

## Safety Literature 26<sup>th</sup> April 2020

### A population-based study of 2347 fall-related injuries among older people in a Finnish emergency department

Soukola SK, Jämsen ERK, Pauniahho SK, Ukkonen MT. Eur. Geriatr. Med. 2020; 11(2): 315-320.

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#### Abstract

**PURPOSE:** Fall-related injuries are a significant cause of morbidity, mortality and functional decline among older people. The aim of this study is to analyze the incidence of fall-related emergency department (ED) visits and compare the characteristics of single and recurrent fallers in a population-based sample.

**METHODS:** Consecutive patients aged  $\geq 80$  years and living in the Tampere city region who visited collaborative emergency department within a two-year study period (1 January 2015 to 31 December 2016) due to fall-related injury were included. The incidence of fall-related injuries and recurrent falls was calculated using population statistics.

**RESULTS:** A total of 6915  $\geq 80$ -year-old patients visited our ED 17,769 times during the study period. Thirteen percent of these visits ( $n = 2347$ , median 87 years, 80-103 years; 74% female) were fall-related. The incidence of fall-related ED visits increased from 94/1000 person-years to 171/1000 among those aged 80-89 years and  $\geq 90$  years, respectively. Twenty-four percent of patients had recurrent falls (range 2-5) during the observational period. Twenty-five percent of those discharged home had a subsequent fall-related injury within one month after the index visit. The distribution of diagnoses was similar among those with single and recurrent falls.

**CONCLUSION:** Fall-related injuries are a significant health issue. Almost one in eight of all ED visits were fall-related, and 24% of patients had recurrent fall-related injuries. The risk of subsequent injury was high during the first month after the first injury, emphasizing the need to intervene with the fall risk promptly.

Language: en

#### Keywords

Accidental falls; Aged; Elderly; Emergency services; Injurious falls

## **Association between the instrumented timed up and go test and cognitive function, fear of falling and quality of life in community dwelling people with dementia**

Williams JM, Nyman SR. *J. Frailty Sarcopenia Falls* 2018; 3(4): 185-193.

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**DOI** 10.22540/JFSF-03-185 **PMID** 32300707

### **Abstract**

**OBJECTIVE:** To explore relationships between the instrumented timed up and go test (iTUG) and the following risk factors for falls: cognitive functioning, fear of falling (FoF), and quality of life (QoL) in people with dementia.

**METHODS:** 83 community-dwelling older adults with dementia (mean±sd age 78.00±7.96 years; 60.2% male) completed an interview to capture global cognition (Mini-Addenbrooke's Cognitive Evaluation), FoF (Iconographical Falls Efficacy Scale) and QoL (ICEpopCAPability measure for Older people). Participants completed an iTUG whilst wearing an inertial sensor on their trunk. Linear accelerations and rotational velocities demarcated sub-phases of the iTUG. Relationships were explored through correlations and regression modelling.

**RESULTS:** Cognition was related to duration of walking sub-phases and total time to complete iTUG ( $r=0.25-0.28$ ) suggesting gait speed was related to cognition. FoF was most strongly related to turning velocity ( $r=0.39-0.44$ ), but also to sit-to-stand, gait sub-phases and total time to complete iTUG. Sub-phases explained 27% of the variance in FoF. There were no correlations between iTUG and QoL.

**CONCLUSIONS:** Cognition and FoF were related to time to complete walking sub-phases but FoF was more closely related to turning velocity and standing acceleration. iTUG may offer unique insights into motor behaviour in people with dementia.

Language: en

### **Keywords**

Balance; Cognition; Falls; Fear of falling; Inertial Sensor

## **Beyond balance and mobility, contributions of cognitive function to falls in older adults with cardiovascular disease**

Blackwood J, Gore S. J. *Frailty Sarcopenia Falls* 2019; 4(3): 65-70.

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**DOI** 10.22540/JFSF-04-065 **PMID** 32300720

### **Abstract**

**OBJECTIVES:** Older adults with cardiovascular disease (CVD) are at risk for cognitive impairment. Cognitive function is associated with falls in older adults however it is unknown if a relationship exists between cognitive function and falls in CVD. The aim of this study was to examine the contributions of cognitive function on falls in older adults with CVD.

**METHODS:** A secondary analysis was performed on data from the Health and Retirement Study cohort 2010 (N=3413) of older adults with CVD. Group assignment was based on falls history (yes/no) within the two years prior to the survey. Demographic (age, education, gender, marital status), physical (strength, balance, physical activity, and mobility) and cognitive (immediate and delayed recall, orientation, semantic verbal fluency, numeracy) information was extracted to characterize the sample. Comparisons between groups were completed for all of these variables. Logistic regression was performed to examine associations between each of the cognitive variables and falls while controlling for age, gender, marital status, education, and BMI.

**RESULTS:** Demographic (age, gender, marital status, and education), physical (grip strength, tandem stance time, and gait speed), and cognitive (orientation, immediate and delayed recall) variables differed by falls history ( $p < 0.05$ ). After controlling for confounding, immediate recall was the only significant predictor of falls (OR=1.09, 95% CI=1.01-1.17) (Nagelkerke  $R^2=0.037$ ,  $\chi^2=35.14$ ,  $p < 0.05$ ) with correctly classifying 65.9% of cases.

**CONCLUSIONS:** In older adults with CVD, cognitive and physical functions are more impaired in those with a falls history. Screening for cognitive function, specifically immediate recall, should be a part of the management of falls in this population.

Language: en

### **Keywords**

Cardiovascular disease; Cognition; Falls; Mobility; Recall

## **Commentary for falls in community-dwelling older adults with heart failure: a retrospective cohort study**

Womack JA. Heart Lung 2020; ePub(ePub): ePub.

