

Safety Literature 30th January 2022

A review on aging, sarcopenia, falls, and resistance training in community-dwelling older adults

Rodrigues F, Domingos C, Monteiro D, Morouço P. *Int. J. Environ. Res. Public Health* 2022; 19(2): e874.

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Abstract

As aging continues to grow in our society, sarcopenia and associated fall risk is considered a public health problem since falling is the third cause of chronic disability. Falls are negatively related to functionality and independence and positively associated with morbidity and mortality. The cost of treatment of secondary injuries related to falls is high. For example, one in ten fall incidents leads to bone fractures and several other comorbidities. As demonstrated by several experimental studies, adopting a more active lifestyle is critical for reducing the number of fall episodes and their consequences. Therefore, it is essential to debate the proven physical exercise methods to reduce falls and fall-related effects. Since muscle mass, muscle strength, bone density, and cartilage function may play significant roles in daily activities, resistance training may positively and significantly affect the elderly. This narrative review aimed to examine current evidence on existing resistance training using resistance machines and bodyweight or low-cost equipment for the elderly and how they are related to falls and fall-related consequences. We provide theoretical links between aging, sarcopenia, and falls linking to resistance training and offer practical suggestions to exercise professionals seeking to promote regular physical exercise to promote quality of life in this population. Exercise programs focusing on strength may significantly influence muscle mass and muscle strength, minimizing functional decline and risk of falling. Resistance training programs should be customized to each elderly according to age, sex, and other fundamental and individual aspects. This narrative review provides evidence to support recommendations for practical resistance training in the elderly related to intensity and volume. A properly designed resistance training program with adequate instructions and technique is safe for the elderly. It should include an individualized approach based on existing equipment (i.e., body weight, resistance machines). Existing literature shows that exercise performance towards 2-3 sets of 1-2 exercises per major muscle group, performing 5-8 repetitions or achieving intensities of 50-80% of 1RM, 2-3 times per week should be recommended, followed by training principles such as periodization and progression. Bearing this in mind, health and exercise professionals should combine efforts focusing on efficient strategies to reduce falls among the elderly and promote higher experiences of well-being at advanced stages in life.

Language: en

Keywords

elderly; aging; fall; resistance training; sarcopenia

Chronic pain and circumstances of falls in community-living older adults: an exploratory study

Cai Y, Leveille SG, Shi L, Chen P, You T. Age Ageing 2022; 51(1): afab261.

(Copyright © 2022, Oxford University Press)

DOI 10.1093/ageing/afab261 **PMID** 35061871

Abstract

BACKGROUND: Chronic pain is a risk factor contributing to mobility impairment and falls in older adults. Little is known about the patterns of circumstances of falls among older adults with chronicpain.

OBJECTIVE: To examine the relationship between chronic pain and circumstances of falls including location, activities at the time of falls and self-reported causes of falls in older adults.

DESIGN: Prospective cohort study. **SETTING:** Communities in/around Boston, Massachusetts. **SUBJECTS:** The MOBILIZE Boston Study enrolled 765 adults aged ≥ 70 years.

METHODS: Pain severity, fall occurrence and fall circumstances were recorded using monthly calendar postcards and fall follow-up interviews during a 4-year follow-up period. Generalised estimating equation models were performed to examine the relation between monthly pain ratings and circumstances of the first fall in the subsequent month.

RESULTS: Compared to fallers without chronic pain, fallers with moderate-to-severe pain had around twice the likelihood of reporting indoor falls (aOR = 1.93, 95%CI: 1.32-2.83), falls in living or dining rooms (aOR = 2.06, 95%CI: 1.27-3.36), and falls due to health problems (aOR = 2.08, 95%CI: 1.16-3.74) or feeling dizzy or faint (aOR = 2.10, 95%CI: 1.08-4.11), but they were less likely to report falls while going down stairs (aOR = 0.48, 95%CI: 0.27-0.87) or falls due to a slip or trip (aOR = 0.67, 95%CI: 0.47-0.95) in the subsequent month.

CONCLUSIONS: Given the exploratory nature of the study, these findings should be interpreted with caution. Future studies may investigate whether better pain management and tailored fall prevention in older people with chronic pain could lead to fewer falls.

Language: en

Keywords

epidemiology; ageing; falls; older people; chronic pain; community-living

Do outpatient podiatry evaluations reduce the risk of falls in elderly patients with diabetes mellitus?

Myers A, Hunter K, Roy S. J. Clin. Med. Res. 2021; 13(12): 521-529.

(Copyright © 2021, Canada-China Clinical Medicine Study Association, Publisher Elmer Press)

DOI 10.14740/jocmr4638 **PMID** 35059070

Abstract

BACKGROUND: Elderly patients with diabetes mellitus (DM) are faced with potential changes in their lower extremities, such as peripheral neuropathy and peripheral arterial disease, making them vulnerable to falls. We hypothesized that evaluations by podiatrists would lower the events of falls.

METHODS: A retrospective chart review of a cohort of patients with DM, 65 years or older, was performed, who visited our primary care office between January 1, 2019 and June 30, 2019. Patients were divided into those who had podiatrist evaluations (PODEVAL), and those who did not (no PODEVAL). Events of falls and comorbid medical conditions were compared between the two groups. We also compared the associations of risk factors between the patients who had falls and those who did not.

