficient = .94-.99), and excellent interrater reliability (intraclass correlation coefficient = .92-.99). The overall prediction success rate was 83.5% with correctly classifying 95.6% of nonfallers and 35.3% of fallers. The SF-FAB scale can provide a quick screen of balance status in older adults to trigger referral to clinicians for a more comprehensive assessment.

Language: en

### **Keywords**

assessment tool; homogeneity; postural balance; tandem walking

## **Videoconference-based adapted physical exercise training is a good and safe option for seniors**

Kuldavletova O, Pasquier F, Bigot L, Langeard A, Gauthier A, Quarck G. *Int. J. Environ. Res. Public Health* 2021; 18(18): e9439.

(Copyright © 2021, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/ijerph18189439 PMID unavailable

### **Abstract**

Videoconference-based adapted physical exercise combines the benefits of supervised exercise training with staying at home, when conventional training is inaccessible. However, exercising with the use of a screen can be considered an optokinetic stimulation, and could therefore induce changes in sensory processing, affecting postural stability. The objectives of this study were to compare the effectiveness of the training delivered Face-to-Face and by Videoconferencing in improving physical capacities of older adults, and to evaluate the possible effects of the Videoconference mode on the processing of sensory information that could affect postural control. Twenty eight older adults underwent the supervised exercise program for sixteen weeks either Face-to-Face or by Videoconference. Muscular strength of knee and ankle flexors and extensors, maximum oxygen uptake, postural stability and horizontal rotational vestibulo-ocular reflex were evaluated before and after the training. Both modes of training similarly increased the VO(2) peak and strength of the motor muscles of lower limbs in all participants. The use of the Videoconference did not modify the vestibulo-ocular reflex in subjects or the importance of vision for postural control. Therefore, the Videoconference-based exercise training can be considered a safe and effective way to maintain good functional capacity in seniors.

Language: en

### **Keywords**

aging; exercise; functional capacities; postural control; seniors; sensory information; videoconference

## **Within-subject variation in the Cognitive Timed Up and Go test as an explanatory variable in fall risk in patients with Parkinson's disease**

Sebastiá-Amat S, Tortosa-Martínez J, García-Jaén M, Pueo B. J. Rehabil. Med. 2021; ePub(ePub): ePub.

(Copyright © 2021, Foundation for Rehabilitation Information)

DOI 10.2340/16501977-2874 PMID unavailable

### **Abstract**

**OBJECTIVE:** To explore the use of within-subject variation in the Cognitive Timed Up and Go test (Cognitive TUGwsv) as an explanatory variable in fall risk in the Parkinson's disease population.

**DESIGN:** Cross-sectional study.

**METHODS:** Fifty-three patients with Parkinson's disease completed 3 trials of the Cognitive TUGwsv. Within-subject variation was calculated using the standard deviation of an individual's repeated measurements, and compared on the basis of the fall history reported in the previous 6 months. Participants who reported < 2 falls were classified as "non-recurrent fallers" (n = 31) and those who reported  $\geq 2$  falls were classified as "recurrent fallers" (n = 22). Univariate and a multivariate logistic regression were used to investigate the statistical impact of the Cognitive TUGwsv as an explanatory variable in fall risk. Discriminative ability and cut-off score were determined based on receiver operating characteristic analysis.

**RESULTS:** There was a significant difference between groups in the Cognitive TUGwsv ( $p = 0.002$ ). Univariate logistic regression indicated a significant association between Cognitive TUGwsv and fall risk ( $\chi^2=12.365$ ,  $p < 0.001$ ), with an odds ratio of 2.5 (95% confidence interval (95% CI) = 1.34-4.65). Multivariate logistic regression showed that body mass index (BMI), Falls Efficacy Scale-International (FES-I), Cognitive TUGwsv, and the mean velocity of the centre of foot pressure (Closed Eyes) (Velocity COP (CE)) were significant explanatory variables in fall risk. Cognitive TUGwsv was the most important independent variable. Receiver operating characteristic analysis revealed an acceptable discriminative power (area under the curve (AUC) = 0.757, 95% CI = 0.619-0.864,  $p < 0.001$ ) and a cut-off point of 1.53 s.

