

Safety Literature 26th March 2023

Community-based physical activity and/or nutrition interventions to promote mobility in older adults: an umbrella review [conference abstract]

Neil-Sztramko S, Coletta G, Teggart K, Ganann R, Kuspinar A, Fitzpatrick-Lewis D, Newbold B, Phillips S, Moore C, Kennedy C, Sherifali D, Alvarez E. Ann. Fam. Med. 2022; 20(Suppl 1): e2937.

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DOI 10.1370/afm.20.s1.2937 PMID 36944044

Abstract

BACKGROUND: Physical activity and a healthy diet are important in helping to maintain mobility and quality of life with aging. Delivery of physical activity and nutrition interventions in a group setting adds the benefits of social participation. Several published systematic reviews have explored a broad range of PA and/or nutrition interventions for older adults, making it challenging to bring together the best scientific evidence to inform program design and to inform multicomponent intervention development. This umbrella review aims to identify group-based physical activity and nutrition interventions for community-dwelling older adults that improve mobility.

METHODS: Five electronic databases (MEDLINE, Embase, CINAHL, Cochrane CENTRAL, Sociological Abstracts) were searched from inception to April 28, 2020. Eligibility criteria included systematic reviews exploring the effectiveness of physical activity and/or nutrition interventions, delivered in a group setting for community-dwelling older adults. Two reviewers independently performed eligibility screening, critical appraisal (using AMSTAR 2) and data extraction. The GRADE approach was used to assess the overall certainty of the evidence. Older adult/provider research partners informed data synthesis and results presentation.

RESULTS: In total, 54 systematic reviews (1 high, 21 moderate, 32 low/critically low quality) were identified; 46 included physical activity only, and eight included both physical activity and nutritional supplements. No reviews included nutrition interventions alone. Combined aerobic/resistance, general physical activity, and mind-body exercise all improved physical function and balance (moderate-high certainty). Aerobic/resistance training improved aerobic capacity (high certainty). Resistance training and general physical activity improved muscle strength (moderate certainty). Aerobic/resistance training and general physical activity are likely to reduce falls among older adults (moderate certainty). There was no evidence of benefit for nutritional supplementation with physical activity.

CONCLUSIONS: Multicomponent group-based physical activity interventions can improve measures of mobility in community-dwelling older adults. We found no reviews focused on nutrition only, highlighting a gap in the literature.

Language: en

Costs and survival of patients having experienced a hospitalized fall-related injury in France: a population-based study

Mounie M, Fabre D, Rapp T, Rolland Y, Blain H, Tchalla A, Carcaillon-Bentata L, Beltzer N, Assous L, Apparitio S, Caby D, Reina N, Andre L, Molinier L, Costa N. J. Am. Med. Dir. Assoc. 2023; ePub(ePub): ePub.

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DOI 10.1016/j.jamda.2023.02.005 **PMID** 36934774

Abstract

OBJECTIVES: To assess the annual costs 2 years before and 2 years after a hospitalized fall-related injury (HFRI) and the 2-year survival among the population 75+ years old.

DESIGN: We performed a population-based, retrospective cohort study using the French national health insurance claims database. **SETTING AND PARTICIPANTS:** Patients 75+ years old who had experienced a fall followed by hospitalization, identified using an algorithm based on International Classification of Diseases codes. Data related to a non-HFRI population matched on the basis of age, sex, and geographical area were also extracted.

METHODS: Cost analyses were performed from a health insurance perspective and included direct costs. Survival analyses were conducted using Kaplan-Meier curves and Cox regression. Descriptive analyses of costs and regression modeling were carried out. Both regression models for costs and on survival were adjusted for age, sex, and comorbidities.

RESULTS: A total of 1495 patients with HFRI and 4484 non-HFRI patients were identified. Patients with HFRI were more comorbid than the non-HFRI patients over the entire periods, particularly in the year before and the year after the HFRI. Patients with HFRI have significantly worse survival probabilities, with an adjusted 2.14-times greater risk of death over 2-year follow-up and heterogeneous effects determined by sex. The annual incremental costs between patients with HFRI and non-HFRI individuals were €1294 and €2378, respectively, 2 and 1 year before the HFRI, and €11,796 and €1659, respectively, 1 and 2 years after the HFRI. The main cost components differ according to the periods and are mainly accounted for by paramedical acts, hospitalizations, and drug costs. When fully adjusted, the year before the HFRI and the year after the HFRI are associated with increase in costs.

CONCLUSIONS AND IMPLICATIONS: We have provided real-world estimates of the cost and the survival associated with patients with HFRI. Our results highlight the urgent need to manage patients with HFRI at an early stage to reduce the significant mortality as well as substantial additional cost management. Special attention must be paid to the fall-related increasing drugs and to optimizing management of comorbidities.

Language: en

Keywords

survival; economic evaluation; Hospitalized fall-related injury; real world evidence

Cumulative effects of comorbid burden and overactive bladder symptoms on fall risk among older women seeking treatment for urogynecologic conditions

Fisher SR, Halder GE, Lee MJ, Allen L, Kilic GS. Urogynecology (Hagerstown) 2023; ePub(ePub): ePub.