RESULTS: Among 197 patients (PODEVAL = 92; no PODEVAL = 105), the mean ages of the two groups were comparable (76.9 years for PODEVAL, 75.5 years for no PODEVAL; $P = 0.151$). There was no significant difference in the events of falls in a 6-month follow-up period between PODEVAL and no PODEVAL groups (35.9% vs. 32.4%; $P = 0.606$). We found significantly higher frequencies of association of several disorders of the lower extremities in PODEVAL group compared to no PODEVAL group, such as bunions and calluses (48.9% vs. 27.6%; $P = 0.002$), peripheral arterial disease (50.0% vs. 26.7%; $P < 0.001$), and peripheral neuropathy (75.0% vs. 47.6%; $P < 0.001$). Patients with falls had higher frequencies of associations of some comorbidities compared to the patients without reported falls, such as coronary artery disease, peripheral arterial disease, dementia, congestive heart failure, carotid stenosis, and syncope.

CONCLUSIONS: Among elderly patients with DM, there is no significant difference in the events of falls between the groups of patients who had podiatrist evaluations and who did not.

Language: en

Keywords

Elderly; Fall; Diabetes mellitus; Podiatrist evaluations

Gender differentiated score on the Falls Efficacy Scale International (FES-I Brazil) to assess self-efficacy in falls in community-dwelling older adults

Canever JB, Danielewicz AL, Leopoldino AAO, Corseuil MW, de Avelar NCP. Aging Clin. Exp. Res. 2022; ePub(ePub): ePub.

(Copyright © 2022, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s40520-021-02058-9 **PMID** 35050494

Abstract

BACKGROUND: Since fear of falling is associated with a history of falls and is more prevalent in women, it is important to define cut-off points differentiated between genders on the Falls Efficacy Scale International Brazil (FES-I Brazil) to implement early prevention and/or rehabilitation strategies. **AIMS:** To determine cut-off points on the FES-I Brazil differentiated between genders which discriminate falls and verify their association with the history of falls.

METHODS: This was a cross-sectional study including 306 community-dwelling older adults. Fear of falling score from the FES-I Brazil was the independent variable and the outcome was the history of falls in the last 12 months. The cut-off points differentiated between genders were established according to sensitivity and specificity values evaluated by the Receiver Operating Characteristic Curves (ROC). The multivariable logistic regression was used to verify the association between fear of falling and history of falls.

RESULTS: The cut-off points on the FES-I Brazil to discriminate falls were > 25 points [AUC: 0.67 (95% CI 0.59-0.73)] for women, and > 19 points [AUC: 0.66 (95% CI 0.57-0.74)] for men, suggesting that women present a greater fear of falling than men, due to the higher cut-off point found for women. Women and men with fear of falling, respectively, had 2.14 (95% CI 1.11-4.13) and 2.62 (95% CI 1.10-6.85) higher odds of suffering falls compared to those without this condition.

CONCLUSIONS: The FES-I can be used to discriminate falls in the elderly and shows that women have a higher cut-off point than men on the scale.

Language: en

Keywords

Aged; Risk factors; Fear of falling; Independent living; FES-I Brazil

Human fall detection using passive infrared sensors with low resolution: a systematic review

Ben-Sadoun G, Michel E, Annweiler C, Sacco G. *Clin. Interv. Aging* 2022; 17: 35-53.

(Copyright © 2022, Dove Press)

DOI 10.2147/CIA.S329668 **PMID** 35046646

Abstract

Systems using passive infrared sensors with a low resolution were recently proposed to answer the dilemma effectiveness-ethical considerations for human fall detection by Information and Communication Technologies (ICTs) in older adults. How effective is this type of system? We performed a systematic review to identify studies that investigated the metrological qualities of passive infrared sensors with a maximum resolution of 16×16 pixels to identify falls. The search was conducted on PubMed, ScienceDirect, SpringerLink, IEEE Xplore Digital Library, and MDPI until November 26-28, 2020. We focused on studies testing only these types of sensor. Thirteen articles were "conference papers", five were "original articles" and one was found in arXiv.org (an open access repository of scientific research). Since four authors "duplicated" their study in two different journals, our review finally analyzed 15 studies. The studies were very heterogeneous with regard to experimental procedures and detection methods, which made it difficult to draw formal conclusions. All studies tested their systems in controlled conditions, mostly in empty rooms. Except for two studies, the overall performance reported for the detection of falls exceeded 85-90% of accuracy, precision, sensitivity or specificity. Systems using two or more sensors and particular detection methods (eg, 3D CNN, CNN with 10-fold cross-validation, LSTM with CNN, LSTM and Voting algorithms) seemed to give the highest levels of performance (> 90%). Future studies should test more this type of system in real-life conditions.

Language: en

Keywords

Aged; Humans; older adults; *Algorithms; *Accidental Falls; fall detection; passive infrared sensor; thermal sensor; thermopile

Impact of correcting nutritional deficiency anemias in the elderly on hospitalizations, falls, and mortalities

Sklarz T, Italiano A, Menon N, Correia C, Sharma E, Wu S, Hunter K, Roy S. J. Hematol. 2021; 10(6): 233-245.

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Abstract

BACKGROUND: The incidence and prevalence of anemia increase with age, particularly in adults older than 65 years, and it is associated with a number of adverse health outcomes (AHO), particularly hospitalizations, falls and mortalities. Given that approximately one-third of these anemias are due to reversible causes, we studied whether the treatment of nutritional deficiency anemia (NDA), namely iron deficiency anemia (IDA), cobalamin deficiency anemia (CDA), and folate deficiency anemia (FDA), improves AHO; and explored whether each NDA had different AHO.