**CONCLUSION:** A higher Cognitive TUGwsv correlated with higher fall risk. Thus, diagnostic tests and exercise programmes could consider Cognitive TUGwsv when assessing fall risk in the Parkinson's disease population.

Language: en

### **Keywords**

gait; Parkinson's disease; dual task; postural balance; risk of falling; variability

## **A backward walking training program to improve balance and mobility in children with cerebral palsy**

Choi JY, Son SM, Park SH. Healthcare (Basel) 2021; 9(9): e1191.

(Copyright © 2021, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/healthcare9091191 PMID unavailable

### **Abstract**

**BACKGROUND:** We studied the effects of motor tasks using backward walking training on balance and gait functions of children with cerebral palsy. This was a single-blinded, randomized controlled trial with a crossover design conducted at a single facility.

**METHODS:** Among 12 children with cerebral palsy, the forward (FWG) (n = 6) and backward walking groups (BWG) (n = 6) underwent training three times a week for 4 weeks, 40 min a day. After a 6-week break, the crossover training was conducted. Functional walking variables were measured. Time-Up-and-Go (TUG) test, Figure-8 Walk Test (FW8T), and Pediatric Balance Scale (PBS) were used for measuring balance.

**RESULTS:** Both groups showed significant improvement in walking speed, stride length, and step length. The BWG demonstrated significant improvement in walking speed ( $p < 0.05$ ) compared with the FWG. The TUG test, FW8T, and PBS showed significant improvement. After the 4-week intervention, both groups displayed a remarkable decrease in TUG duration and FW8T. Both groups also exhibited improvement in the PBS; more so in the BWG.

**CONCLUSIONS:** Backward walking training with motor dual tasks could be a more effective interventional approach than forward walking training to improve balance and walking functions of children with spastic hemiplegia.

Language: en

### **Keywords**

backward walking; balance; cerebral palsy

## Comparing fall detection methods in people with multiple sclerosis: a prospective observational cohort study

Hildebrand A, Jacobs PG, Folsom JG, Mosquera-Lopez C, Wan E, Cameron MH. *Mult. Scler. Relat. Disord.* 2021; 56: e103270.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.msard.2021.103270 PMID unavailable

### Abstract

**Background** Falls occur across the population but are more common, and have more negative sequelae, in people with multiple sclerosis (MS). Given the prevalence and impact of falls, accurate measures of fall frequency are needed. This study compares the sensitivity and false discovery rates of three methods of fall detection: the current gold standard, prospective paper fall calendars, real-time self-reporting and automated detection, the latter two from a novel body-worn device.

**METHODS** Falls in twenty-five people with MS were recorded for eight weeks with prospective fall calendars, real-time body-worn self-report, and an automated body-worn detector concurrently. Eligible individuals were adults with MS enrolled in a randomized controlled trial of a fall prevention intervention. Entry criteria were at least two falls or near-falls in the previous two months, Expanded Disability Status Scale  $\leq 6.0$ , community dwelling, and no MS relapse in the previous month. The sensitivity (proportion of true falls detected) and false discovery rates (proportion of false reports generated) of the fall detection methods were compared. A true fall was a fall reported by at least two methods. A false report was a fall reported by only one method. The trial is registered on ClinicalTrials.gov (NCT02583386) and is closed.

**RESULTS** In the 1,276 person-days of fall counting with all three methods in use simultaneously there were 1344 unique fall events. Of these, 8.5% (114) were true falls and 91.5% (1230) were false reports. Fall calendars had the lowest sensitivity (0.614) and the lowest false discovery rate (0.067). The automated detector had the highest sensitivity (0.921) and the highest false discovery rate (0.919). All methods generated under one false report per day. There were no fall detection-related adverse events.

