

## Safety Literature 19<sup>th</sup> January 2020

### Assessment of risk factors associated with falls among the elderly in a municipality in the state of Paraíba, Brazil. A cross-sectional study

Rodrigues ARGM, Assef JC, Lima CB. Sao Paulo Med. J. 2019; 137(5): 430-437.

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DOI 10.1590/1516-3180.2018.0198120619 PMID 31939568

#### Abstract

**BACKGROUND:** Falls among the elderly are one of the main public health problems that have direct consequences for their health. They reduce these individuals' autonomy and functional independence.

**OBJECTIVE:** The objective of this study was to evaluate the risk factors associated with falls among elderly people enrolled within primary healthcare. **DESIGN AND SETTING:** Cross-sectional study conducted at primary healthcare units in the municipality of Patos, state of Paraíba, Brazil.

**METHODS:** The Fall Risk Score and Timed Up and Go (TUG) test were used for evaluating the risk of falling among 316 elderly individuals. The independent variables used were sociodemographic and health conditions, while the dependent variable was the frequency of falls on the same level, over the course of previous years. The descriptive statistical tests used were the chi-square and Mann-Whitney tests.

**RESULTS:** Occurrence of falls was reported by 211 of the 316 participants, representing a prevalence of 66.8% with confidence interval 61.6-72.0. The logistic regression results showed, after adjusting for all variables included in the model, that only the variables of vestibular disorders, self-assessed health status and dizziness/vertigo (trend) were significant ( $P \leq 0.05$ ). Most of the elderly participants had two or more associated pathological conditions. The participants were predominantly female (68.4%).

**CONCLUSIONS:** Higher occurrence of falls was observed among female elderly individuals who suffered recurrent falls, had had low levels of schooling, presented comorbidities, had comorbidities and made use of drugs. These conditions predisposed these individuals to greater vulnerability to the risk of falls.

Language: en

## Association of benzodiazepines, opioids and tricyclic antidepressants use and falls in trauma patients: conditional effect of age

Cordovilla-Guardia S, Molina TB, Franco-Antonio C, Santano-Mogena E, Vilar-López R. PLoS One 2020; 15(1): e0227696.

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### Abstract

**INTRODUCTION:** The relationship between benzodiazepines, opioids and tricyclic antidepressants and trauma is of great importance because of increased consumption and the growing evidence of a positive association among older adults. The objective of this study was to determine the effect size of the association between the consumption of psychotropic medications /opioids and falls in patients who have suffered trauma by studying the role of other variables in this relationship.

**METHOD:** From 2011 to 2016, the presence of benzodiazepines, opioids and tricyclic antidepressants and other drugs in 1060 patients admitted for trauma at a level I trauma hospital was analysed. Multivariate models were used to measure the adjusted effect size of the association between consumption of benzodiazepines, opioids and tricyclic antidepressants and falls, and the effect of age on this association was studied.

**RESULTS:** A total of 192 patients tested positive for benzodiazepines, opioids and tricyclic antidepressants, with same-level falls being the most frequent mechanism of injury in this group (40.1%), with an odds ratio of 1.96 (1.40-2.75),  $p < 0.001$ . Once other covariates were introduced, this association was not observed, leaving only age, gender (woman) and, to a lesser extent, sensory conditions as variables associated with falls. Age acted as an effect modifier between benzodiazepines, opioids and tricyclic antidepressants and falls, with significant effect sizes starting at 51.9 years of age.

**CONCLUSIONS:** The association between the consumption of benzodiazepines, opioids and tricyclic antidepressants and falls in patients admitted for trauma is conditioned by other confounding variables, with age being the most influential confounding variable.

Language: en

## **Depressive symptom as a mediator of the influence of self-reported sleep quality on falls: a mediation analysis**

Liu JH, Ma QH, Sun HP, Xu Y, Pan CW. *Aging Ment. Health* 2020; ePub(ePub): ePub.