METHODS: We reviewed electronic medical records of our internal medicine office patients aged 65 years or older, who had a diagnosis of anemia in a non-acute setting.

RESULTS: Total 600 patients were included. Mean age was 75.2 years. Thirty-one point three percent had NDA (CDA 15.3%, IDA 12.3%, FDA 3.7%); and 68.7% had other anemias whom we categorized as non-nutritional deficiency anemias (NNDA), which included anemia of chronic disease (11.2%), myelodysplastic syndrome (6.2%), renal insufficiency anemia (5.7%) and unexplained anemia (45.6%). Even after adequate treatment, IDA group had significantly more hospitalizations (median, 25th - 75th: 2 (0 - 4) vs. 0 (0 - 1), $P < 0.001$), falls (median, 25th - 75th: 1 (0 - 3) vs. 0 (0 - 1), $P < 0.001$) and mortalities (10.8% vs. 3.4%, $P = 0.011$); CDA group had significantly more hospitalizations (median, 25th - 75th: 1 (0 - 2) vs. 0 (0 - 1), $P = 0.007$), but no difference in falls (median, 25th - 75th: 0 (0 - 1) vs. 0 (0 - 1), $P = 0.171$) and mortalities (7.6% vs. 3.4%, $P = 0.083$); and FDA group had significantly more hospitalizations (median, 25th - 75th: 1 (0 - 2) vs. 0 (0 - 1), $P = 0.001$), but no difference in falls (median, 25th - 75th: 0 (0 - 1) vs. 0 (0 - 1), $P = 0.615$) and mortalities (4.5% vs. 3.4%, $P = 0.550$), compared to the NNDA group. Age, Black race, higher number of comorbidities, presence of malignancy and use of direct oral anticoagulants were associated with increased odds of AHO in patients with NDA.

CONCLUSIONS: Compared to the patients with NNDA, patients with IDA had more hospitalizations, falls and mortalities even after adequate treatment; while patients with CDA and FDA had only more hospitalizations. Adequate treatment mitigated falls and mortalities in elderly patients with CDA and FDA.

Language: en

Keywords

Elderly; Anemia; Cobalamin deficiency; Folate deficiency; Iron deficiency; Nutritional deficiency anemias; Vitamin B12 deficiency

Linking health service utilisation and mortality data-unravelling what happens after fall-related paramedic care

Mikolaizak AS, Harvey L, Toson B, Lord SR, Tiedemann A, Howard K, Close JCT. Age Ageing 2022; 51(1).

(Copyright © 2022, Oxford University Press)

DOI 10.1093/ageing/afab254 **PMID** 35077557

Abstract

BACKGROUND: A randomised controlled trial implemented and evaluated a new model of care for non-transported older fallers to prevent future falls and unplanned health service use. This current study uses linked data to evaluate the effects of the intervention beyond the initial 12-month study period.

METHOD: Study data from an established cohort of 221 adults were linked to administrative data from NSW Ambulance, Emergency Department Data Collection, Admitted Patient Data Collection and Registry of Births, Deaths and Marriages evaluating health service use at 12, 24 and 36 months following randomisation including time to event (health service utilisation) and mortality. Negative binomial and Cox's proportional hazard regression were performed to capture the impact of the study between groups and adherence status.

RESULTS: At 36 months follow-up, 89% of participants called an ambulance, 87% attended the Emergency Department and 91% were admitted to hospital. There were no significant differences in all-cause health service utilisation between the control and intervention group (IG) at 12, 24 and 36 months follow-up. Fall-related health service use was significantly higher within the IG at 12 (IRR:1.40 (95%CI:1.01-1.94) and 24 months (IRR:1.43 (95%CI:1.05-1.95)). Medication use, impaired balance and previous falls were associated with subsequent health service use. Over 40% of participants died by the follow-up period with risk of death lower in the IG at 36 months (HR:0.64, 95%CI:0.45-0.91).

CONCLUSION: Non-transported fallers have a high risk of future health service use for fall and other medical-related reasons. Interventions which address this risk need to be further explored.

Language: en

Keywords

emergency medicine; intervention; older people; linked data; health service use; older fallers

Role of medicines management in preventing falls in older people

Smith H. Nurs. Older People 2022; ePub(ePub): ePub.

(Copyright © 2022, RCN Publishing)

DOI 10.7748/nop.2022.e1376 **PMID** 35080169

Abstract

Falls are common in older people and are a cause of preventable morbidity and mortality. As well as causing injury, falls can result in pain, distress, loss of confidence, loss of independence and increased mortality. Older people are more likely to visit an emergency department following a fall, therefore these incidents place a high burden on these patients and their carers, as well as on healthcare systems. Appropriate risk assessment accompanied by multifactorial falls prevention interventions can reduce the risk of falls. Assessments should include a medication review because various medicines, sometimes referred to as 'falls risk increasing drugs', can precipitate or contribute to falls. This article examines some of the medicines in this group that can contribute to falls, serious injuries and fractures in older people. It also discusses the importance of medicines management as part of falls risk assessment and prevention interventions.

Language: en

Keywords

falls; older people; polypharmacy; clinical; medicines; medicines management; medicines review; patient assessment; patients; professional

The association between falls and anxiety among elderly Chinese individuals: the mediating roles of functional ability and social participation

Yue Z, Liang H, Gao X, Qin X, Li H, Xiang N, Liu E. *J. Affect. Disord.* 2022; ePub(ePub): ePub.