**CONCLUSION** Fall calendars likely underestimate fall frequency by around 40%. The automated detector evaluated here misses very few falls but likely overestimates the number of falls by around one fall per day. Additional research is needed to produce an ideal fall detection and counting method for use in clinical and research applications. Funding United States Department of Veterans Affairs, Rehabilitation Research and Development Service. Language: en

### Keywords

Accidental falls; Ambulatory monitoring; Multiple sclerosis; Self report; Wearable electronic devices

**Differences in evaluating fall risk by primary care provider type**

Mark JA, Haddad YK, Burns ER. *J. Nurse Pract.* 2020; 16(7): 528-532.

(Copyright © 2020, Elsevier Publishing)

**DOI** 10.1016/j.nurpra.2020.04.014 **PMID** 34552448

**Abstract**

This study assessed differences in clinical fall risk assessment of older adults (65+) and clinical resources used by primary care providers (PCP). We used Porter Novelli's 2016 DocStyles survey to examine clinical behavior data from PCPs (n=1128). Compared to other practitioners, nurse practitioners (NP) reported a higher percentage of their patients were older adults. The majority of NPs reported screening for falls risk routinely, but most did not use standardized fall-risk assessments to assess risk factors. There were also differences in the types of clinical resources used by NPs and other PCPs to evaluate the safety profile of medications.

Language: en

**Keywords**

elderly; older adults; fall screening; medication assessment; nurse practitioners; primary care providers

**Effectiveness of interventions to prevent falls for people with multiple sclerosis, Parkinson's disease and stroke: an umbrella review**

O'Malley N, Clifford AM, Conneely M, Casey B, Coote S. BMC Neurol. 2021; 21(1): e378. (Copyright © 2021, Holtzbrinck Springer Nature Publishing Group - BMC)

DOI 10.1186/s12883-021-02402-6 PMID unavailable

**Abstract**

**BACKGROUND:** The implementation of condition-specific falls prevention interventions is proving challenging due to lack of critical mass and resources. Given the similarities in falls risk factors across stroke, Parkinson's Disease (PD) and Multiple Sclerosis (MS), the development of an intervention designed for groups comprising of people with these three neurological conditions may provide a pragmatic solution to these challenges. The aims of this umbrella review were to investigate the effectiveness of falls prevention interventions in MS, PD and stroke, and to identify the commonalities and differences between effective interventions for each condition to inform the development of an intervention for mixed neurological groups.

**METHODS:** A systematic literature search was conducted using 15 electronic databases, grey literature searches and hand-screening of reference lists. Systematic reviews of studies investigating the effects of falls prevention interventions in MS, PD and stroke were included.

**METHODological** quality of reviews was assessed using the A MeaSurement Tool to Assess Systematic Reviews 2. A matrix of evidence table was used to assess the degree of overlap. The Grading of Recommendations Assessments, Development and Evaluation framework was used to rate the quality of evidence.

**FINDINGS** were presented through narrative synthesis and a summary of evidence table.

**RESULTS:** Eighteen reviews were included; three investigating effectiveness of falls prevention interventions in MS, 11 in PD, three in stroke, and one in both PD and stroke. Exercise-based interventions were the most commonly investigated for all three conditions, but differences were identified in the content and delivery of these interventions. Low to moderate quality evidence was found for the effectiveness of exercise-based interventions at reducing falls in PD. Best available evidence suggests that exercise is effective at reducing falls in stroke but no evidence of effect was identified in MS.

**CONCLUSIONS:** The findings suggest that exercise-based interventions are effective at reducing falls in PD, however, the evidence for MS and stroke is less conclusive. A strong theoretical rationale remains for the use of exercise-based interventions to address modifiable physiological falls risk factors for people with MS, PD and stroke, supporting the feasibility of a mixed-diagnosis intervention. Given the high overlap and low methodological quality of primary studies, the focus should be on the development of high-quality trials investigating the effectiveness of falls prevention interventions, rather than the publication of further systematic reviews.