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DOI 10.1097/SPV.0000000000001343 **PMID** 36946883

Abstract

IMPORTANCE: Overactive bladder (OAB) syndrome and urinary incontinence, age, and comorbid burden are strong risk factors for falls in women. Less is known about their cumulative effects on fall risk in a urogynecologic population.

OBJECTIVE: The purpose of this study was to investigate the effects of coexisting OAB, older age, and comorbidities on risk of falling among treatment seeking women with pelvic floor disorders. **STUDY DESIGN:** We conducted a retrospective medical records review of 348 consecutive women presenting to a urogynecology clinic over 6 months. Fall risk was determined by the Centers for Disease Control and Prevention's, Stopping Elderly Accidents, Deaths, and Injuries screening tool. Clinical and sociodemographic measures were abstracted from the electronic medical record. Odds of screening positive for high fall risk based on different patient profiles were calculated. We then used a classification and regression tree analysis to determine the relative importance of the different variables on fall risk within the homogeneous subgroups.

RESULTS: Of the 348 women (mean age, 58.7 ± 15.8 years) who completed the fall risk screen, 124 (36%) screened positive for increased fall risk. Overactive bladder symptoms increased the likelihood of a positive fall risk screen across all combinations of age and comorbid burden. The patient profile of ≥ 3 OAB symptoms, ≥ 4 comorbid conditions, and age 65 years or older increased the odds of screening positive for high fall risk more than 6-fold (odds ratio, 6.4; 95% confidence interval, 3.1-12.9). In the following order of importance, the combination of high comorbid burden, OAB, and older age identified approximately 3 in 4 patients (73.3%) at high risk of falling.

CONCLUSION: The presence of 3 easily identifiable patient characteristics is strongly associated with a risk of falls in women seeking care for pelvic floor disorders.

Language: en

Effect of COVID-19 lockdown on the incidence and severity of falls in institutionalized older people: a longitudinal study

Escribà-Salvans A, Vemorel C, Font-Jutglà C, Minobes-Molina E, Goutan-Roura E, Rosa-Oliveira V, Jerez-Roig J. Rev. Esp. Geriatr. Gerontol. 2023; ePub(ePub): ePub.

Vernacular Title

Efecto del confinamiento por COVID-19 sobre la incidencia y gravedad de las caídas en personas mayores institucionalizadas: estudio longitudinal

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DOI 10.1016/j.regg.2023.02.005 **PMID** 36931911

Abstract

BACKGROUND: During the COVID-19 pandemic, virus contention measures such as strict confinement were declared in nursing homes.

OBJECTIVE: To assess the impact of confinement on the incidence of falls and their associated factors in institutionalized older persons during the first year of the pandemic compared to the previous year.

METHODS: A multicenter, comparative study was conducted between the pre-pandemic year (March 2019 to February 2020) and the first year (March 2020 to February 2021) in five nursing homes in Catalonia (Spain). The number of falls, date, placement and consequences were recorded, as well as sociodemographic and health information. A descriptive, bivariate and multivariate analysis was performed, calculating odds ratio (OR) with 95% confidence intervals and statistical significance of $p < 0.05$.

RESULTS: The sample consisted of 80 individuals, with a mean age of 84.4 years, 83.7% being women. In the first year of the pandemic, the number of falls per person increased by 0.21% (32.0% in rooms). In multivariate analysis of the pre-pandemic period, the risk of sarcopenia (OR = 4.02; 95% CI [1.09-14.82], $p = 0.036$) was a risk factor for falls independently of age and hypertension. In the first year of pandemic no statistically significant associated factors were found.

CONCLUSIONS: In the first year of the COVID-19 pandemic, there was a 15.6% increase in falls and an 8.7% increase in the number of people who fell compared to the previous year. The falls' location changed from common areas to bedrooms and increased in severity, with a 10.1% increase in fractures. Older age, risk of sarcopenia and arterial hypertension were associated with falls during the pre-pandemic period.

Language: es

Keywords

Falls; Older people; Caídas; Confinamiento; Confinement; Nursing homes; Personas mayores; Residencias geriátricas

Gait and turning characteristics from daily life increase ability to predict future falls in people with Parkinson's disease

Shah VV, Jagodinsky A, McNamers J, Carlson-Kuhta P, Nutt JG, El-Gohary M, Sowalsky K, Harker G, Mancini M, Horak FB. *Front. Neurol.* 2023; 14: e1096401.

(Copyright © 2023, Frontiers Research Foundation)

DOI 10.3389/fneur.2023.1096401 **PMID** 36937534

Abstract

OBJECTIVES: To investigate if digital measures of gait (walking and turning) collected passively over a week of daily activities in people with Parkinson's disease (PD) increases the discriminative ability to predict future falls compared to fall history alone.

METHODS: We recruited 34 individuals with PD (17 with history of falls and 17 non-fallers), age: 68 ± 6 years, MDS-UPDRS III ON: 31 ± 9 . Participants were classified as fallers (at least one fall) or non-fallers based on self-reported falls in past 6 months. Eighty digital measures of gait were derived from 3 inertial sensors (Opal(®) V2 System) placed on the feet and lower back for a week of passive gait monitoring. Logistic regression employing a "best subsets selection strategy" was used to find combinations of measures that discriminated future fallers from non-fallers, and the Area Under Curve (AUC). Participants were followed via email every 2 weeks over the year after the study for self-reported falls.