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**DOI** 10.1080/13607863.2020.1711860 **PMID** 31920106

### **Abstract**

**Objectives:** It is well known that sleep quality was associated with falls. This study aimed to examine whether the presence of depressive symptoms mediate the association of self-reported sleep quality with falls. **Methods:** Data of community-based study including 4,579 adults aged 60 years or older were analyzed. Information regarding sleep quality and falls was self-reported by participants using pre-designed questionnaires. The nine-item Patient Health Questionnaire (PHQ-9) without the sleep item was used to assess the presence of depressive symptoms. A bootstrapping approach was performed to explore whether the relationship between self-reported sleep quality and falls was partially mediated by depressive symptoms. The mediator was considered significant if the 95% confidence interval (CI) did not include 0. **Results:** Older adults with poor sleep quality had higher odds of falls than their counterparts with normal sleep. In the equation regressed falls on self-reported sleep quality and PHQ-9 score, the association between self-reported sleep quality and falls disappeared. Depressive symptoms partially mediated the association between self-reported sleep quality and falls based on the significance of indirect effect ( $\beta = 0.15$ , 95% bootstrap CI = 0.08, 0.22). **Conclusions:** The presence of depressive symptoms might partially mediate the association of self-reported sleep quality with falls among older adults.

Language: en

### **Keywords**

Sleep quality; depressive symptoms; elderly; falls

## **Determinants, circumstances and consequences of injurious falls among older women living in the community**

Phelan EA, Rillamas-Sun E, Johnson L, LaMonte MJ, Buchner DM, Lacroix AZ, Anderson GL. *Inj. Prev.* 2020; ePub(ePub): ePub.

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(Copyright © 2020, BMJ Publishing Group)

**DOI** 10.1136/injuryprev-2019-043499 **PMID** 31941756

### **Abstract**

**OBJECTIVE:** To identify the risk factors of women who fell with injury relative to women who did not fall or fell without injury and to describe the circumstances and consequences of injurious and non-injurious falls.

**METHODS:** We analysed 5074 older women from the Objective Physical Activity and Cardiovascular Health Study who prospectively tracked their falls using a 13-month calendar. Women with a reported fall were phone interviewed about fall-related details, including injuries. Risk factors were identified from surveys and clinical home visits. Logistic regression models were used to calculate adjusted ORs and 95% CIs for injurious falls relative to not falling or falling without injury. Circumstances of injurious and non-injurious falls were compared.

**RESULTS:** At least one fall was experienced by 1481 (29%) participants. Of these, 1043 were phone interviewed, of whom 430 (41%) reported at least one injurious fall. Relative to not falling, the risk factor most strongly associated with experiencing an injurious fall was having fallen  $\geq 2$  times (OR 4.0, CI 2.7 to 5.8) in the past year. Being black was protective for fall-related injury (OR 0.6, CI 0.4 to 0.9). No strong associations in risk factors were observed for injurious relative to non-injurious falls. Injurious falls were more likely to occur away from and outside of the home ( $p < 0.05$ ). Over half of those who injured self-managed their injury.

**CONCLUSION:** Falling repeatedly is a powerful risk factor for injurious falls. Those who have fallen more than once should be prioritised for interventions to mitigate the risk of an injurious fall.

Language: en

### **Keywords**

epidemiology; fall; older people; planning

## Effects of a resistance and balance exercise programme on physical fitness, health-related quality of life and fear of falling in older women with osteoporosis and vertebral fracture: a randomized controlled trial

Stanghelle B, Bentzen H, Giangregorio L, Pripp AH, Skelton D, Bergland A. *Osteoporos. Int.* 2020; ePub(ePub): ePub.

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DOI 10.1007/s00198-019-05256-4 PMID 31925473

### Abstract

Exercise is recommended for people with osteoporosis, but the effect for people who have suffered vertebral fracture is uncertain. This study shows that a multicomponent exercise-program based on recommendations for people with osteoporosis improved muscle strength, balance, and fear of falling in older women with osteoporosis and vertebral fracture.

**INTRODUCTION:** Guidelines for exercise strongly recommend that older adults with osteoporosis or osteoporotic vertebral fracture should engage in a multicomponent exercise programme that includes resistance training in combination with balance training. Prior research is scarce and shows inconsistent findings. This study examines whether current exercise guidelines for osteoporosis, when applied to individuals with vertebral fractures, can improve health outcomes.