Language: en

**Keywords**

Falls; Multiple sclerosis; Parkinson's disease; Stroke; Umbrella review

## **Effects of multimedia-based fall prevention education on the knowledge, attitudes, or behaviors of patients**

Wang SC, Lee DC, Lee YH, Chang YP, Chu IL. *Jpn. J. Nurs. Sci.* 2021; ePub(ePub): ePub.

(Copyright © 2021, John Wiley and Sons)

DOI 10.1111/jjns.12455 PMID unavailable

### **Abstract**

**OBJECTIVES:** Patient safety is regarded as a critical quality monitoring indicator for medical institutions. The effects of a multimedia-based patient education intervention on knowledge, attitudes, and behaviors regarding fall prevention were observed.

**METHODS:** The study had a quasi-experimental research design and enrolled 140 participants. Seventy participants in the experimental group received multimedia-based patient education and a health education leaflet, while those in the control group received only the health education leaflet. A structured questionnaire was used for data collection at baseline, and a posttest was applied after the intervention.

**RESULTS:** The participants were predominantly treated in the gastroenterology department (45.7%), followed by the pulmonology department (33.6%). A total of 86.4% of patients had not experienced a fall within 3 months. After the intervention, the average scores for all variables in the experimental group were higher than those in the control group. The results indicate that attitudes, knowledge, and behaviors regarding fall prevention among patients in the pulmonology department were higher than those among patients in the gastroenterology department; the differences were statistically significant.

**CONCLUSION:** The individualized health education content was of substantial significance for patients with different disease backgrounds and facilitated changes in their knowledge, attitudes, and behaviors regarding falls. **RELEVANCE TO CLINICAL PRACTICE:** Multimedia-based patient education influenced inpatients' knowledge, attitudes, and behaviors for preventing falls.

Language: en

### **Keywords**

attitudes; behaviors; fall prevention; knowledge; multimedia; patient education

## **Falls - the socio-economic and medical aspects important for developing prevention and treatment strategies**

Mikos M, Trybulska A, Czerw A. Ann. Agric. Environ. Med. 2021; 28(3): 391-396.

(Copyright © 2021, Institute of Agricultural Medicine of Poland)

DOI 10.26444/aaem/122409 PMID unavailable

### **Abstract**

**INTRODUCTION:** Although falls occur extremely frequently, they are still one of the least investigated causes of death. According to the World Health Organization, around 37.3 million falls occur globally every year resulting in the deaths of over 660,000 adults and almost 30,000 children.

**OBJECTIVE:** The aim of this review is to evaluate the most up-to-date and comprehensive knowledge on falls and their consequences, especially in populations at the highest risk of fatal falls. **BRIEF DESCRIPTION OF STATE OF KNOWLEDGE:** Currently, there is a limited amount of literature which analyzes falls. Falls affect all age groups, but their location, cause, and severity vary among different populations. Individuals who are particularly at risk of falling at home include younger children and the elderly. Research indicates that falls are one of the main causes of work-related injuries and deaths, especially those occurring at significant heights. Falls in the home environment are the second most common cause of death in over 33% of accidents and the main cause of injury in 41.2% of accidents. During patient hospitalizations, falls generate additional burdens and costs on the healthcare system.

**CONCLUSIONS:** This review elaborated on the nature of falls in different populations and analyzed the influence falls have on the healthcare system, in society, and on the economy. This knowledge is particularly important in an aging society, which will inevitably face increasing problems due to falls in the near future. As the emphasis on falls increases, leaders and lawmakers will be pushed to establish individualized prevention measures, as described in this review, for specific risk groups to effectively prevent falls and their consequences.