RESULTS: Twenty-five subjects reported falls in the follow-up year. Quantity of gait and turning measures (e.g., number of gait bouts and turns per hour) were similar in future fallers and non-fallers. The AUC to discriminate future fallers from non-fallers using fall history alone was 0.77 (95% CI: [0.50-1.00]). In contrast, the highest AUC for gait and turning digital measures with 4 combinations was 0.94 [0.84-1.00]. From the top 10 models (all AUCs>0.90) via the best subsets strategy, the most consistently selected measures were variability of toe-out angle of the foot (9 out of 10), pitch angle of the foot during mid-swing (8 out of 10), and peak turn velocity (7 out of 10).

CONCLUSIONS: These findings highlight the importance of considering precise digital measures, captured via sensors strategically placed on the feet and low back, to quantify several different aspects of gait (walking and turning) during daily life to improve the classification of future fallers in PD.

Language: en

Keywords

Parkinson's disease; daily life; inertial sensors; gait; future falls; turning

Multifactorial exercise intervention decreases falls risk in high-risk and low-risk older adults

Estep A, Morrison S, Caswell SV, Ambegaonkar JP, Vaz JR, Cortes N. Sports Health 2023; ePub(ePub): ePub.

(Copyright © 2023, American Orthopaedic Society for Sports Medicine, Publisher SAGE Publishing)

DOI 10.1177/19417381231158658 **PMID** 36945182

Abstract

BACKGROUND: Each year, 1 in 4 people over the age of 65 years of age will experience a fall. It is important to identify and address modifiable risk factors that are associated with falls in adults at high and low risk for falls. **HYPOTHESIS:** Falls risk improves in both high-risk and low-risk participants with the implementation of Stay Active and Independent for Life (SAIL). **STUDY DESIGN:** Cohort study. **LEVEL OF EVIDENCE:** Level 3.

METHODS: Seventy-eight older adults (age, 70.9 ± 5.1 years) were included in this study and categorized into high risk and low risk for falling based on the falls risk score from the Physiological Profile Assessment. High risk was defined as having a preintervention falls risk score >1 , whereas low risk was defined as having a preintervention falls risk score <1 . Both groups had the same 10-week intervention. A multivariate analysis of covariance was used to compare differences pre- and postintervention, using preintervention falls risk score as covariate.

RESULTS: Results showed that regardless of preintervention falls risk, participants showed significant improvements in right and left knee extensor strength and sit-to-stand after participation in the 10-week SAIL program. Also, noteworthy is that 15 participants who were considered at high risk for falling preintervention were considered low risk for falling postintervention.

CONCLUSION: The positive outcomes noted on modifiable risk factors suggest SAIL can be beneficial for decreasing falls risk in older adults, regardless of risk of falling, using a multifactorial exercise intervention. Our results also showed that it was possible for participants not only to improve falls risk but to improve to such a degree that they change from high risk to low risk of falling. **CLINICAL RELEVANCE:** Our results demonstrated that SAIL was effective in improving overall fall risk after a 10-week intervention. Targeted community-based interventions for the aging population can bring physical health benefits that can decrease falls risk.

Language: en

Keywords

older adults; quality of life; falls prevention; longevity

Normative data of modified Romberg balance test for risk of fall in elderly population of Pakistan

Zahra S, Waris M, Ain QU, Sajjad Y. J. Pak. Med. Assoc. 2023; 73(3): 515-519.

(Copyright © 2023, Pakistan Medical Association)

DOI unavailable **PMID** 36932752

Abstract

OBJECTIVE: To generate normative data of modified Romberg balance test for the risk of fall among the elderly.

METHODS: The cross-sectional study was conducted from July 1 to December 31, 2021, and comprised healthy adults of either gender aged 60 years and above from different cities of Pakistan. The participants were screened for balance issues using the Patient Reported Outcomes Measurement Information System Global Health Questionnaire. All the individuals were subjected to the modified Romberg balance test. Data was analysed using SPSS 21.

RESULTS: Of the 2004 participants, 1,041(51.95%) were males and 963(48.05%) were females. The overall mean age was 70.36±6.20 years and mean body mass index was 21.92±3.08kg/m². Overall, 207(10.33%) participants passed all the 4 conditions of the modified Romberg balance test.

CONCLUSIONS: With increasing age, the capability to perform modified Romberg balance test decreased, increasing the chance of fall among the elderly.

Language: en

Keywords

Adult; Aged; Humans; Female; Male; Middle Aged; Pakistan; *Postural Balance; Adult, Balance, Fall, Frail older, Musculoskeletal equilibrium.

Number of medications and polypharmacy are associated with risk of fall in Saudi community-dwelling adults

Alenazi AM. Saudi Pharm. J. 2023; 31(2): 185-190.

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Abstract

BACKGROUND: This study primarily aimed to examine the association between the number of medications and polypharmacy with fall history and fear of falling among Saudi community-dwelling adults aged 50 years and older. A secondary objective was to determine the cutoff score of the number of medications associated with a history of falls within this population.