**METHODS:** This single blinded randomized controlled trial included 149 older women diagnosed with osteoporosis and vertebral fracture, 65+ years. The intervention group performed a 12-week multicomponent exercise programme, the control group received usual care. Primary outcome was habitual walking speed, secondary outcomes were physical fitness (Senior Fitness Test, Functional Reach and Four Square Step Test), health-related quality of life and fear of falling. Descriptive data was reported as mean (standard deviation) and count (percent). Data were analyzed following intention to treat principle and per protocol. Between-group differences were assessed using linear regression models (ANCOVA analysis).

**RESULTS:** No statistically significant difference between the groups were found on the primary outcome, walking speed (mean difference 0.04 m/s, 95% CI - 0.01-0.09,  $p = 0.132$ ). Statistically significant between-group differences in favour of intervention were found on FSST (dynamic balance) (mean difference - 0.80 s, 95% CI - 1.57 to - 0.02,  $p = 0.044$ ), arm curl (mean difference 1.55, 95% CI 0.49-2.61,  $p = 0.005$ ) and 30-s STS (mean difference 1.85, 95% CI 1.04-2.67,  $p < 0.001$ ), as well as fear of falling (mean difference - 1.45, 95% CI - 2.64 to - 0.26,  $p = 0.018$ ). No statistically significant differences between the groups were found on health-related quality of life.

**CONCLUSION:** Twelve weeks of a supervised multicomponent resistance and balance exercise programme improves muscle strength and balance and reduces fear of falling, in women with osteoporosis and a history of vertebral fractures. **TRIAL REGISTRATION:** ClinicalTrials.gov Identifier: NCT02781974. Registered 25.05.16. Retrospectively registered.

Language: en

### **Keywords**

Exercise; Health-related quality of life; Osteoporosis; Physical fitness; Vertebral fracture

## Effects of Otago exercise combined with action observation training on balance and gait in the old people

Leem SH, Kim JH, Lee BH. *J. Exerc. Rehabil.* 2019; 15(6): 848-854.

(Copyright © 2019, Korean Society of Exercise Rehabilitation)

DOI 10.12965/jer.1938720.360 PMID 31938708

### Abstract

This study aimed to investigate the effects of Otago exercise combined with action observation (AO) training on the balance, and gait in the old people to prevent falls in the community. A total of 30 old women participated and randomly assigned into three groups: AO plus Otago (n=10), Otago (n=10), or control (n=10). The AO plus Otago and Otago groups performed 50 min of strength training and balance exercises from the Otago Exercise Program 3 times a week for 12 weeks. The AO plus Otago group received an additional 20 min of training 3 times a week. We used the electronic muscle dynamometer to changes in strength, Timed Up and Go (TUG) test to evaluate dynamic balance, and the short version of the Falls Efficacy Scale-International was used to evaluate the fear of falls, and GAITRite was used to evaluate changes in the spatiotemporal parameters of walking. The muscle strength significantly increased in the AO plus Otago and Otago groups compared to the strength before training. The TUG test showed a significant improvement in the dynamic balance in both intervention groups. A significant increase was observed in the walking speed, cadence, step length, and stride length in both intervention groups. We also noted a significant change in the efficacy measures for falls. It is expected that Otago exercise combined with AO training will be used as an intervention method in hospital treatment programs and the old people facilities for preventing falls in the old people.

Language: en

### Keywords

Old people; balance; Action observation; Gait; Otago exercise; Prevent falls

## Effects of vibratory stimulation on balance and gait in Parkinson's disease: a systematic review and meta-analysis

Marazzi S, Kiper P, Palmer K, Agostini M, Turolla A. Eur. J. Phys. Rehabil. Med. 2020; ePub(ePub): ePub.