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### **Abstract**

The age-adjusted incidence of heart failure in the US is declining. Overall incidence and prevalence, however, are increasing. This is likely due to the growing proportion of the US population that is 70+ years of age. 1 , 2 Heart failure treatments have also improved, which has led to longer survival with the condition. 2 As survival improves, we need to pay more attention to quality of life among those living with heart failure. Falls and other frailty-related conditions are important drivers of health-related quality of life and are thus important foci for the care and management of individuals living with heart failure. The article by Lee and colleagues 3 makes an important contribution to our knowledge about both heart failure and falls by highlighting their association in older adults and the need to develop fall prevention programs specific to the needs of this population. Strengths of this study include the large sample size and the ability to adjust for a number of important fall risk factors including prior falls, demographics, comorbidities, and psychiatric medications. In addition, the authors included a number of factors not often assessed when considering falls, including the impact of the physical and social environment. They also explored the association between functional risk factors (physical, cognitive, sensory, and urinary) and falls and found that while function accounts for some of this association, it does not account for all of it.

Language: en

## Effect of aging on trunk muscle function and its influence on falls among older adults

Porto JM, Spilla SB, Cangussu-Oliveira LM, Freire Júnior RC, Nakaishi APM, de Abreu DCC. *J. Aging Phys. Act.* 2020; ePub(ePub): ePub.

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DOI 10.1123/japa.2019-0194 PMID 32303002

### Abstract

The objective was to determine whether trunk muscle function is influenced by the aging process and to identify if the trunk can be an important factor in older people's falls over a period of 1 year. The peak torque, rate of torque development, and torque steadiness of the trunk extensors and flexors were compared between a young group, older group (older adults with no episodes of falls), and older faller group (older adults who had suffered at least one fall episode over a period of 1 year) by one-way analysis of variance, followed by the post hoc Tukey test. The adjusted multivariate linear regression was applied to verify the association between the number of falls and the trunk parameters in older adults. The young group showed higher extensors and flexors peak torque and rate of torque development, and lower extensor torque steadiness at 10% when compared with older groups. Only trunk flexor peak torque showed a negative association with the number of future falls ( $p = .042$ ), but there was no difference in trunk muscle function between the older group and the older faller group.

Language: en

### Keywords

muscle strength; peak torque; rate of torque development; risk of falls; torque steadiness

## **Effect of Wii Fit® exercise on balance of older adults with neurocognitive disorders: a meta-analysis**

Sultana M, Bryant D, Orange JB, Beedie T, Montero-Odasso M. J. *Alzheimers Dis.* 2020; ePub(ePub): ePub.

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**DOI** 10.3233/JAD-191301 **PMID** 32310168

### **Abstract**

**BACKGROUND:** Exercise is beneficial to maintain balance. Wii Fit®, a video game-based exercise, offers an enjoyable way to exercise and is feasible for older adults with neurocognitive disorders (NCD).

**OBJECTIVE:** To evaluate the effects of Wii Fit® exercise training on the balance of older adults with NCD.

**METHODS:** Systematic review and meta-analysis of randomized control trials using Cochrane collaboration tools. The participants were older adults (60 years and over) with NCD. Balance was measured with Berg Balance Scale (BBS) and Timed Up and Go (TUG). Two reviewers independently searched, selected, extracted data, assessed risk of biases, and determined the quality of evidence. Outcomes were evaluated using Grading of Recommendations Assessment, Development, and Evaluation (GRADE). A meta-analysis was performed.

**RESULTS:** The literature search identified 522 source documents of which titles and abstracts were reviewed for 428 after removing 94 duplicates. The reviewers selected five studies out of 50 after a full text review. The overall effect of Wii Fit® exercise training on BBS was moderate, significant, and clinically meaningful (standardized mean difference [SMD]=0.5 standard deviation [SD] [95% confidence interval CI] 0.08, 0.84)). No effect was observed with TUG scores (SMD=0.00 SD [95% CI -0.44, 0.44]). The GRADE quality of evidence was very low.

**CONCLUSION:** Wii Fit® exercise training has a positive effect on balance in older adults with NCD. However, further research with sufficient power is needed to evaluate its effectiveness.

Language: en

### **Keywords**

Aged; neurocognitive disorders; postural balance; video games

## Effects of a falls exercise intervention on strength, power, functional ability and bone in older frequent fallers: FaME (Falls Management Exercise) RCT secondary analysis

Skelton DA, Rutherford OM, Dinan-Young S, Sandlund M. J. Frailty Sarcopenia Falls 2019; 4(1): 11-19.

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DOI 10.22540/JFSF-04-011 PMID 32300711

### Abstract

**OBJECTIVES:** Falls Management Exercise (FaME) has been shown to reduce falls in frequent fallers and in lower risk sedentary older people. The effects of FaME on the strength, power, physical function and bone health of frequently falling older women are yet to be established.

**METHODS:** This paper reports secondary analysis of data from the original randomised controlled trial of FaME in 100 community dwelling women aged  $\geq 65$  years with a history of  $\geq 3$  falls in the previous year. Intervention was group delivered, weekly one hour tailored dynamic balance and strength exercise classes and home exercise for nine months.

**OUTCOME MEASURES INCLUDED:** strength (handgrip, quadriceps, hamstrings, hip abductors, ankles), lower limb explosive power and functional tests (timed up and go, functional reach, timed floor rise and balance), analysed using Linear Mixed Model analysis. Bone Mineral Density (BMD) at hip and spine was measured in a smaller sub-group and analysed using t-tests.