Language: en

### **Keywords**

accident prevention; falls; patient safety; Elderly population; healthcare system

## Hypothetical interventions for falls among older adults: an application of the parametric G-formula

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### Abstract

**INTRODUCTION:** Falls, which have a higher incidence and mortality due to accidental injuries, are a major global health challenge. The effects of lifestyle factor, health indicator, psychological condition, and functional status interventions on the risk of falls are unknown and the conventional regression model would not adjust for the confounders. This study aimed to evaluate the 4-year risk of falls on the basis of these hypothetical interventions among Chinese older adults.

**METHODS:** Data were obtained from 9,692 aged 65 years and over older adults in the China Health and Retirement Longitudinal Study wave, from 2011 to 2015. We used the parametric g-formula to evaluate the risk of falls on the basis of independent hypothetical interventions of sleep duration, social activities, smoking status, drinking status, body mass index (BMI), systolic blood pressure (SBP), vision, depression, activities of daily living (ADL), and their different joint intervention combinations.

**RESULTS:** During the follow-up of 4 years, we documented 1,569 falls. The observed risk of falls was 23.58%. The risk ratios (95% confidence intervals [CIs]) of falls under the intensive hypothetical interventions on increasing sleep duration, participating in more social activities, quit smoking and drinking, reducing BMI and SBP, better vision, alleviating depressive symptoms, and improving ADL capability were 0.93 (0.87-0.96), 0.88 (0.79-0.92), 0.98 (0.95-1.03), 0.97 (0.95-1.02), 0.92 (0.86-1.03), 0.93 (0.87-1.04), 0.86 (0.74-0.91), 0.91 (0.85-0.96), and 0.79 (0.74-0.85), respectively. The feasible and intensive joint hypothetical intervention reduced the 4-year fall risk by 22% (95% CI: 0.52-0.91) and 33% (95% CI: 0.56-0.72), respectively.

**CONCLUSIONS:** Hypothetical interventions for increasing sleep duration, participating in more social activities, better vision, alleviating depressive symptoms, and improving ADL capability help protect older adults from falls. Our findings suggest that a combination of lifestyle factors, health indicators, psychological conditions, and functional status may prove to be an effective strategy for preventing falls among older adults.

Language: en

### Keywords

primary prevention; older adults; falls; g-formula; hypothetical intervention

## **Prevalence and factors associated with recurrent falls among middle-aged community-dwelling women**

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### **Abstract**

**OBJECTIVE:** This community-based study evaluated the prevalence and associated risk factors of recurrent falls among middle-aged community-dwelling women in Southern-Sri Lanka.

**METHODS:** Randomly selected 285 middle-aged women (40-60years, Mean±SD;51.7±6.1years) participated. History of falls within the previous 12-months was inquired and those who reported two or more falls within 6-month period were considered as recurrent fallers. Age, menopausal status, weight (kg), height (m), waist-circumference (WC, cm), appendicular-skeletal-muscle-mass (ASMM, kg by DXA), hand-grip-strength (HGS, kg) and gait-speed (GS, m/s) were evaluated. Body-mass-index (BMI, kg/m<sup>2</sup>) and relative-ASMM-index (RSMI, kg/m<sup>2</sup>) were calculated.

**RESULTS:** The prevalence of recurrent falls was 13% (95%CI; 9.4%-17.5%) (n=37). Recurrent falls were higher among postmenopausal women compared to premenopausal women, older middle-aged women (51-60years) compared to young middle-aged women (40-50years), those with low RSMI compared to normal RSMI, low HGS compared to normal HGS and low GS compared to normal GS (p<0.01). BMI and WC did not show significant associations with recurrent falls. Risk factors associated with recurrent falls were age (OR;7.41, 95%CI; 1.23-44.43, p=0.02), RSMI (OR;3.21, 95%CI; 1.00-10.32, p=0.04) and HGS (OR;3.19, 95%CI; 1.26-8.09, p=0.01).

**CONCLUSIONS:** The prevalence of falls among middle-aged women was considerably high. Falls were associated with advanced age, low muscle mass and muscle strength.

Language: en

### **Keywords**

Sri Lanka; Obesity; Middle-aged women; Recurrent falls; Sarcopenia