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DOI 10.23736/S1973-9087.20.06099-2 PMID 31939269

### Abstract

**INTRODUCTION:** Among the different rehabilitative approaches to Parkinson's disease, there is conflicting evidence about the effects of vibratory stimulation and its capability to modulate the central elaboration of proprioceptive stimuli. The hypothesis is that the vibration-induced sensorial perturbation (through Whole Body Vibration (WBV) or localized vibration) can influence the motor response in complex tasks such as postural control and gait. Thus, the objective of this review was to evaluate the effect of different modalities of vibratory stimulation treatment on balance, gait signs and symptoms, and quality of life, in patients with Parkinson's disease. **EVIDENCE ACQUISITION:** From the initial 1249 records, 10 of them which compared Whole Body Vibration (WBV) or localized vibration to conventional physiotherapy were included (i.e. randomized controlled trials, crossover trials, and quasi-experimental trials). Finally, five papers on WBV were included in quantitative synthesis (meta-analysis), while for three studies on localized vibrations a qualitative synthesis was performed. Two independent reviewers selected potentially relevant studies based on the inclusion criteria, extracted data, and evaluated the methodological quality. **EVIDENCE SYNTHESIS:** Meta-analysis was performed among five studies on WBV treatment, whose effect was found to be significantly better than standard treatment for improving gait (measured by Timed Up and Go test and Stand-walk-sit test: Standardized Mean Difference= -0.51; 95% confidence interval= -1.00 to -0.01). Conversely, WBV was not significantly better than standard treatment for all the other outcomes. Due to high heterogeneity it was not possible to conduct a quantitative meta-analysis on studies of localized vibration.

**CONCLUSIONS:** Results of the review show that WBV can improve gait performance in patients with Parkinson's disease.

Language: en



## **Falls in community-dwelling older adults with heart failure: A retrospective cohort study**

Lee K, Davis MA, Marcotte JE, Pressler SJ, Liang J, Gallagher NA, Titler MG. Heart Lung 2020; ePub(ePub): ePub.

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**DOI** 10.1016/j.hrtlng.2019.12.005 **PMID** 31932065

### **Abstract**

**BACKGROUND:** While heart failure (HF) in older adults is associated with fall risk, little is known about this in the U.S.

**OBJECTIVE:** To examine the independent effect of functional impairments related to HF on falls among community-dwelling older adults in the U.S.

**METHODS:** A retrospective cohort study was conducted with 17,712 community-dwelling older adults aged 65 and above with (n = 1693) and without HF, using mixed-effects logistic regression to examine the association between HF and falls.

**RESULTS:** HF patients had 14% greater odds of falling than those without HF. Moreover, HF patients with functional difficulties in mobility, large muscle difficulty, instrumental activities of daily living difficulty, poor vision, and urinary incontinence demonstrated an increased likelihood of falling.

**CONCLUSION:** Community-dwelling older adults with HF and functional difficulties have a higher fall risk than those without HF, indicating that fall prevention programs should be developed, tested, and implemented for this population.

Language: en

### **Keywords**

Aging; Falls; Heart failure; Nursing; Older adults

## Falls risk in relation to activity exposure in high risk older adults

Del Din S, Galna B, Lord S, Nieuwboer A, Bekkers EMJ, Pelosin E, Avanzino L, Bloem BR, Olde Rikkert MGM, Nieuwhof F, Cereatti A, Della Croce U, Mirelman A, Hausdorff JM, Rochester L. J. Gerontol. A Biol. Sci. Med. Sci. 2020; ePub(ePub): ePub.

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DOI 10.1093/gerona/glaa007 PMID 31942969

### Abstract

**BACKGROUND:** Physical activity is linked to many positive health outcomes, stimulating the development of exercise programs. However, many falls occur whilst walking and so promoting activity might paradoxically increase fall rates, causing injuries and worse quality of life. The relationship between activity exposure and fall rates remains unclear. We investigated the relationship between walking activity (exposure to risk) and fall rates before and after an exercise program (V-TIME).

**METHODS:** 109 elderly fallers, 38 people with mild cognitive impairment (MCI) and 128 people with Parkinson's disease (PD) were randomly assigned to one of two active interventions: treadmill training only or treadmill training combined with a virtual reality component. Participants were tested before and after the interventions. Free-living walking activity was characterised by volume, pattern, and variability of ambulatory bouts using an accelerometer positioned on the lower back for one week. To evaluate that relationship between fall risk and activity, a normalized index was determined expressing fall rates relative to activity exposure (FRA index), with higher scores indicating a higher risk of falls per steps taken.