METHODS: This cross-sectional study included community-dwelling adults aged ≥ 50 years living in Saudi Arabia. The participants were asked to report any history of falls in the past 12 months; the Falls Efficacy Scale (FES-I) was used to measure the fear of falling. The number of medications was obtained by interviewing the participants and was recorded as a number. Polypharmacy was defined as the use of ≥ 4 medications. Binary logistic regression and linear regression analyses were performed. Receiver operator characteristics and area under the curve were used to determine the cut-off scores for the number of medications that distinguished fallers from non-fallers.

RESULTS: A total of 206 participants (96 women) were included. The prevalence of falls was 12.6 %. Number of medications was associated with a history of falls (OR 1.55, 95 % CI [1.16, 2.07], $p = 0.003$) after adjustments for age, sex, body mass index, education, employment status, marital status, and number of chronic conditions. Polypharmacy was associated with a history of falls (OR 9.06, 95 % CI [2.56, 32.04], $p = 0.012$) after adjusting for covariates. Neither the number of medications nor polypharmacy was associated with fear of falling, as measured by FES-I. The number of medications with a cutoff of ≥ 2 or more medications was associated with a history of fall with a sensitivity of 69.23 % and specificity of 66.67 %.

CONCLUSION: This study found that the number of medications and polypharmacy were associated with a history of falls among community-dwelling adults aged ≥ 50 years. A cutoff score was identified of 2 or more medications that distinguished fallers from non-fallers in this population. This cut-off score was below the polypharmacy threshold.

Language: en

Keywords

Saudi Arabia; Drugs; Falling; Polypharmacy

Plantar pressure and falling risk in older individuals: a cross-sectional study

Yan Y, Ou J, Shi H, Sun C, Shen L, Song Z, Shu L, Chen Z. J. Foot Ankle Res. 2023; 16(1): e14.

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

DOI 10.1186/s13047-023-00612-4 **PMID** 36941642

Abstract

BACKGROUND: Falls are commonplace among elderly people. It is urgent to prevent falls. Previous studies have confirmed that there is a difference in plantar pressure between falls and non-falls in elderly people, but the relationship between fall risk and foot pressure has not been studied. In this study, the differences in dynamic plantar pressure between elderly people with high and low fall risk were preliminarily discussed, and the characteristic parameters of plantar pressure were determined.

METHODS: Twenty four high-fall-risk elderly individuals (HR) and 24 low-fall-risk elderly individuals (LR) were selected using the Berg Balance Scale 40 score. They wore wearable foot pressure devices to walk along a 20-m-long corridor. The peak pressure (PP), pressure time integral (PTI), pressure gradient (maximum pressure gradient (MaxPG), minimum pressure gradient (MinPG), full width at half maximum (FWHM)) and average pressure (AP) of their feet were measured for inter-group and intra-group analysis.

RESULTS: The foot pressure difference comparing the high fall risk with low fall risk groups was manifested in PP and MaxPG, concentrated in the midfoot and heel ($p < 0.05$), while the only time parameter, FWHM, was manifested in the whole foot ($p < 0.05$). The differences between the left and right foot were reflected in all parameters. The differences between the left and right foot in LR were mainly reflected in the heel ($p < 0.05$), while it in the HR was mainly reflected in the forefoot ($p < 0.05$).

CONCLUSIONS: The differences comparing the high fall risk with low fall risk groups were mostly reflected in the midfoot and heel. The HR may have been more cautious when landing. In the intra-group comparison, the difference between the right and left foot of the LR was mainly reflected during heel striking, while it was mainly reflected during pedalling in the HR. The sensitivity of PP, PTI and AP was lower and the newly introduced pressure gradient could better reflect the difference in foot pressure between the two groups. The pressure gradient can be used as a new foot pressure parameter in scientific research.

Language: en

Keywords

Aged; Humans; Cross-Sectional Studies; Elderly people; *Accidental Falls; Pressure; Fall risk; *Foot; Heel; Plantar pressure

Prevalence and risk factors of falls in adults with rheumatoid arthritis: a systematic review and meta-analysis

Guo X, Pei J, Wei Y, Zhang G, Yan F, Han L. *Semin Arthritis Rheum* 2023; 60: e152186.

(Copyright © 2023, Elsevier Publishing)

DOI 10.1016/j.semarthrit.2023.152186 PMID 36933303

Abstract

BACKGROUND: Despite the fact that the estimated prevalence and risk factors of falls in adults with rheumatoid arthritis (RA) are widely reported, these results have not been synthesized. The systematic review and meta-analysis aimed to investigate the prevalence and risk factors of falls in adults with RA.

METHODS: PubMed, EMBASE, Web of Science, the Cochrane Library, Cumulative Index to Nursing & Allied Health Literature (CINAHL), Wanfang Database, China Knowledge Resource Integrated Database (CNKI), Weipu Database (VIP), and Chinese Biomedical Database (CBM) were searched for relevant studies published from the inception of the database until July 4, 2022. Stata 15.0 Software was used to perform the meta-analysis. For the prevalence of falls in adults with RA and risk factors that were investigated in at least 2 studies in a comparable way, we calculated pooled incidence and odds ratios (ORs) using random-effects models, with a test for heterogeneity. A study protocol was registered in PROSPERO (CRD42022358120).