(Copyright © 2022, Elsevier Publishing)

DOI 10.1016/j.jad.2022.01.070 **PMID** 35051441

Abstract

BACKGROUND: Elderly individuals who experience falls suffer from higher levels of anxiety because of physical or mental injury. This study examined the association between falls and anxiety among elderly Chinese individuals. It also explored the mediating roles of functional ability and social participation in the link between falls and anxiety.

METHODS: The analytical sample included 8233 elderly people aged 60 and above, and prospective data were obtained from the Chinese Longitudinal Healthy Longevity Survey (CLHLS). Anxiety was evaluated by a 7-item Generalized Anxiety Disorder (GAD-7) scale, and falls were determined by self-report. The association between falls and anxiety was assessed by linear regression. Mediation analysis was used to explore the potential mediating roles of functional ability and social participation on the association between falls and anxiety.

RESULTS: Suffering falls predicted higher anxiety levels among elderly individuals ($B = 0.608$, 95% CI: 0.471, 0.746). Functional ability and social participation play partial mediating roles in the association between falls and anxiety, and the mediating effects were 0.036 (95% CI: 0.020, 0.058) and 0.005 (95% CI: 0.003, 0.014), respectively. The serial mediating effect of functional ability and social participation on the association between falls and anxiety was 0.003 (95% CI: 0.002, 0.005). **LIMITATIONS:** This study is based upon cross-sectional data, which limit inferring causality.

CONCLUSIONS: This study suggests that policy-makers should explore how to encourage elderly individuals who experience falls to restore functional ability and participate in appropriate social activities to alleviate anxiety.

Language: en

Keywords

Falls; Anxiety; Elderly Chinese individuals; Functional ability; Social participation

The effect of interventions anticipated to improve plantar intrinsic foot muscle strength on fall-related dynamic function in adults: a systematic review

Willemse L, Wouters EJM, Bronts HM, Pisters MF, Vanwanseele B. J. Foot Ankle Res. 2022; 15(1): e3.

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DOI 10.1186/s13047-021-00509-0 **PMID** 35057831

Abstract

BACKGROUND: The plantar intrinsic foot muscles (PIFMs) have a role in dynamic functions, such as balance and propulsion, which are vital to walking. These muscles atrophy in older adults and therefore this population, which is at high risk to falling, may benefit from strengthening these muscles in order to improve or retain their gait performance. Therefore, the aim was to provide insight in the evidence for the effect of interventions anticipated to improve PIFM strength on dynamic balance control and foot function during gait in adults.

METHODS: A systematic literature search was performed in five electronic databases. The eligibility of peer-reviewed papers, published between January 1, 2010 and July 8, 2020, reporting controlled trials and pre-post interventional studies was assessed by two reviewers independently.

RESULTS from moderate- and high-quality studies were extracted for data synthesis by summarizing the standardized mean differences (SMD). The GRADE approach was used to assess the certainty of evidence.

RESULTS: Screening of 9199 records resulted in the inclusion of 11 articles of which five were included for data synthesis. Included studies were mainly performed in younger populations. Low-certainty evidence revealed the beneficial effect of PIFM strengthening exercises on vertical ground reaction force (SMD: -0.31-0.37). Very low-certainty evidence showed that PIFM strength training improved the performance on dynamic balance testing (SMD: 0.41-1.43). There was no evidence for the effect of PIFM strengthening exercises on medial longitudinal foot arch kinematics.

CONCLUSIONS: This review revealed at best low-certainty evidence that PIFM strengthening exercises improve foot function during gait and very low-certainty evidence for its favorable effect on dynamic balance control. There is a need for high-quality studies that aim to investigate the effect of functional PIFM strengthening exercises in large samples of older adults. The outcome measures should be related to both fall risk and the role of the PIFMs such as propulsive forces and balance during locomotion in addition to PIFM strength measures.

Language: en

Keywords

Balance; Gait; Falling; Exercise therapy; Intrinsic foot musculature

"Sarcopenia and risk of osteoporosis, falls and bone fractures in patients with chronic kidney disease: a systematic review"

Rashid A, Chaudhary Hauge S, Suetta C, Hansen D. PLoS One 2022; 17(1): e0262572.

(Copyright © 2022, Public Library of Science)

DOI 10.1371/journal.pone.0262572 PMID 35061818

Abstract

BACKGROUND: Chronic kidney disease [CKD] has been suggested to increase the risk of osteoporosis, sarcopenia, falls, and fractures. The aim of this systematic review was to explore the occurrence of osteoporosis, falls, and fractures in patients with sarcopenia and CKD, and to explore the possible association between sarcopenia and osteoporosis, falls, and fractures in patients with CKD.

METHODS: This systematic review was conducted according to the PRISMA guideline. The protocol was registered at PROSPERO. The systematic literature search was conducted in Pubmed [1966 to present] and EMBASE [1974 to present] on December 4, 2020. We searched for articles on CKD and sarcopenia, and then we selected them with outcomes such as osteoporosis, falls, and bone fractures. The risk of bias was assessed with the Newcastle-Ottawa Scale.

RESULTS: Five studies were eligible and included. No studies reported the occurrence of osteoporosis, falls, and bone fractures in patients with CKD and sarcopenia. Sarcopenia had a significant association with low bone mineral density [BMD] and osteoporosis in patients with CKD. The risk of bias assessed with the Newcastle-Ottawa Scale varied from 3-7 stars [median of 7]. Due to the included studies' heterogeneity, a meta-analysis could not be conducted.