**RESULTS:** At baseline the FRA index was higher for people with PD compared to those with MCI and elderly fallers. Walking activity did not change after the intervention for the groups but the FRA index decreased significantly for all groups ( $p \leq 0.035$ ).

**CONCLUSIONS:** This work showed that V-TIME interventions reduced falls risk without concurrent change in walking activity. We recommend using the FRA index in future fall prevention studies to better understand the nature of intervention programs.

Language: en

### Keywords

Parkinsons; exercise; falls; physical activity; wearable technology

## Frailty and prediction of recurrent falls over 10 years in a community cohort of 75-year-old women

Bartosch PS, Kristensson J, McGuigan FE, Akesson KE. Aging Clin. Exp. Res. 2020; ePub(ePub): ePub.

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DOI 10.1007/s40520-019-01467-1 PMID 31939201

### Abstract

**BACKGROUND:** Frailty captures the age-related declines in health leading to increased vulnerability, including falls which are commonplace in older women. The relationship between frailty and falls is complex, with one leading to the other in a vicious cycle. AIMS: This study addresses the gap in understanding how patterns of frailty and falls propensity interact, particularly in those who have not yet entered the falls-frailty cycle.

**METHODS:** The Osteoporosis Risk Assessment cohort consists of 1044 community-dwelling women aged 75, with 10 years of follow-up. Investigations were performed and a frailty index constructed at baseline, 5 and 10 years. Falls were self-reported for each previous 12 months. Analysis was two-directional, firstly based on frailty status and second, based on falls status. Recurrent falls was the primary outcome.

**RESULTS:** Baseline frailty was a significant predictor of recurrent falls after 5 and 10 years [(OR 2.55 (1.62-3.99); 3.04 (1.63-5.67)]. Among women who had no history of falls at age 75, frailty was a stronger predictor of falls at 5 years [OR 3.06 (1.59-5.89)] than among women who had previously fallen.

**DISCUSSION:** Frailty is significantly associated with recurrent falls and most pronounced in those who are frail but have not yet fallen.

**CONCLUSIONS:** This suggests that frailty should be an integral part of falls-risk assessment to improve identification of those at risk of becoming fallers.

Language: en

### Keywords

Community-dwelling; Falls; Frailty; Women

## **Impact of the backward chaining method on physical and psychological outcome measures in older adults at risk of falling: a systematic review**

Leonhardt R, Becker C, Groß M, Mikolaizak AS. Aging Clin. Exp. Res. 2020; ePub(ePub): ePub.

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**DOI** 10.1007/s40520-019-01459-1 **PMID** 31939202

### **Abstract**

**BACKGROUND:** Being unable to "get up from the floor" is a risk factor and predictor of serious fall-related injuries in older age; however, floor-rise training (FRT) is not widely used. The backward chaining method (BCM) is a success-oriented, step-by-step form of FRT. This systematic review aimed to evaluate the impact of BCM on physical and psychological outcome measures, and its clinical application.

**METHODS:** Studies were identified through systematic searching of five databases. Criteria for inclusion were: use of BCM as a treatment method, outcome measures related to falls, and participants aged 60 + years. Study quality was evaluated using the Mixed Methods Appraisal Tool and PEDro scale, if applicable.

**RESULTS:** Seven studies with a total of 446 participants (mean age  $82.4 \pm 5.3$  years) were identified. Emerging evidence shows that BCM significantly improves the ability to get up unassisted from the floor, as well as mobility with reduced fall incidence in older people. Furthermore, it can potentially reduce fear of falling. Reporting on feasibility and acceptance of BCM was limited. Study quality varied widely.

**CONCLUSIONS:** BCM provides a promising intervention in fall-related recovery strategies for older adults and is most effective when offered to older adults at risk of falling. Considering the small number of included studies and the varying methodological quality, these findings should be evaluated accordingly. The growing evidence regarding the benefits of BCM, yet the lack of adoption into standard care, highlights the need for further research and clinical application of this intervention approach.