RESULTS: A total of 6,470 articles were screened and data from 34 studies involving 24,123 subjects were used in meta-analysis. The pooled prevalence of any falls was 34% (95% confidence interval, CI: 29% to 38%, $I(2)=97.7\%$, $P<0.001$), and 16% for recurrent falls (95% CI: 12% to 20%, $I(2)=97.5\%$, $P<0.001$). 25 risk factors were considered, including sociodemographic, medical and psychological, medication, and physical function. The strongest associations were found for history of falls (OR=3.08, 95%CI: 2.32 to 4.08, $I(2)=0.0\%$, $P = 0.660$), history of fracture (OR=4.03, 95%CI: 3.12 to 5.21, $I(2)=97.3\%$, $P<0.001$), walking aid use (OR=1.60, 95%CI: 1.23 to 2.08, $I(2)=67.7\%$, $P = 0.026$), dizziness (OR=1.95, 95%CI: 1.43 to 2.64, $I(2)=82.9\%$, $P = 0.003$), psychotropic medication use (OR=1.79, 95%CI: 1.39 to 2.30, $I(2)=22.0\%$, $P = 0.254$), antihypertensive medicine/diuretic (OR=1.83, 95%CI: 1.37 to 2.46, $I(2)=51.4\%$, $P = 0.055$), taking four or more medicine (OR=1.51, 95%CI: 1.26 to 1.81, $I(2)=26.0\%$, $P = 0.256$), and HAQ score (OR=1.54, 95%CI: 1.40 to 1.69, $I(2)=36.9\%$, $P = 0.135$).

CONCLUSIONS: This meta-analysis provides a comprehensive evidence-based assessment of the prevalence and risk factors for falls in adults with RA, confirming their multifactorial etiology. Understanding the risk factors of falls can provide healthcare personnel with a theoretical basis for the management and prevention of RA patients.

Language: en

Keywords: Prevalence; Falls; Meta-analysis; Risk factor; Rheumatoid arthritis

Real world validation of activity recognition algorithm and development of novel behavioral biomarkers of falls in aged control and movement disorder patients

Nouriani A, Jonason A, Sabal LT, Hanson JT, Jean JN, Lisko T, Reid E, Moua Y, Rozeboom S, Neverman K, Stowe C, Rajamani R, McGovern RA. *Front. Aging Neurosci.* 2023; 15: e1117802.

(Copyright © 2023, Frontiers Research Foundation)

DOI 10.3389/fnagi.2023.1117802 **PMID** 36909945

Abstract

The use of wearable sensors in movement disorder patients such as Parkinson's disease (PD) and normal pressure hydrocephalus (NPH) is becoming more widespread, but most studies are limited to characterizing general aspects of mobility using smartphones. There is a need to accurately identify specific activities at home in order to properly evaluate gait and balance at home, where most falls occur. We developed an activity recognition algorithm to classify multiple daily living activities including high fall risk activities such as sit to stand transfers, turns and near-falls using data from 5 inertial sensors placed on the chest, upper-legs and lower-legs of the subjects. The algorithm is then verified with ground truth by collecting video footage of our patients wearing the sensors at home. Our activity recognition algorithm showed >95% sensitivity in detection of activities. Extracted features from our home monitoring system showed significantly better correlation (~69%) with prospectively measured fall frequency of our subjects compared to the standard clinical tests (~30%) or other quantitative gait metrics used in past studies when attempting to predict future falls over 1 year of prospective follow-up. Although detecting near-falls at home is difficult, our proposed model suggests that near-fall frequency is the most predictive criterion in fall detection through correlation analysis and fitting regression models.

Language: en

Keywords

falls; wearable sensors; Parkinson's disease; gait; near-falls; postural instability

Relationship between fall history and toe grip strength in older adults with knee osteoarthritis in Japan: a cross-sectional study

Mawarikado Y, Inagaki Y, Fujii T, Kubo T, Kido A, Tanaka Y. PLoS One 2023; 18(3): e0282944.

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DOI 10.1371/journal.pone.0282944 **PMID** 36913410

Abstract

BACKGROUND: Knee osteoarthritis (KOA), one of the most common musculoskeletal diseases in older adults, is associated with a high incidence of falls. Similarly, toe grip strength (TGS) is associated with a history of falls in older adults; however, the relationship between TGS and falls in older adults with KOA who are at risk of falling is not known. Therefore, this study aimed to determine if TGS is associated with a history of falls in older adults with KOA.

METHODS: The study participants, older adults with KOA scheduled to undergo unilateral total knee arthroplasty (TKA), were divided into two groups: non-fall (n = 256) and fall groups (n = 74). Descriptive data, fall-related assessments, modified Fall Efficacy Scale (mFES), radiographic data, pain, and physical function including TGS were evaluated. The assessment was conducted on the day before performing TKA. Mann-Whitney and chi-squared tests were performed to compare the two groups. Multiple logistic regression analysis was performed to determine the association of each outcome with the presence or absence of falls.