CONCLUSION: The occurrence of osteoporosis, falls, and bone fractures in patients with sarcopenia and CKD could not be assessed from the included studies, but an association between sarcopenia and decreased BMD/osteoporosis in patients with CKD was found. The potential mechanistic link between sarcopenia and osteoporosis in CKD needs to be investigated in future studies.

Language: en

Characterization of balance problems and rehabilitation needs of patients with Ménière's disease

Pyykkö I, Pyykkö N, Zou J, Manchaiah V. *Audiol. Res.* 2022; 12(1): 22-32.

(Copyright © 2022, PagePress)

DOI 10.3390/audiolres12010003 **PMID** 35076449

Abstract

BACKGROUND: To explore and characterize balance problems in subjects with Ménière's disease (MD).

METHODS: A total of 539 people with MD with a mean age of 61.9 years, mean disease history of 15.6 years, and 79.5% females were recruited. The online questionnaire, consisting of 39 questions, including both structured and open-ended questions, focused on symptoms of MD, balance problems, impacts of the complaints, and quality of life (QoL).

RESULTS: After hearing loss (58%) and tinnitus (50%), balance problems (44%) were among the most commonly reported MD complaints, even higher than the impact of vertigo (40%). However, only 22% reported that those balance problems made obvious impacts in their daily lives. The most common balance problem that significantly reduced QoL was tripping (34%). Swaying (25%) had a limited impact on QoL, whereas rocking (10%) was less common but caused a significant impact on QoL. Non-defined balance problems were reported at 18%; these were occasional and correlated with vertigo attacks. Older participants had more frequent tripping problems. Younger participants more frequently reported swaying and rocking.

CONCLUSIONS: Risk factors predicting poor postural control were mostly related to complaints reflecting otolith pathology. Different types of postural problems require different strategies to manage balance control and cope with the disease.

Language: en

Keywords

balance problems; Mal de Debarquement; Ménière's disease; rocking; swaying; tripping

Coding quality of deaths and its impact on elderly unintentional fall mortality data from 1990 to 2019: a retrospective analysis of the WHO Mortality Database

Hua J, Ning P, Cheng P, Rao Z, He J, Xiao W, Li L, Fu Y, Li R, Li J, Wang W, Schwebel DC, Hu G. *BMC Geriatr.* 2022; 22(1): e72.

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DOI 10.1186/s12877-021-02744-3 PMID 35073870

Abstract

BACKGROUND: Several studies have assessed the reporting quality of all-cause mortality data from the WHO Mortality Database, but little is known about coding quality and its impact on elderly unintentional fall mortality data worldwide. We aimed to assess the coding quality of deaths and its impact on elderly unintentional fall mortality.

METHODS: Using data from the WHO Mortality Database, 1990-2019, we calculated the number of countries/territories that had mortality data in the database, and the proportion of deaths with five types of problematic codes based on the 10th International Classification of Disease (unspecified deaths, injury deaths with undetermined intent, unspecified unintentional injury, unintentional falls with unspecified mechanism, unintentional falls with unknown occurrence place). We estimated age-adjusted unintentional fall mortality before and after correcting problematic codes.

RESULTS: Only 64% (124/194) of WHO member states had at least 1 year of mortality data in the database during 1990-2019, and data unavailability was more common for underdeveloped countries/territories than for developed countries/territories. Coding quality was poor for many countries/territories. Among the study years when countries/territories possessed mortality data, 80, 53, 51, and 63% had a proportion of unintentional fall deaths with unspecified mechanism over 50% in low-income, lower middle-income, upper middle-income, and high-income countries/territories, respectively; comparable proportions for unintentional fall deaths with unknown occurrence place were 100, 42, 71, and 62%. Among the 94 countries/territories having mortality data, problematic codes caused a relative mortality difference $\geq 50\%$ in 59 countries/territories (63%). After correcting problematic codes, 5 of 55 countries/territories with data witnessed a reverse in mortality changes between 2005 and 2015. Among the 82 countries/territories with mortality data for 5 or more years, 18 countries/territories (22%) experienced a directional reverse in linear regression coefficient.

CONCLUSIONS: The availability and coding quality of global data related to elderly unintentional fall mortality was poor between 1990 and 2019. When data are available, varying coding quality across countries/territories and over time have a substantial impact on mortality estimates and mortality comparisons. Global agencies plus each individual government should be aware of the importance of collecting and sharing high-quality mortality data, and take action to improve data quality for inclusion in the WHO Mortality Database.

Language: en

Keywords

Mortality; Coding quality; Data availability; Unintentional fall; WHO Mortality Database

Correlation between fall risk increasing drugs (FRIDs) and fall events at a rehabilitation hospital

Castaldi S, Principi N, Carnevali D, Tiwana N, Pietronigro A, Mosillo M, Marrazzo M, Colombo R, Avanzi GM, Corna S. *Acta Biomed. Ateneo Parmense* 2022; 92(6): e2021397.

(Copyright © 2022, Societa di Medicina e scienze naturali di Parma)

DOI 10.23750/abm.v92i6.11340 **PMID** 35075080

Abstract

Background and aim Falls and fall-related injuries are a major public health issue which needs global attention due to its clinical and socioeconomic impact. Important risk factors for falls are polypharmacy and the assumption of so-called Fall Risk Increasing Drugs (FRIDs). Aims of our study were to investigate the associations between falls and the use of medications among inpatients by conducting a retrospective case-control study in a rehabilitation hospital in Northern Italy in 2018.