Language: en

### **Keywords**

Backward chaining method; Fall prevention; Falls; Floor rise training; Older adults

## Peak expiratory flow and the risk of injurious falls in older adults: the role of physical and cognitive deficits

Trevisan C, Rizzuto D, Ek S, Maggi S, Sergi G, Fratiglioni L, Welmer AK. *J. Am. Med. Dir. Assoc.* 2020; ePub(ePub): ePub.

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DOI 10.1016/j.jamda.2019.11.013 PMID 31926799

### Abstract

**OBJECTIVES:** Previous studies showed that peak expiratory flow (PEF) is associated with health-related outcomes in advanced age, but the extent to which it may be related to falls risk remains unclear. We aimed to detect the association between PEF and injurious falls in older adults and to explore the role of cognitive and physical deficits in this association.

**DESIGN:** Prospective study with a 6-year follow-up. **SETTING AND PARTICIPANTS:** The study involves 2234 community-dwelling older adults with no history of pulmonary disease.

**METHODS:** For each study participant, we assessed the PEF at baseline, expressed as standardized residual (SR) percentile and derived from the normalization of residuals between the measured and predicted PEF values (based on individual age, sex, and body height); incident injurious falls over 6 years, from Hospital Discharge Diagnosis; and physical and cognitive functioning at the baseline and at 3- and 6-year follow-ups by evaluating walking speed, balance, chair stand, and Mini-Mental State Examination, respectively.

**RESULTS:** Over the follow-up, 232 individuals experienced injurious falls. Cox models indicated 7% higher risk of falls per each 10th reduction in PEF SR-percentile. The risk of injurious falls increased by more than twice for those who had PEF SR-percentile <10th as for values of 80th-100th (hazard ratio = 2.31, 95% confidence interval: 1.41-3.76). Physical deficits mediated 63% of the total effect of PEF on falls risk.

**CONCLUSIONS AND IMPLICATIONS:** Our findings suggest that low PEF is associated with higher risk of injurious falls in older adults, and most of this association is explained by balance or muscular strength deficits.

Language: en

**Keywords** cognitive status; injurious falls; peak expiratory flow; physical function

## **Retention, savings and interlimb transfer of reactive gait adaptations in humans following unexpected perturbations**

McCrum C, Karamanidis K, Willems P, Zijlstra W, Meijer K. *Commun. Biol.* 2018; 1(1): e230.

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**DOI** 10.1038/s42003-018-0238-9 **PMID** 31924858

### **Abstract**

Reactive locomotor adaptations are crucial for safe mobility, but remain relatively unexplored. Here we assess reactive gait adaptations, and their retention, savings and interlimb transfer. Using new methods to normalise walking speed and perturbation magnitude, we expose eighteen healthy adults to ten unexpected treadmill belt accelerations during walking (the first and last perturbing the right leg, the others perturbing the left leg) on two days, one month apart. Analysis of the margins of stability using kinematic data reveals that humans reactively adapt gait, improving stability and taking fewer recovery steps, and fully retain these adaptations over time. On re-exposure, retention and savings lead to further improvements in stability. Currently, the role of interlimb transfer is unclear. Our findings show that humans utilise retention and savings in reactive gait adaptations to benefit stability, but that interlimb transfer may not be exclusively responsible for improvements following perturbations to the untrained limb.

Language: en

## **Risk of falls and fear of falling in older adults residing in public housing in Ontario, Canada: findings from a multisite observational study**

Pirrie M, Saini G, Angeles R, Marzanek F, Parascandolo J, Agarwal G. *BMC Geriatr.* 2020; 20(1): e11.

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**DOI** 10.1186/s12877-019-1399-1 **PMID** 31918674

### **Abstract**

**BACKGROUND:** Falls in older adults is a widely researched topic. However, older adults residing in public housing are a vulnerable population that may have unique risk factors for falls. This study aims to describe the prevalence and risk factors for falls, fear of falling, and seeking medical attending for falls in this population.