RESULTS: Mann-Whitney U test revealed that the fall group had statistically significantly lower height, TGS on the affected and unaffected sides, and mFES. Multiple logistic regression analysis revealed that the incidence of fall history is associated with TGS on the affected side; the weaker the affected TGS of the KOA, the more likely the individual is to fall.

CONCLUSIONS: Our results indicate that TGS on the affected side is related to a history of falls in older adults with KOA. The significance of evaluating TGS among patients with KOA in routine clinical practice was demonstrated.

Language: en

Keywords

Aged; Humans; Cross-Sectional Studies; Japan/epidemiology; Hand Strength;
*Osteoarthritis, Knee/surgery; Toes

Serum Irisin level is associated with fall risk, muscle strength, and cortical porosity in postmenopausal women

Liang H, Qi W, Jiajue R, Chi Y, Liu W, Wang O, Li M, Xing X, Yu W, Jiang Y, Xia W. *Front. Endocrinol. (Lausanne)* 2023; 14: e1096950.

(Copyright © 2023, Frontiers Research Foundation)

DOI 10.3389/fendo.2023.1096950 **PMID** 36926035

Abstract

BACKGROUND: Irisin plays a role in bone-muscle crosstalk, but the relationship between the serum irisin level and bone microarchitecture remains unknown.

OBJECTIVE: This study aimed to investigate the relationships between serum irisin level and fall risk, muscle strength, bone mineral density (BMD), and bone microarchitecture among Chinese postmenopausal women.

METHODS: In all 138 postmenopausal women, handgrip strength, short physical performance battery (SPPB), and the timed up-and-go test were performed to evaluate muscle strength, physical performance, and fall risk, respectively. The serum irisin was measured. High-resolution peripheral quantitative computed tomography (HR-pQCT) was performed to acquire volumetric BMD and bone microarchitecture. Bivariate analysis was used to explore relationships between serum irisin level and muscle strength and HR-pQCT parameters. Univariate and multivariate linear regression analyses were performed to determine associations between serum irisin level and vBMD and cortical porosity (Ct.Po).

RESULTS: All participants had a median serum irisin level of 3.91 µg/ml. Participants with high fall risk had significantly lower serum irisin levels than those with low fall risk (2.22 µg/ml vs. 4.16 µg/ml, $p=0.024$). Irisin level was positively related to handgrip strength ($r_s=0.185$, $p=0.030$) and SPPB performance. In univariate linear regression, serum irisin level was positively associated with cortical volumetric BMD (Ct.vBMD, radius: standardized $\beta=0.184$, $p=0.031$; tibia: standardized $\beta=0.242$, $p=0.004$), but it had no significant associations with Ct.vBMD after multivariate adjustment. After adjusting by age, height, serum sclerostin level, and body fat ratio, only Ct.Po at the distal radius had a significantly negative association with serum irisin level (standardized $\beta=-0.276$, $p=0.003$).

CONCLUSION: Postmenopausal women with lower serum irisin levels have a higher fall risk, weaker muscle strength, and higher cortical porosity. Moreover, serum irisin level has a positive association with Ct.vBMD, but it is affected by factors such as age.

Language: en

Keywords

Humans; Female; fall risk; muscle strength; Hand Strength; *Fibronectins; *Postmenopause; bone microarchitecture; irisin; Muscle Strength; Porosity; postmenopausal women

Systematic review: what works to prevent falls for older people [editorial]

Harris E. J. Am. Med. Assoc. JAMA 2023; ePub(ePub): ePub.

(Copyright © 2023, American Medical Association)

DOI 10.1001/jama.2023.4001 **PMID** 36947061

Abstract

Minimizing risks in the home, such as clutter, poor lighting, and stairs without railings, can reduce the rate of falls by 26% in older people, with a reduction of 38% specifically in people characterized as being at higher risk because of a recent hospitalization or history of falls, researchers reported in the Cochrane Database of Systematic Reviews...

Language: en

The association of peripheral neuropathy detected by monofilament testing with risk of falls and fractures in older adults

Hicks CW, Wang D, Daya N, Juraschek SP, Matsushita K, Windham BG, Selvin E. J. Am. Geriatr. Soc. 2023; ePub(ePub): ePub.

(Copyright © 2023, John Wiley and Sons)

DOI 10.1111/jgs.18338 **PMID** 36945108

Abstract

BACKGROUND: In persons with diabetes, annual screening for peripheral neuropathy (PN) using monofilament testing is the standard of care. However, PN detected by monofilament testing is common in older adults, even in the absence of diabetes. We aimed to assess the association of PN with risk of falls and fractures in older adults.

METHODS: We included participants in the Atherosclerosis Risk in Communities (ARIC) Study who underwent monofilament testing at visit 6 (2016-2017). Incident falls and fractures were identified based on ICD-9 and ICD-10 codes from active surveillance of all hospitalizations and linkage to Medicare claims. We used Cox models to assess the association of PN with falls and fractures (combined and as separate outcomes) after adjusting for demographics and risk factors for falls.