**RESULTS:** Significant time\*group interactions in all measures of strength, except isometric ankle dorsiflexion, concentric hamstring and eccentric quadriceps strength. These improvements in strength equated to average improvements of 7-45%. There were also significant improvements in explosive power (W/kg) (18%,  $p=0.000$ ), timed up and go (16%,  $p=0.000$ ), functional reach (17%,  $p=0.000$ ), floor rise (10%,  $p=0.002$ ) and eyes closed static balance (56%,  $p=0.000$ ). There was a significant loss of hip BMD in the control group (neck of femur  $p<0.05$ ; ward's triangle  $p<0.02$ ).

**CONCLUSION:** The FaME intervention improves lower limb strength, power and clinically relevant functional outcomes in frequently falling older women.

Language: en

### Keywords

Bone Health; Exercise; Falls; Physical Function; Power; Strength



## Evaluation of risk factors for falls in patients with rheumatoid arthritis

Mikos M, Kucharska E, Lulek AM, Kłosiński M, Batko B. Med. Sci. Monit. 2020; 26: e921862.

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**DOI** 10.12659/MSM.921862 **PMID** 32292180

### Abstract

**BACKGROUND** The aim of our study was to investigate the risk factors for falls in the rheumatoid arthritis (RA) patient population in Poland. This would be a major step towards the development of new fall prevention programs. **MATERIAL AND METHODS** There were 450 RA patients who met the criteria of the American College of Rheumatology who participated in this study. The average age of patient participants was 54.2 years; the average RA duration was 15.1 years. All patients filled out the study questionnaire regarding falls, medications, and diseases, and they filled out the Polish version of the Health Assessment Questionnaire (HAQ).

**RESULTS** Of the 400 patients, 203 patients (51%) experienced falls. Out of the 268 falls experienced by study patients, 113 falls (42%) were due to an environmental cause, the remainder 155 falls were caused by health conditions. The number of falls positively correlated with HAQ scores ( $r=0.42$ ,  $P<0.01$ ) and the duration of RA ( $r=0.39$ ,  $P<0.05$ ). For individuals who had fallen 3 or more times, there was a stronger positive correlation between the number of falls and the total HAQ score ( $r=0.61$ ,  $P<0.01$ ). The main risk factors for falls in the study group were dizziness (odds ratio [OR]=3.42), the use of hypotensive medication (OR=2.82), foot deformities (OR=4.09), and a high HAQ score (OR=2.59). Other factors such as drug use (e.g., glucocorticoids), pain, and duration of RA were measured using a visual analogue scale, and were found not to have increased the risk for falls and fractures ( $P>0.05$ ).

**CONCLUSIONS** Knowledge about risk factors can help identify high-risk patients to help decrease their risk of falling, thus preventing fall-related injuries.

Language: en



## Executive function predicts decline in mobility after a fall: the MYHAT study

Hughes TF, Beer JC, Jacobsen E, Ganguli M, Chang CH, Rosano C. *Exp. Gerontol.* 2020; ePub(ePub): ePub.

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DOI 10.1016/j.exger.2020.110948 PMID 32302664

### Abstract

**BACKGROUND:** Evidence suggests that better cognitive functioning is associated with better mobility in older age. It is unknown whether older adults with better cognitive function are more resilient to mobility decline after a fall.

**METHODS:** Participants from the Monongahela Youghiogheny Healthy Aging Team (MYHAT) study were followed annually for up to 9 years for incident falls. We examined one-year (mean 1.0 year, SD 0.1) change in mobility pre- to post-fall using the Timed Up and Go (TUG) in relation to pre-fall cognition (executive function, attention, memory, and visuospatial function) among incident fallers ( $n = 598$ , mean age 79.1, SD = 7.0). Linear regression models tested the association of cognition with change in TUG. Interaction terms were tested to explore if age, sex, body mass index, physical activity, depressive symptoms, or visual acuity modified the associations of cognition and mobility among fallers. The association between cognition and one-year change in TUG was also tested in a comparison sample of non-fallers ( $n = 442$ , mean age 76.3, SD = 7.2).

**RESULTS:** Overall, mobility decline was greater in fallers compared to non-fallers. In fully-adjusted models, higher executive function, but not attention, memory, or visuospatial function, was associated with less decline in mobility among incident fallers. The effect was significantly stronger for those who were older, sedentary, and had lower body mass index. Higher scores in memory tests, but not in other domains, was associated with less mobility decline among non-fallers.

**CONCLUSIONS:** Higher executive function may offer resilience to mobility decline after a fall, especially among older adults with other risk factors for mobility decline. Future studies should assess whether executive function may be a helpful risk index of fall-related physical functional decline in geriatric settings.

Language: en

### Keywords

Cognition; Executive function; Falls; Mobility

## Fear of falling and cognitive impairment in elderly with different social support levels: findings from a community survey in Central Vietnam

Vo THM, Nakamura K, Seino K, Nguyen HTL, Van Vo T. BMC Geriatr. 2020; 20(1): e141.

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DOI 10.1186/s12877-020-01533-8 PMID 32299392

### Abstract

**BACKGROUND:** Fear of falling (FoF) in the elderly is one of the major public health concerns in this era of aging of the population. As there is limited evidence on how cognitive function may differ by social support level in relation to FoF among the elderly, this cross-sectional study aims to investigate the prevalence of FoF and the associations between cognitive impairment and FoF by the social support level, after adjustments for potential confounders.