METHODS A Conditional Logistic Regression was performed to analyze the impact that 13 types of FRIDs individually and the number of administrated FRIDs had on the risk of falling. A second regression model was obtained adjusting the case-control matching for CIRS, Morse and Barthel scores.

RESULTS We identified 148 cases and 444 controls. 3 types of FRIDs were significantly correlated ($p < 0,05$) with an increased risk of falling: Antipsychotics, Antidepressants, Diuretics. Antidepressants were the only type of FRID significantly correlated ($p=0,008$) even in the model adjusted for CIRS, Morse and Barthel scores. The unadjusted model showed that the addition of one type of FRID to therapy was significantly associated with the fall event ($p<0.05$).

CONCLUSION Assumption of drugs, in particular antidepressant and polypharmacy, can play a role in hospital falling. The fall risk assessment tools available, suffer from low specificity and sensitivity and do not assess these risk factors. A holistic approach with a multidimensional evaluation of the patient through screening tools, functional assessment tools and a full medical evaluation should be pursued to improve prediction.

Language: en

Fall risk, healthcare resource use, and costs among adult patients in the United States treated for insomnia with zolpidem, trazodone, or benzodiazepines: a retrospective cohort study

Amari DT, Juday TR, Frech FH, Wang W, Gor D, Atkins NJ, Wickwire EM. *Adv. Ther.* 2022; ePub(ePub): ePub.

(Copyright © 2022, Springer Healthcare Communications)

DOI 10.1007/s12325-022-02041-4 PMID 35072889

Abstract

INTRODUCTION: Falls are a common cause for morbidity and mortality among patients taking prescription insomnia medication. The objective of this study is to compare the risk of falls, all-cause healthcare resource utilization (HCRU), and costs among patients treated with commonly used, older generation insomnia medications and non-sleep-disordered controls.

METHODS: This retrospective cohort study used the IBM(®) MarketScan(®) Commercial and Medicare Supplemental Databases to identify patients aged at least 18 years treated with commonly prescribed medications for insomnia (zolpidem, trazodone, benzodiazepines) between 1 January 2012 and 30 September 2017. The insomnia-treated cohort were age- and sex-matched (1:1) to non-sleep-disordered controls. Odds ratios (ORs) compared risk of falls in each cohort, adjusting for covariates. Costs were adjusted to 2018 dollars, the most recent year for the study data.

RESULTS: Relative to matched controls (n = 313,086), the insomnia-treated cohort had a higher rate of falls (3.34% vs. 1.33%), and higher risk of falls [OR = 2.36 (95% confidence interval 2.27-2.44)]. Relative to other index treatments, patients treated with trazodone had the greatest risk of falls. Compared with matched controls, the estimated mean number of inpatient visits, emergency department visits, outpatient visits, and mean length of inpatient stay were all significantly higher among patients treated for insomnia. Such patients incurred greater total costs per patient per month than matched controls (\$2100 versus \$888; estimated mean ratio, 2.36; 95% CI 2.35-2.38; p < 0.0001).

CONCLUSIONS: Relative to matched controls, the insomnia-treated cohort showed higher risk of falls with greater HCRU and costs. Each outcome measured was highest among patients treated with trazodone, relative to other index treatments.

FINDINGS suggest the need for new treatment options to optimize quality of care for patients with insomnia.

Language: en

Keywords

Cost; Falls; Benzodiazepines; Insomnia; Trazodone; Zolpidem

Falls are common, morbid, and predictable among people with cirrhosis

Murphy SL, Blackwood J, Richardson JK, Martinez B, Tapper EB. Eur. J. Gastroenterol. Hepatol. 2021; 33(Suppl 1): e1101-e1102.

(Copyright © 2021, Lippincott Williams and Wilkins)

DOI 10.1097/MEG.0000000000002263 **PMID** 35048681

Abstract

[The publisher has not provided an abstract for this article.]

Language: en

Identification of gait unbalance and fallers among subjects with cerebellar ataxia by a set of trunk acceleration-derived indices of gait

Castiglia SF, Trabassi D, Tatarelli A, Ranavolo A, Varrecchia T, Fiori L, Di Lenola D, Cioffi E, Raju M, Coppola G, Caliandro P, Casali C, Serrao M. *Cerebellum* 2022; ePub(ePub): ePub.

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Abstract

This study aimed to assess the ability of 25 gait indices to characterize gait instability and recurrent fallers among persons with primary degenerative cerebellar ataxia (pwCA), regardless of gait speed, and investigate their correlation with clinical and kinematic variables. Trunk acceleration patterns were acquired during the gait of 34 pwCA, and 34 age- and speed-matched healthy subjects (HS(matched)) using an inertial measurement unit. We calculated harmonic ratios (HR), percent recurrence, percent determinism, step length coefficient of variation, short-time largest Lyapunov exponent (sLLE), normalized jerk score, log-dimensionless jerk (LDLJ-A), root mean square (RMS), and root mean square ratio of accelerations (RMSR) in each spatial direction for each participant. Unpaired t-tests or Mann-Whitney tests were performed to identify significant differences between the pwCA and HS(matched) groups. Receiver operating characteristics were plotted to assess the ability to characterize gait alterations in pwCA and fallers. Optimal cutoff points were identified, and post-test probabilities were calculated. The HRs showed to characterize gait instability and pwCA fallers with high probabilities. They were correlated with disease severity and stance, swing, and double support duration, regardless of gait speed. sLLEs, RMSs, RMSRs, and LDLJ-A were slightly able to characterize the gait of pwCA but failed to characterize fallers.