**METHODS:** Sociodemographic and health-related data was collected as part of a community-based health assessment program with older adults in public housing. Three pre-screening questions identified individuals at potential risk for falls; individuals who screened positive performed the objective Timed Up and Go (TUG) test. Logistic regression was used to evaluate risk factors for four outcome variables: falls in the past year, seeking medical attention for falls, fear of falling, and objectively measured fall risk via TUG test.

**RESULTS:** A total of 595 participants were evaluated, of which the majority were female (81.3%), white (86.7%), did not have a high school diploma (50.0%), and reported problems in mobility (56.2%). The prevalence of falls in the past year was 34.5%, seeking medical attention for falls was 20.2% and fear of falling was 38.8%. The TUG test was completed by 257 participants. Notably, males had significantly reduced odds of seeking medical attention for a fall (OR = 0.50, 95%CI 0.25-0.98) and having a fear of falling (OR = 0.42, 95%CI 0.24-0.76); daily fruit and vegetable consumption was associated with decreased odds of having a fall in the past year (OR = 0.55, 95%CI 0.37-0.83), and alcohol consumption was associated with increased odds of fear of falling (OR = 1.72, 95%CI 1.03-2.88).

**CONCLUSION:** Older adults residing in public housing have unique risk factors associated with social determinants of health, such as low fruit and vegetable consumption, which may increase their risk for falls. The findings of this study can be used to inform falls interventions for this population and identify areas for further research.

Language: en

### **Keywords**

Fall risk; Fear of falling; Low income; Older adults; Public housing; Social determinants of health

## Smartphone based timed up and go test can identify postural instability in Parkinson's disease

Yahalom G, Yekutieli Z, Israeli-Korn S, Elinx-Benizri S, Livneh V, Fay-Karmon T, Tchelet K, Rubel Y, Hassin-Baer S. *Isr. Med. Assoc. J.* 2020; 22(1): 37-42.

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DOI unavailable PMID 31927804

### Abstract

**BACKGROUND:** There is a need for standardized and objective methods to measure postural instability (PI) and gait dysfunction in Parkinson's disease (PD) patients. Recent technological advances in wearable devices, including standard smartphones, may provide such measurements.

**OBJECTIVES:** To test the feasibility of smartphones to detect PI during the Timed Up and Go (TUG) test.

**METHODS:** Ambulatory PD patients, divided by item 30 (postural stability) of the motor Unified Parkinson's Disease Rating Scale (UPDRS) to those with a normal (score = 0, PD-NPT) and an abnormal (score  $\geq 1$ , PD-APT) test and a group of healthy controls (HC) performed a 10-meter TUG while motion sensor data was recorded from a smartphone attached to their sternum using the Encephalog application.

**RESULTS:** In this observational study, 44 PD patients (21 PD-NPT and 23 PD-APT) and 22 HC similar in age and gender distribution were assessed. PD-APT differed significantly in all gait parameters when compared to PD-NPT and HC. Significant difference between PD-NPT and HC included only turning time ( $P < 0.006$ ) and step-to-step correlation ( $P < 0.05$ ).

**CONCLUSIONS:** While high correlations were found between Encephalog gait parameters and axial UPDRS items, the pull test was least correlated with Encephalog measures. Motion sensor data from a smartphone can detect differences in gait and balance measures between PD with and without PI and HC.

Language: en



## The effect of a mentally fatiguing task on postural balance control in young and older women

Morris AJ, Christie AD. *Exp. Gerontol.* 2020; ePub(ePub): ePub.

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### Abstract

The purpose of this study was to examine the effect of a mentally fatiguing task on postural responses to unexpected backward perturbations in sixteen young and sixteen older women. Postural responses were characterized by center of pressure (COP) displacement, corrective COP peak velocity, and electromyography (EMG) of the medial gastrocnemius. Older women had slower reaction time ( $p = .002$ ), longer EMG onset times ( $p = .03$ ), larger COP displacement ( $p = .001$ ), and faster COP velocity ( $p = .02$ ) than younger women overall. However, only young women experienced mental fatigue (slower reaction times;  $p = .001$ ) and this was accompanied by significantly faster COP velocity during the mental fatigue condition ( $p = .02$ ) than the control condition. Performance of mental fatigue task, not necessarily the development of mental fatigue, affects neuromuscular activation in young women only, but does not affect the magnitude of postural response to perturbation.