**METHODS:** Data from the "Health needs assessment of elderly in Thua Thien Hue Province, Vietnam in 2018" survey of 725 elderly aged 60 years or older were used for analysis. FoF was assessed using the Fall Efficacy Scale-International. High FoF was defined as a score above 28. The Multidimensional Scale of Perceived Social Support was used to measure the perception of support. Logistic regression analysis was performed to investigate the association between cognitive function and FoF by social support levels ( $p < 0.05$ ).

**RESULTS:** The prevalence of high FoF among the elderly was 40.8%. Female gender, advanced age, a marital status of single or formerly married, living alone, history of injury, history of falls, chronic diseases (arthritis and/or hypertension), limitations of the IADL and BADL, visual difficulty and walking difficulty, low social support, and cognitive impairment were all significantly associated with a high FoF. After adjustments for the age, gender, marital status, history of falls and health-related factors, cognitive impairment remained significantly associated with a high FoF among the elderly with a low to moderate social support level (OR = 2.97, 95% CI 1.49-5.89), but not in those with a high social support level.

**CONCLUSIONS:** A high FoF was associated with impairment of cognitive function among the elderly who perceived themselves as having low or moderate support levels, even after adjustments for socio demographic and physical functional factors. However, this association was not observed among the elderly who perceived themselves as having high social support levels. Fall prevention programs for the elderly with various levels of social support should be carefully devised, keeping in mind the cognitive function levels of the target recipients.

Language: en

### Keywords

Cognitive impairment; Elderly; Fear of falling; Social support

## **Impact of exercise on bone mineral density, fall prevention, and vertebral fragility fractures in postmenopausal osteoporotic women**

Hoke M, Omar NB, Amburgy JW, Self DM, Schnell A, Morgan S, Larios EA, Chambers MR. *J. Clin. Neurosci.* 2020; ePub(ePub): ePub.

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**DOI** 10.1016/j.jocn.2020.04.040 **PMID** 32305276

### **Abstract**

Osteoporosis is the most prevalent bone disease worldwide and predisposes affected individuals to fragility fractures. Exercise has been shown to have multiple health benefits in post-menopausal osteoporotic women, but often recommendations regarding the benefits of specific exercise types are vague. Improving bone mineral density (BMD) is an essential component in any program to prevent osteoporotic vertebral fractures. The objective of this report is to briefly review the current understanding on the impact of exercise on BMD in postmenopausal women as it pertains to fragility fractures. Broad categories of exercises include aerobic, resistance, stretching, and balance. Tai Chi, Yoga, and Pilates are a heterogeneous group of specific exercise modalities that can span multiple categories. Current literature suggests that only resistance type exercises have a convincing impact on BMD. Core-strengthening exercises and attention to posture/balance can help mitigate falls. A number of barriers affect patient compliance and accessibility to exercise. In summary, exercise should be included in any multi-modality osteoporosis treatment plan with the goal of sustained exercise throughout life. If possible, osteoporotic women should be on a resistance-based regimen incorporating weight-bearing exercises, and also target posture and balance. Healthcare providers and educators should have resources readily available for patients.

Language: en

### **Keywords**

Bone mineral density; Exercise; Osteoporosis; Post-menopausal; Vertebral fracture

## Physio-feedback and exercise program (PEER) improves balance, muscle strength, and fall risk in older adults

Thiamwong L, Stout JR, Sole ML, Ng BP, Yan X, Talbert S. Res. Gerontol. Nurs. 2020; ePub(ePub): ePub.

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DOI 10.3928/19404921-20200324-01 PMID 32286669

### Abstract

A one-group pre/posttest study was conducted to examine the feasibility and effect size of an 8-week physio-feedback and exercise program (PEER) on improving balance, muscle strength, and fall risk. Nineteen participants (mean age = 76 years) received the intervention, which included visual physio-feedback by the BTrackS™ Assess Balance System, cognitive reframing, and a combined group- and home-based exercise program by a trained peer coach. Pre- and post-measurement outcomes were evaluated for balance, handgrip strength, and fall risk. Feasibility was assessed by dropout rate, safety, and adherence to exercise. Significant improvements were noted in dynamic balance (Sit-to-Stand, Timed Up & Go tests), handgrip strength, and fall risk. Participants' attendance was 87.5%, with no fall incidence. The physio-feedback, cognitive reframing, and peer coaching facilitate older adults to align their perceived fall risk with physiological fall risk and motivate them to stay active. PEER intervention is feasible; safe; improves balance, muscle strength, and fall risk; and may enhance activity engagement. **TARGETS:** Community-dwelling older adults. **INTERVENTION DESCRIPTION:** Provide visual physio-feedback and cognitive reframing based on the fall risk appraisal matrix and participate in combined group- and home-based exercises by a trained peer coach. **MECHANISM OF ACTION:** Align perceived and physiological fall risk, peer coaching to exercise. **OUTCOMES:** Balance, handgrip strength, fall risk, and activity engagement. [Research in Gerontological Nursing, xx(x), xx-xx].

Language: en

## **Prevalence and risk factors associated with falls among community-dwelling and institutionalized older adults in Indonesia**

Susilowati IH, Nugraha S, Sabarinah S, Peltzer K, Pengpid S, Hasiholan BP. *Malays. Fam. Physician* 2020; 15(1): 30-38.

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**DOI** unavailable

**PMID** 32284802

### **Abstract**

**OBJECTIVE:** To assess the prevalence and social and health correlates of falls and fall risk in a sample of community-dwelling and institutionalized older Indonesians.

**METHODS:** This cross-sectional study was conducted July-August 2018 in three regions in Indonesia. Adults aged 60 years and above (n=427) were recruited via random sampling from community clinics and public and private elderly homes. They responded to interview-administered questions and provided measurements on sociodemographics and various health variables, including falls and fall risk. Fall risk was assessed with the STEADI (Stopping Elderly Accidents, Deaths, & Injuries) screen. Multivariable logistic regression was conducted to estimate associations with fall and fall risk.