RESULTS: There were 3617 ARIC participants (mean age 79.4 [SD 4.7] years, 40.8% male, and 21.4% Black adults), of whom 1242 (34.3%) had PN based on monofilament testing. During a median follow-up of 2.5 years, 371 participants had a documented fall, and 475 participants had a documented fracture. The incidence rate (per 1000 person-years) for falls or fractures for participants with PN versus those without PN was 111.1 versus 74.3 ($p < 0.001$). The age-, sex-, and race-adjusted 3-year cumulative incidence of incident fall or fracture was significantly higher for participants with PN versus those without PN (26.5% vs. 18.4%, $p < 0.001$). After adjusting for demographics, PN remained independently associated with falls and fractures (HR 1.48, 95% CI 1.26, 1.74).

RESULTS were similar for models including traditional risk factors for falls, when falls and fractures were analyzed as separate outcomes, and after adjustment for competing risk of death.

CONCLUSIONS: PN, as measured by monofilament testing, is common in older adults and associated with risk of falls and fracture. Screening with monofilament testing may be warranted to identify older adults at high risk for falls.

Language: en

Keywords

older adults; falls; fractures; peripheral neuropathy

The effects of optic flow on postural stability: influence of age and fall risk

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Abstract

BACKGROUND: Optic flow provides dynamic information relating to body position and motion with respect to visual frames of reference. This study investigated the effects of optic flow stimuli presented in four directions on postural stability in young and older adults.

METHODS: Twenty-five young (20-40 years) and 51 older (≥ 65 years) people participated in this study, with the older group classified into low fall risk ($n = 27$), and high fall risk ($n = 24$) sub-groups. While standing in a dark room, participants viewed static scattered white dots for 30 s, followed by 30 s periods of optic flow consisting of white dots "moving" in one of four flow directions, randomised: radial expansion and contraction, circular anti-clockwise and clockwise. Centre of pressure (CoP) position, postural sway in anteroposterior (AP) and mediolateral (ML) axes, and muscle activity of tibialis anterior (TA), gastrocnemius medialis (GM) and tensor fascia latae (TFL) were recorded.

RESULTS: Across groups, the four optic flow stimuli induced increased AP sway and three of the four optic flow stimuli induced increased ML sway, with concomitant increases in muscle activity, indicating optic flow stimuli induced a generalised destabilising, rather than a direction-specific, effect. Only one optic flow condition (radial contraction) induced a change in average CoP position, and this may reflect the adoption of a protective stance position to avoid a backward fall. Optic flow destabilised postural control more in older people compared with younger people, and radial expansion stimuli destabilised ML postural control more in the older high fall risk group compared with the older low fall risk group.

CONCLUSION: Optic flow stimuli have a generalised destabilising effect on postural control across groups as shown by non-directional specific increases in postural sway and muscular activity. Optic flow stimuli have a greater impact on postural stability in older compared with younger adults and this is more pronounced in the ML plane for older people at increased risk of falls.

Language: en

Keywords

Aged; Accidental falls; Optic flow; Postural sway; Posture; Visual field dependence

Effect of backward and forward walking on lower limb strength, balance, and gait in multiple sclerosis: a randomized feasibility trial

DelMastro HM, Ruiz JA, Simaitis LB, Gromisch ES, Neto LO, Cohen ET, Wong E, Krug RJ, Lo AC. *Int. J. MS Care* 2023; 25(2): 45-50.

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Abstract

BACKGROUND: Backward walking (BW) interventions have improved gait and balance in persons with stroke, cerebral palsy, and Parkinson disease but have not been studied in persons with multiple sclerosis (MS). We examined the feasibility of a BW intervention and how it affected strength, balance, and gait vs forward walking (FW) in persons with MS.

METHODS: Sixteen persons with MS with a Patient-Determined Disease Steps (PDDS) scale score of 3 to 5 (gait impairment-late cane) were randomized to the FW (n = 8) or BW (n = 8) group. Participants did 30 minutes of FW or BW on a treadmill 3 times per week for 8 weeks (24 visits). Enrollment, adherence rate, and safety were tracked. The Timed Up and Go test, Six-Spot Step Test, single-leg stance, and abbreviated Activities-specific Balance Confidence scale were used to measure balance. Hip and knee flexion and extension strength (isometric peak torque), gait speed, and spatiotemporal gait parameters were measured. A 2×2 factorial multivariate analysis of covariance was used to examine changes in strength, balance, and gait, with the PDDS scale score as the covariate.

RESULTS: Treatment adherence rate was 99.7%, with no safety concerns. After controlling for baseline differences in disability (PDDS scale score; $P = .041$), the BW group improved dominant hip flexion strength preintervention to postintervention compared with the FW group ($F(1,13) = 9.03$; $P = .010$). No other significant differences were seen between groups.

CONCLUSIONS: This was the first study to look at BW as an intervention in persons with MS. Based on its feasibility, safety, and significant finding, BW should be studied in a larger, definitive trial in the future.

Language: en

Keywords

balance; gait; backwards walking; lower limb strength; multiple sclerosis

Examining the influence of cognition on the relationship between backward walking and falls in persons with multiple sclerosis

Edwards EM, Daugherty AM, Fritz NE. *Int. J. MS Care* 2023; 25(2): 51-55.