Language: en

### Keywords

Center of pressure displacement; Center of pressure velocity; Electromyography; Women

## Inflammatory markers associated with fall recurrence and severity: the Bambuí Cohort Study of Aging

de Amorim JSC, Torres KCL, Carvalho AT, Martins-Filho OA, Lima-Costa MF, Peixoto SV. *Exp. Gerontol.* 2020; ePub(ePub): ePub.

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### Abstract

**BACKGROUND:** The aim of this study was to analyze the association between inflammatory markers and recurrent and severe falls in 1304 community-dwelling older adults from the Bambuí Cohort Study of Aging.

**METHODS:** Information about falls in the previous 12 months was collected, and classified based on recurrence (two or more falls) and severity (requirement of medical attention). The screened biomarkers included interleukins (IL-1 $\beta$ , IL-6, IL-10, and IL-12, TNF), chemokines (CXCL8, CXCL9, CXCL10, CCL2, and CCL5), and high-sensitive C-reactive protein (hs-PCR). Potential confounders included sociodemographic, behavioral, and health indicators. Associations were evaluated through logistic regression, using odds ratios (OR) and 95% confidence intervals (95% CI), with Stata 13.1.

**RESULTS:** The prevalence of recurrent and severe falls was 10.7% and 9.0%, respectively. After adjustments, elevated levels of IL-12 (OR: 1.92; 95% CI: 1.09-3.37) and CXCL9 (OR: 1.67; 95% CI: 1.05-2.66) were found to be associated with recurrent falls, while elevated levels of TNF (OR: 1.58; 95% CI: 1.01-2.50), IL-12 (OR: 2.04; 95% CI: 1.13-3.70), CXCL10 (OR: 1.75; 95% CI: 1.04-2.92), and CCL5 (OR: 1.90; 95% CI: 1.18-3.07) were associated with severe falls.

**CONCLUSIONS:** The results highlight a wide range of biomarkers not yet explored in the literature and suggest that inflammation may be an important component of recurrent and severe falls.

Language: en

### Keywords

Accidental falls; Biomarkers; Inflammation

## Sub-clinical peroneal neuropathy affects ambulatory, community dwelling adults and is associated with falling

Poppler LH, Yu J, Mackinnon SE. *Plast. Reconstr. Surg.* 2020; ePub(ePub): ePub.

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### Abstract

**BACKGROUND:** Peroneal neuropathy with an overt foot drop is a known risk factor for falling. Sub-clinical peroneal neuropathy (SCPN) due to compression at the fibular neck is subtler and does not have foot drop. A previous study found SCPN in 31% hospitalized patients. This was associated with having fallen. The purpose of this study is to determine the prevalence of SCPN in ambulatory adults and investigate if it is associated with falling.

**METHODS:** A cross-sectional study of 397 ambulatory adults presenting to outpatient clinics at a large academic hospital was conducted in 2016-2017. Patients were examined for dorsiflexion weakness and signs localizing peroneal nerve compression to the fibular neck. Fall risk was assessed with the Activities and Balance Confidence (ABC) Scale and self-reported history of falling. Multivariate logistic regression was used to correlate sub-clinical peroneal neuropathy with fall risk and a history of falls.

**RESULTS:** The mean age was  $54 \pm 15$  years and 248 patients (62%) were female. Thirteen patients (3.3%) were found to have SCPN. After controlling for various factors known to increase fall risk, patients with SCPN were 3.74 times [95% confidence interval: 1.06 - 13.14] ( $p=0.04$ ) more likely to report having fallen multiple times in the past year than patients without SCPN. Similarly, patients with SCPN were 7.22 times [95% confidence interval: 1.48 - 35.30] ( $p=0.02$ ) more likely to have an elevated fall risk on the ABC fall risk scale.

**CONCLUSIONS:** Sub-clinical peroneal neuropathy affects 3.3% of adult outpatients and may predispose them to falling.

Language: en