**RESULTS:** In the year immediately preceding the study, 29.0% of participants had suffered a fall. Approximately one-third of women (31.1%) and one-fifth of men (20.4%) reported a fall in the past year, and 25.4% of community dwellers and 32.7% of institutionalized older adults had fallen. The overall proportion of fall risk was 45.4%, 49.0% among women, 38.0% among men, 50.5% in the institutionalized setting, and 40.4% in the community setting. In adjusted logistic regression analysis, older age (OR: 1.89, CI: 1.06, 3.37), private elderly home setting (OR: 2.04, CI: 1.10, 3.78), and being female (OR: 0.49, CI: 0.30, 0.82) were associated with falls in the preceding 12 months. Older age (80-102 years) (OR: 2.55, CI: 1.46, 4.46), private elderly home residence (OR: 2.24, CI: 1.19, 4.21), lack of education (OR: 0.51, CI: 0.28, 0.93), memory problems (OR: 1.81, CI: 1.09, 2.99), and arthritis (OR: 2.97, CI: 1.26, 7.00) were associated with fall risk by the STEADI screen. In stratified analysis by setting, being female (OR: 0.49, CI: 0.25, 0.95) and living in urban areas (OR: 1.97, CI: 1.03, 3.76) were associated with falls in the institutionalized setting, and having near vision problems (OR: 2.32, CI: 1.09, 4.93) was associated with falls in the community setting. Older age (OR: 2.87, CI: 1.36, 6.07) was associated with fall risk in the institutionalized setting, and rural residence (OR: 0.37, CI: 0.15, 0.93) and having a joint disorder or arthritis (OR: 4.82, CI: 1.28, 16.61) were associated with fall risk in the community setting.

**CONCLUSION:** A high proportion of older adults in community and institutional care in Indonesia have fallen or were at risk of falling in the preceding 12 months. Health variables for fall and fall risk were identified for the population overall and for specific populations in the home care and community setting that could help in designing fall-prevention strategies.

Language: en

### **Keywords**

Fall; Indonesia; community; elderly home; fall risk; health correlates; older adults

## **The effect of a multicomponent exercise programme on elderly adults' risk of falling in nursing homes: a systematic review**

Abdullah Alfadhel SA, Vennu V, Alotaibi AD, Algarni AM, Saad Bindawas SM. J. Pak. Med. Assoc. 2020; 70(4): 699-704.

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**DOI** 10.5455/JPMA.292007 **PMID** 32296218

### **Abstract**

**OBJECTIVE:** To determine the effect of a multi-component exercise programme on elderly adults' risk of falling in nursing homes.

**METHODS:** A computerised search of published randomised controlled trials in the English language was performed using PubMed, Cochrane Library, the Cumulative Index of Nursing and Allied Health Literature, Physiotherapy Evidence Database (PEDro), and the Institute for Scientific Information up to December 2017. We included highquality articles that reported a score of  $\geq 5$  on the Physiotherapy Evidence Databasescale which compared multicomponent exercise with a single exercise programme in nursing homes, with the risk of falling as an outcome, among participants aged  $\geq 65$  years.

**RESULTS:** A total of 8 articles, comprising 382 participants, were included. All these articles scored 6-8 points out of 10 on the PEDro scale, with an average of 6.7 points. The mean age of participants in the included articles was ranged from  $76 \pm 8.0$  to  $92 \pm 2.0$  years, and 286 (75%) participants were females. A multi-component exercise programme in the experimental group, which had 204 (53.4%) subjects significantly reduced the risk of falling in nursing homes compared to a single-exercise programme, which was used in the control group that had 178(46.6%) subjects.

**CONCLUSIONS:** A multi-component exercise programme was found to be useful for reducing elderly adults' risk of falling in nursing homes.

Language: en

### **Keywords**

Exercise, Elderly, Nursing home, Systematic review, Fall.



## **The Footfall Programme: participant experiences of a lower limb, foot and ankle exercise intervention for falls prevention - an exploratory study**

Conde M, Hendry G, Skelton DA. *J. Frailty Sarcopenia Falls* 2019; 4(3): 78-90.

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**DOI** 10.22540/JFSF-04-078 **PMID** 32300722

### **Abstract**

**OBJECTIVES:** Despite growing evidence that foot and ankle exercise programmes are effective for falls prevention, little is known about older adults' views and preferences of programme components for long-term maintenance. The aims of this study were to explore the experiences and acceptability of Scottish and Portuguese older adults of undertaking a home-based foot, ankle and lower limb exercise intervention.

**METHODS:** Ten Scottish (mean age 76 years, 7 female) and fourteen Portuguese (mean age 66 years, 12 female) community-dwelling older adults undertook the programme for one week, followed by focus group discussions (2-6 people per group), guided by a semi-structured interview guide. Data was analysed using thematic analysis.

**RESULTS:** Seven themes were identified: Assessment, Group exercise taster, Home based exercise; Footfall programme kit, Midweek phone call, Reasons for participation and the Research Process. Programme components, support telephone calls and research procedures were generally well accepted by participants and they valued having a contribution to the design. They preferred a blended home and intermittent group-based programme format for motivation and progression and recommended changes to some of the exercises and equipment to reduce barriers to participation. Some cultural differences emerged, including importance of the functional assessments for Portuguese participants, time issues and difficulty in completion of the exercise diary, reflecting lower literacy levels.

**CONCLUSIONS:** Participants found the programme acceptable but preferred a blended home and occasional group-based programme for adherence and motivation. A strong educational component to improve health literacy and simple paperwork completion to avoid data loss in future studies with Portuguese older adults is important.