Language: en

Keywords

Falls; Accelerometry; Cerebellar ataxia; Gait disorders; Harmonic ratio; Inertial measurement units; Neurologic

Incidences and circumstances of falls among women following total hip arthroplasty on long-term follow-up

Ikutomo H, Nagai K, Tagomori K, Miura N, Okamura K, Okuno T, Nakagawa N, Masuhara K. *J. Orthop. Sci.* 2022; ePub(ePub): ePub.

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Abstract

BACKGROUND: Patients who undergo total hip arthroplasty have an increased risk of falls during the first postoperative year. However, it is unclear whether patients after total hip arthroplasty will continue to be at high risk of falls more than 1 year postoperatively. To better understand whether the risk of falls changes after a 1-year period, we investigated the incidences and circumstances of falls in women patients for 5 years after total hip arthroplasty.

METHODS: This longitudinal prospective cohort study analyzed 65 women with severe hip osteoarthritis who underwent total hip arthroplasty. The incidences and circumstances of falls before total hip arthroplasty and at 1, 2, and 5 years postoperatively were investigated. We assessed the Harris Hip Score and evaluated hip pain and ambulatory ability using a self-administered questionnaire.

RESULTS: The incidences of at least one fall were 30.8%, 26.2%, 23.1%, and 30.8% before and 1, 2, and 5 years after surgery, respectively. Among the circumstances of falls from pre-surgery to 5 years post-surgery, there was a significant difference in the direction of falls; however, there were no significant differences in the location, time, cause, and type of injury. Most falls occurred indoors by tripping or loss of balance during the daytime. Among the participants who had falls almost half sustained injuries, and approximately 10% of falls resulted in fractures each year. Although self-reported hip pain, ambulation, and the Harris Hip Score significantly improved in women after total hip arthroplasty compared to pre-surgery, there was no significant difference in the incidences of falls from 1 to 5 years post-surgery.

CONCLUSION: Women who underwent total hip arthroplasty continued to have an increased risk of falls and fall-induced injuries for 5 years postoperatively. Preventive measures against falling to reduce fall-induced injuries in the long term are required for women after total hip arthroplasty.

Language: en

Keywords

Injury; Prevention; Fall; Hip osteoarthritis; Total hip arthroplasty

Pathway of trends and technologies in fall detection: a systematic review

Tanwar R, Nandal N, Zamani M, Manaf AA. Healthcare (Basel) 2022; 10(1): e172.

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Abstract

Falling is one of the most serious health risk problems throughout the world for elderly people. Considerable expenses are allocated for the treatment of after-fall injuries and emergency services after a fall. Fall risks and their effects would be substantially reduced if a fall is predicted or detected accurately on time and prevented by providing timely help. Various methods have been proposed to prevent or predict falls in elderly people. This paper systematically reviews all the publications, projects, and patents around the world in the field of fall prediction, fall detection, and fall prevention. The related works are categorized based on the methodology which they used, their types, and their achievements.

Language: en

Keywords

fall detection; fall prediction; fall prevention; fall risk factors; gait assessment

Patient preferences for lifestyle behaviours in osteoporotic fracture prevention: a cross-European discrete choice experiment

Beaudart C, Boonen A, Li N, Bours S, Goemaere S, Reginster JY, Roux C, McGowan B, Díez-Pérez A, Rizzoli R, Cooper C, Hiligsmann M. *Osteoporos. Int.* 2022; ePub(ePub): ePub.

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Abstract

Using a discrete choice experiment, we aimed to assess patients' preferences with regard to adopting lifestyle behaviours to prevent osteoporotic fractures. Overall, the 1042 patients recruited from seven European countries were favourable to some lifestyle behaviours (i.e., engaging in moderate physical activity, taking calcium and vitamin D supplements, reducing their alcohol consumption and ensuring a normal body weight).

INTRODUCTION: Alongside medical therapy, healthy lifestyle habits are recommended for preventing osteoporotic fractures. In this study, we aimed to assess patients' preferences with regard to adopting lifestyle changes to prevent osteoporotic fractures.

METHODS: A discrete choice experiment was conducted in seven European countries.

Patients with or at risk of osteoporosis were asked to indicate to what extent they would be motivated to adhere to 16 lifestyle packages that differed in various levels of 6 attributes. The attributes and levels proposed were physical activity (levels: not included, moderate or high), calcium and vitamin D status (levels: not included, taking supplements, improving nutrition and assuring a minimal exposure to sunlight daily), smoking (levels: not included, quit smoking), alcohol (levels: not included, moderate consumption), weight reduction (levels: not included, ensure a healthy body weight) and fall prevention (levels: not included, receiving general advice or following a 1-day fall prevention program). A conditional logit model was used to estimate a patient's relative preferences for the various attributes across all participants and per country.

RESULTS: In total, 1042 patients completed the questionnaire. Overall, patients were favourable to lifestyle behaviours for preventing osteoporotic fractures. However, among the lifestyle behaviours proposed, patients were consensually not prone to engage in a high level of physical activity. In addition, in Ireland, Belgium, the Netherlands and Switzerland, patients were also not inclined to participate in a 1-day fall prevention program and Belgian, Swiss and Dutch patients were not prone to adhere to a well-balanced nutritional program. Nevertheless, we observed globally that patients felt positively about reducing their alcohol consumption, engaging in moderate physical activity, taking calcium and vitamin D supplements and ensuring a normal body weight, all measures aimed at preventing fractures.