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Abstract

BACKGROUND: Multiple sclerosis (MS) causes motor, cognitive, and sensory impairments that result in injurious falls. Current fall risk measures in MS (ie, forward walking [FW] speed and balance) are limited in their sensitivity. Backward walking (BW) velocity is a sensitive marker of fall risk and correlates with information processing speed (IPS) and visuospatial memory (VSM) in persons with MS. Backward walking is a complex motor task that requires increased cognitive demands, which are negatively affected by MS; however, whether cognitive function modifies the sensitivity of BW as a fall risk assessment in MS remains unknown. This study examines the influence of cognition on the relationship between BW and falls in persons with MS.

METHODS: Measures of BW, FW, IPS, VSM, and retrospective falls were collected. Hierarchical regression tested moderation and included an interaction term predicting number of falls. Covariates for all analyses included age and disease severity.

RESULTS: Thirty-eight persons with MS participated. Although BW, IPS, and covariates significantly predicted the number of falls ($R(2) = 0.301$; $P = .016$), there was no evidence of moderation. Backward walking, VSM, and covariates also significantly predicted number of falls ($R(2) = 0.332$, $P = .008$), but there was no evidence of moderation. The FW models generated comparable results.

CONCLUSIONS: The relationship between BW velocity and falls was not conditional on IPS or VSM in this sample. Larger-scale studies examining additional cognitive domains commonly affected by MS and prospective falls are needed to characterize neurobiological processes relevant to BW and its clinical application in the assessment of fall risk.

Language: en

Keywords

falls; cognition; walking; multiple sclerosis; backward walking

Influence of the COVID-19 pandemic on the epidemiological profile of the initial care of victims of falls

VON-Bahten LC, Zvicker AL, Silva AADA, Salviato BZ, Teixeira HM, Ando PK, Bernardelli RS. Rev. Col. Bras. Cir. 2023; 50: e20233422.

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DOI 10.1590/0100-6991e-20233422-en **PMID** 36921132

Abstract

OBJECTIVE: to assess the epidemiological profile of trauma patients from fall from the same level (FSL) and fall from an elevated level (FEL) during the COVID-19 pandemic, and to compare it with data from different levels of restriction (flags) and data prior to the pandemic.

METHOD: a cross-sectional study with a probability sample of the medical records of patients aged 18 years or older admitted to the emergency room due to falls, from June 2020 to May 2021. Epidemiological data, such as sex, age and injuries were analyzed, as well the current level of restriction. The three restriction periods were compared between then and the proportion of admissions due to falls was compared with the period from December 2016 to February 2018.

RESULTS: a total of 296 admissions were evaluated, 69.9% were victims of FSL and 30.1% of FEL. The mean age was 57.6 years, and 45.6% were over 60 years old. Admissions among men predominated, and 40.2% of patients required hospitalization. During the red flag period, there were proportionally more injuries to the head and neck ($p=0.016$), injuries to extremities ($p=0.015$) and neurological trauma ($p<0.001$). An average of 6.1, 6.3 and 5.2 admissions per day was obtained during the yellow, orange and red flag, respectively. There was a relative increase in falls when compared to the pre-pandemic period.

CONCLUSIONS: there was an absolute reduction in admissions of victims of falls in midst of the most restrictive period during the pandemic. However, when compared to pre-pandemic data, there was a relative increase in falls.

Language: pt

Online delivery of the individualized reduction of falls intervention for persons with multiple sclerosis who use a wheelchair or scooter full-time: a pilot study

McArthur AR, Peterson EW, Sosnoff J, Backus D, Yarnot R, Abou L, Kish J, Steinkellner S, Sandhu A, Rice L. *Int. J. MS Care* 2023; 25(2): 82-90.

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Abstract

BACKGROUND: People with multiple sclerosis (MS) who use a wheelchair or scooter full-time fall frequently; however, fall prevention programming that meets the unique needs of this population is limited. This study examined the preliminary efficacy of a group-based online fall prevention and management intervention designed specifically for people with MS.

METHODS: This pre/post intervention, mixed-methods study included people with MS who used a wheelchair or scooter full-time, experienced at least 1 fall within the past year, and transferred independently or with minimal or moderate assistance. Participants engaged in a 6-week, online, individualized, multicomponent fall prevention and management intervention: Individualized Reduction of Falls-Online (iROLL-O).

RESULTS: No statistically significant change in fall incidence occurred after iROLL-O. However, fear of falling significantly decreased ($P < .01$) and knowledge related to fall management ($P = .04$) and fall prevention and management ($P = .03$) significantly improved. Qualitative results indicated that participants valued the opportunity for peer learning and iROLL-O's attention to diverse influences on fall risk.

CONCLUSIONS: This study is the first to examine the preliminary efficacy of an online fall prevention and management intervention for people with MS who use a wheelchair or scooter full-time. iROLL-O has promise, and participants found it valuable. Further efforts are needed to retain iROLL-O participants with lower confidence and functional mobility, and more research is needed to investigate the impact of the intervention on key outcomes over time.

Language: en

Keywords

accidental falls; telehealth; multiple sclerosis; wheelchair