Language: en

### **Keywords**

Exercise; Falls; Feasibility; Feet; Older adults



## **The prevalence of sarcopenia in fallers and those at risk of falls in a secondary care falls unit as measured by bio-impedance analysis**

Barnes KS, Smeed B, Taylor R, Hood V, Brooke-Wavell K, Slee A, Ryg J, Masud T. J. Frailty Sarcopenia Falls 2018; 3(3): 128-131.

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### **Abstract**

**OBJECTIVES:** Sarcopenia is characterised by loss of skeletal muscle mass and strength with adverse outcomes: physical disability, poor quality of life and death. Low muscle mass and strength are risk factors for falls, although there are few data available on the prevalence of sarcopenia in fallers. This study aimed to determine prevalence of sarcopenia in older people referred to a falls clinic.

**METHODS:** Consecutive patients referred to a secondary care falls unit were recruited. Sarcopenia was diagnosed using the European Working Group on Sarcopenia definition (low muscle mass and function) and cut-off points. Bio-impedance measured appendicular skeletal muscle mass. Gait speed and grip strength were functional measures.

**RESULTS:** Fifty-eight patients were recruited. Mean (SD) grip strength for women and men respectively were 17.9 (4.9) and 29.9(8.7) kg, mean (SD) gait speeds were 0.61(0.18) and 0.72 (0.4) m/s, mean (SD) appendicular skeletal muscle index in women and men were 6.98(1.0) and 7.85 (1.0) kg/m<sup>2</sup> (p=0.018). Prevalence of sarcopenia was 9.8% (95% CI=1.6%-18%).

**CONCLUSIONS:** Sarcopenia, as measured by bio-impedance is not uncommon in older people accessing a secondary care falls clinic. Bio-impedance was simple to perform, although further validation against gold standard methods is needed. As nutritional and exercise interventions for sarcopenia are available, simple methods for diagnosing sarcopenia in fallers should be considered.

Language: en

### **Keywords**

Bio-impedance; Falls; Muscle; Prevalence; Sarcopenia

## Assessment of dynamic balance during step initiation in Parkinson's disease patients and elderly - a validity study

Juras G, Kamieniarz A, Michalska J, Słomka K. Acta Bioeng. Biomech. 2020; 22(1): 3-10.

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### Abstract

**PURPOSE:** The aim of this study was to evaluate the reliability of the novel posturographic procedure and to investigate the relationships between parameters of this procedure and clinical tests. We hypothesised the proposed step initiation procedure to be reliable method of balance and motor disability assessment, especially in patients with neurological deficits. Also, we assumed high significant correlation between parameters of step initiation procedures and clinical tests.

**METHODS:** The 35 subjects with idiopathic PD and 35 agedmatched healthy controls participated in this study. The gait initiation was measured using two force platforms. The procedure consisted of three phases: (1) quiet standing on a first platform (2) crossing on the second platform, (3) quiet standing on a second platform. Testing was carried out in four conditions: unperturbed trial, obstacle crossing, step-up and step-down.

**RESULTS:** In the proposed gait initiation procedure, the vCOP, raCOP and rmsCOP showed an excellent reliability ( $ICC > 0.80$ ). For transit phase, reliability of all variables in all conditions also was excellent ( $ICC = 0.8-0.9$ ). There were only a few associations between Tinetti scores and posturographic variables in controls, but in PD patients the significant correlations were found between the proposed measures and the UPDRS, Tinetti, FRT, TUG and with the BBS.

**CONCLUSIONS:** The proposed gait initiation procedure is reliable and very suitable for the assessment of patients with Parkinson's disease. It can be used as an objective assessment of the clinical condition and dynamic balance, and help in the designing and programming of the appropriate rehabilitation and treatment.

Language: en

## Current state of fall prevention and management policies and procedures in Canadian spinal cord injury rehabilitation

Singh H, Flett HM, Silver MP, Craven BC, Jaglal SB, Musselman KE. BMC Health Serv. Res. 2020; 20(1): e299.

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### Abstract

**BACKGROUND:** Preventing patient falls is a priority in tertiary spinal cord injury (SCI) rehabilitation. Falls can result in patient or staff injury, delayed rehabilitation, and hospital liability. A comprehensive overview of fall prevention/management policies and procedures in Canadian SCI rehabilitation is currently lacking. We describe and compare the fall prevention/management policies and procedures implemented in Canadian tertiary hospitals that provide SCI rehabilitation.

**METHODS:** Fall prevention/management documents implemented in SCI rehabilitation at six Canadian tertiary rehabilitation hospitals across five provinces were analyzed using a document analysis. Analysis involved multiple readings of the documents followed by a content and thematic document analysis.

**RESULTS:** Fall prevention/management policies and procedures in SCI rehabilitation were organized into three main categories: 1) pre-fall policies and procedures; 2) post-fall policies and procedures; and, 3) communication between and amongst staff, patients, and families. Pre-fall policies and procedures encompassed: a) the definition of a fall; b) fall risk assessments in SCI rehabilitation; and, c) fall prevention strategies. The post-fall policies and procedures included: a) recovery from a fall; b) incident reporting process; and, c) fall classification. Components of fall prevention/management policies and practices that differed between hospitals included the fall risk assessments, post-fall huddles, and fall classifications.

**CONCLUSIONS:** Fall prevention/management is a required organizational practice for all hospitals. Although Canadian tertiary hospitals that provide SCI rehabilitation have similar components of fall prevention/management policies and procedures, the specific requirements differ at each site. There is a need for evidence-informed, consensus-driven implementation of SCI-specific fall prevention and management procedures across Canadian SCI rehabilitation settings.