CONCLUSIONS: In a patient-centred approach, fracture prevention should take these considerations and preferences into account.

Language: en

Keywords

Fractures; Osteoporosis; Discrete choice experiment; Lifestyle; Patients' preferences

The degree of safety against falls provided by 4 different prosthetic knee types in people with transfemoral amputation: a retrospective observational study

Palumbo P, Randi P, Moscato S, Davalli A, Chiari L. Phys. Ther. 2022; ePub(ePub): ePub.

(Copyright © 2022, American Physical Therapy Association)

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Abstract

OBJECTIVE: People with transfemoral amputation have balance and mobility problems and are at high risk of falling. An adequate prosthetic prescription is essential to maximize their functional levels and enhance the quality of life. This study aimed to evaluate the degree of safety against falls offered by different prosthetic knees.

METHODS: A retrospective study was conducted using data from a center for prosthetic fitting and rehabilitation. Eligible individuals were adult patients with unilateral transfemoral amputation or knee disarticulation. The prosthetic knee models were grouped into 4 categories: locked knees (LK), articulating mechanical knees (AMK), fluid-controlled knees (FK), and microprocessor-controlled knees (MPK). The outcome was the number of falls experienced during inpatient rehabilitation while wearing the prosthesis. Association analyses were performed with mixed-effect Poisson models. Propensity score weighting was used to adjust causal estimates for patient confounding factors.

RESULTS: Data on 1486 hospitalizations of 815 individuals were analyzed. Most hospitalizations (77.4%) were related to patients with amputation due to trauma. After propensity score weighting, the knee category was significantly associated with falls. People with FK had the highest rate of falling (incidence rate = 2.81 falls per 1000 patient days, 95% CI = 1.96-4.02). FK significantly increased the risk of falling compared with MPK (incidence rate ratio [IRRFK-MPK] = 2.44, 95% CI = 1.20-4.96). No other comparison among knee categories was significant.

CONCLUSIONS: Fluid-controlled prosthetic knees expose inpatients with transfemoral amputation to higher incidence of falling than MPK during rehabilitation training. **IMPACT:** These findings can guide clinicians in the selection of safe prostheses and reduction of falls in people with transfemoral amputation during inpatient rehabilitation.

Language: en

Keywords

Accidental Falls; Balance; Amputation; Knee; Prostheses and Implants

The effects of pilates on health-related outcomes in individuals with increased risk of fracture: a systematic review

McLaughlin EC, Bartley J, Ashe MC, Butt D, Chilibeck PD, Wark J, Thabane L, Stapleton J, Giangregorio L. *Appl. Physiol. Nutr. Metab.* 2022; ePub(ePub): ePub.

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Abstract

This systematic review examined the effect of Pilates on health-related outcomes in individuals with increased fracture risk to inform the 2021 Clinical Practice Guidelines for Management of Osteoporosis and Fracture Prevention in Canada. Seven electronic databases were searched to December 2020. Studies of Pilates in men and postmenopausal women aged ≥ 50 years with low BMD, history of fragility fracture, or moderate-high risk of fragility fracture were included. Two reviewers independently screened studies and performed risk of bias assessment. Of 7286 records and 504 full-text articles, five studies were included, encompassing data from 143 participants (99% female). Data were insufficient for meta-analyses. There is low-certainty evidence that Pilates improved physical functioning and health-related quality of life. The effect of Pilates on falls and BMD is uncertain. No evidence was available for the effect of Pilates on mortality, fractures, or adverse events. Overall, Pilates may improve physical functioning and quality of life. Evidence of benefits relative to harms of Pilates in people with increased fracture risk, particularly males, is limited. PROSPERO registration: CRD42019122685. Novelty Bullets: • Pilates may improve physical functioning and quality of life in women with osteoporosis. • Evidence of the effect of Pilates on BMD, falls, fractures, or adverse events is limited.

Language: en

The impact of pain on functionality, postural control and fall risk in woman aged 45 to 64 years old

Beaupré P, da Silva RA, Chevrette T. *Geriatrics* (Basel) 2022; 7(1).

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Abstract

BACKGROUND: Ageing in women is associated with chronic degenerative pain leading to a functional decrease and therefore increase fall risk. It is therefore essential to detect early functional decreases in the presence of pain related to osteoarthritis.

OBJECTIVE: This cross-sectional study aimed to assess the impact of pain on functionality, postural control and fall risk in women aged between 45 to 64 years old.

METHODS: Twenty-one (21) women aged 45 to 64 were evaluated by clinical and functional measures such as a pain questionnaire (Lequesne Index), functional tests (Stair Step Test, 5 times sit-to-stand, 6MWD, Timed-up and Go) and postural performance (under force platform). Women were classified into 2 groups from the Lequesne Pain Index (PI): low pain (score ≤ 9) and strong pain (score ≥ 10) for subsequent comparisons on functionality (physical and postural control performance).

RESULTS: A significant impact was observed between the pain index (strong PI) and 3 of the 4 functional tests carried out including Stair Step Test ($p = 0.001$; $g = 1.44$), walking distance ($p = 0.003$; $g = 1.31$) and Timed-up and Go ($p = 0.04$; $g = -0.93$). The group with a strong PI score reported further poor postural control under force platform compared to the weak pain group.

CONCLUSION: Pain and severity based on the PI index negatively modulate physical and postural control performance in women aged 45 to 64 years old.

Language: en

Keywords

aging; pain; osteoarthritis; hip; woman