Language: en

### Keywords

Document analysis; Fall prevention; Rehabilitation; Spinal cord injuries

## Design and analysis for fall detection system simplification

Martínez-Villaseñor L, Ponce H. J. Vis. Exp. 2020; ePub(158): ePub.

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### Abstract

This paper presents a methodology based on multimodal sensors to configure a simple, comfortable and fast fall detection and human activity recognition system that can be easily implemented and adopted. The methodology is based on the configuration of specific types of sensors, machine-learning methods and procedures. The protocol is divided into four phases: (1) database creation (2) data analysis (3) system simplification and (4) evaluation. Using this methodology, we created a multimodal database for fall detection and human activity recognition, namely UP-Fall Detection. It comprises data samples from 17 subjects that perform 5 types of falls and 6 different simple activities, during 3 trials. All information was gathered using 5 wearable sensors (tri-axis accelerometer, gyroscope and light intensity), 1 electroencephalograph helmet, 6 infrared sensors as ambient sensors, and 2 cameras in lateral and front viewpoints. The proposed novel methodology adds some important stages to perform a deep analysis of the following design issues in order to simplify a fall detection system: a) select which sensors or combination of sensors are to be used in a simple fall detection system, b) determine the best placement of the sources of information, and c) select the most suitable machine learning classification method for fall and human activity detection and recognition. Even though some multimodal approaches reported in literature only focus on one or two of the above-mentioned issues, our methodology allows simultaneously solving these three design problems related to a human fall and activity detection and recognition system.

Language: en

## Fall risk and balance outcomes in healthy young adults: a call for research

Osama M, Waseem M, Imran H. J. Pak. Med. Assoc. 2020; 70(4): 769-770.

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### Abstract

Editor: a great emphasis has been paid on measurement and improvement of balance in the elderly in gerontology and neuromuscular rehabilitation, and both fall risk and balance deterioration are found to be significantly correlated with advancing age in the elderly, and for a long time, balance has been thought of being a major predictor of falls.<sup>1,2</sup> Contrary to the popular belief, falls are not uncommon in healthy young individuals either, with an incidence of 18%, as compared to 21% and 35% for the middle aged and older adults respectively.<sup>2</sup> This finding is also reinforced by the data of 80 million reported falls in community dwelling U.S adults, out of which 32.3% were reported to be young adults, 35.3% middle aged and 32.3% were older adults.<sup>3</sup> Even though it is perceived that sports and recreational activities would be the most common activity resulting in falls in healthy young adults, but according to literature it is ambulation in 31.5% of cases.<sup>2</sup> Similarly, the most common perceived cause of fall is found to be balance and gait impairment (38.9%) and the most common environmental factor resulting in fall is found to be uneven surfaces and steps (20.9%).<sup>2</sup> It is reported that it was more common for healthy young adults as compared to middle aged and older adults, to experience an injury resulting from fall with an incidence ...

Language: en

## **Fall/fracture-related healthcare costs and their association with cumulative anticholinergic burden in people with overactive bladder**

Lozano-Ortega G, Schermer CR, Walker DR, Szabo SM, Rogula B, Deighton AM, Gooch KL, Campbell NL. *Pharmacoecon*. Open 2020; ePub(ePub): ePub.

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### **Abstract**

**BACKGROUND:** Falls/fractures are major causes of morbidity and mortality among older adults and the resulting health consequences generate a substantial economic burden. Risk factors are numerous and include overactive bladder (OAB) and anticholinergic use.

**OBJECTIVES:** We aimed to estimate the impact of falls/fractures on all-cause healthcare resource utilization and costs, according to levels of cumulative anticholinergic burden, among individuals with OAB.

**METHODS:** Among a US cohort of adults with OAB (identified based on medical claims for OAB or OAB-specific medications), the frequency of resource utilization (outpatients visits, medication use, and hospitalizations) was examined according to level of anticholinergic burden. Anticholinergic burden was assessed cumulatively using a published measure, and categorized as no, low, medium, or high. Resource utilization prior to and after a fall/fracture was compared. Generalized linear models were used to examine overall and incremental changes in healthcare resource utilization and costs by fall/fracture status, and annual costs were predicted according to age, sex, fall/fracture status, and level of anticholinergic burden.

**RESULTS:** The mean age of the OAB cohort (n = 154,432) was 56 years, 68% were female, and baseline mean anticholinergic burden was 266.7 (i.e. a medium level of burden); a fall/fracture was experienced by 9.9% of the cohort. All estimates of resource utilization were higher among those with higher levels of anticholinergic burden, regardless of fall/fracture status, and higher for all levels of anticholinergic burden after a fall/fracture. Among those with a fall/fracture, the highest predicted annual costs were observed among those aged 66-75 years with high anticholinergic burden (US\$22,408 for males, US\$22,752 for females).

**CONCLUSIONS:** Falls/fractures were associated with higher costs, which increased with increasing anticholinergic burden.

Language: en

## Impact of STEADI-Rx: a community pharmacy-based fall prevention intervention

Blalock SJ, Ferreri SP, Renfro CP, Robinson JM, Farley JF, Ray N, Busby-Whitehead J. J. Am. Geriatr. Soc. 2020; ePub(ePub): ePub.

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### Abstract

**OBJECTIVES:** To evaluate the effects of a community pharmacy-based fall prevention intervention (STEADI-Rx) on the risk of falling and use of medications associated with an increased risk of falling.

**DESIGN:** Randomized controlled trial. **SETTING:** A total of 65 community pharmacies in North Carolina (NC). **PARTICIPANTS:** Adults (age  $\geq 65$  years) using either four or more chronic medications or one or more medications associated with an increased risk of falling (n = 10,565). **INTERVENTION:** Pharmacy staff screened patients for fall risk using questions from the Stopping Elderly Accidents, Deaths, and Injuries (STEADI) algorithm. Patients who screened positive were eligible to receive a pharmacist-conducted medication review, with recommendations sent to patients' healthcare providers following the review. **MEASUREMENTS:** At intervention pharmacies, pharmacy staff used standardized forms to record participant responses to screening questions and information concerning the medication reviews. For participants with continuous Medicare Part D/NC Medicaid coverage (n = 3,212), the Drug Burden Index (DBI) was used to assess exposure to high-risk medications, and insurance claims records for emergency department visits and hospitalizations were used to assess falls.

**RESULTS:** Among intervention group participants (n = 4,719), 73% (n = 3,437) were screened for fall risk. Among those who screened positive (n = 1,901), 72% (n = 1,373) received a medication review; and 27% (n = 521) had at least one medication-related recommendation communicated to their healthcare provider(s) following the review. A total of 716 specific medication recommendations were made. DBI scores decreased from the pre- to postintervention period in both the control and the intervention group. However, the amount of change over time did not differ between these two groups (P = .66). Risk of falling did not change between the pre- to postintervention period or differ between groups (P = .58). **CONCLUSION:** We successfully implemented STEADI-Rx in the community pharmacy setting. However, we found no differences in fall risk or the use of medications associated with increased risk of falling between the intervention and control groups.

Language: en

### Keywords

aging; community pharmacy; falls; health services; medication



## **Physical, mental, and social functioning in women age 65 and above with and without a falls history: an observational case-control study**

Minet LR, Thomsen K, Ryg J, Matzen L, Masud T, Ytterberg C. J. Frailty Sarcopenia Falls 2018; 3(4): 179-184.

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### **Abstract**

**OBJECTIVES:** There is a lack of knowledge about how falls are associated with the older person's physical, mental, and social functioning which would help find effective methods for identifying rehabilitation needs in the older population to ensure appropriate follow-up. The aim was to investigate and compare functioning in women with and without a falls history.

**METHODS:** This was an observational case-control study. Study participants were fallers aged  $\geq 65$  years recruited consecutively from a hospital; age matched randomly selected community controls (fallers without contact with the healthcare system due to falls and non-fallers). Fallers were classified as once only fallers and recurrent fallers.

**RESULTS:** The sample constituted a group of older women with and without a falls history; 117 fallers from the Falls Clinic, and 99 fallers and 106 non-fallers community controls, median age 80 years. Both fallers from the clinic and the community had significantly lower functioning compared to non-fallers in all three domains. Recurrent fallers had poorer functioning compared to once only fallers.

**CONCLUSION:** This study contributes to knowledge about older people's functioning and disability in conjunction with a high fall-risk and highlights the importance of rehabilitation and prevention strategies that focus on early identification of disability in the older population regardless of falls history.

Language: en

### **Keywords**

Falls; Functioning; Observational study; Older women

## Self-reported fall and associated factors among adult people with visual impairment in Gondar, Ethiopia: a cross-sectional study

Gashaw M, Janakiraman B, Minyihun A, Jember G, Sany K. BMC Public Health 2020; 20(1): e498.

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### Abstract

**BACKGROUND:** Fall is a major public health problem and potentially disabling issue. A vast burden of visually impaired live in low-middle income countries particularly in Sub-Saharan Africa. Limited ability to detect environmental hazards puts visually impaired at a greater risk of falls and unintentional injuries. Falls among visually impaired is associated with considerable disability, health care cost, loss of independence, and socio-economic consequences. Ethiopia lacked estimates of fall among any vulnerable population, particularly among visually impaired people. Therefore, this study aimed to estimate the prevalence of falls and factors associated among adult people with medically diagnosed visual impairment in Ethiopia.

**METHODS:** An institutional-based cross-sectional study was conducted among visually impaired adults who attended the ophthalmology clinic at the University of Gondar comprehensive specialized hospital during the study period. Data were collected by interview method using structured questionnaires, patient medical record reviews, and physical measurements. Bivariate and multivariable binary logistic regression model analysis was used to identify factors associated with falls. Adjusted odds ratio with corresponding 95% confidence intervals were computed to show the strength of association.

**RESULTS:** A total of 328 adults medically diagnosed with visual impairment participated in the study (97.3% response rate). The age of the participants ranged from 25 to 89 years with a mean age of (56.46 ± 14.2 years). The overall cumulative prevalence of self-reported falls among adults with visual impairment was 26.8% with 95%CI (22.7, 32.4%). The major associated factors of fall identified by multivariate analysis were; visual impairment in both eye (AOR 3.21, 95% CI 1.11, 9.29), fear of falling: some concerned: (AOR, 4.12; 95%CI, 1.44, 11.76), very concerned fear (AOR 10.03; 95% CI, 3.03, 33.21), medications: (AOR 4.63; 95% CI 2.14, 10.00) and self-reported depression: (AOR 3.46; 95% CI 1.11, 10.79).

**CONCLUSION:** The result of this study indicates a moderate self-reported prevalence of fall among adult people with medically diagnosed visual impairment. Identifying sub-groups at risk of falls among visually impaired, modifiable risk factors, implementation of precaution measures to avoid fall and fall-related injuries, and most importantly measures that would reduce the fear of falls in visually impaired people deserves immediate attention.

Language: en

### Keywords

Depression; Ethiopia; Fall; Fear of fall; Medications; Visual impairment