

Safety Literature 26th November 2023

Deaths caused by osteoporotic fractures in Japan: an epidemiological study

Abe K, Inage K, Yoshimura K, Sato D, Yamashita K, Yamashita M, Sasaki T, Yamaoka A, Shiga Y, Eguchi Y, Orita S, Ohtori S. *J. Orthop. Sci.* 2023; ePub(ePub): ePub.

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PMID: 37985296

Abstract

BACKGROUND: Osteoporosis is a global issue with a worldwide prevalence of 18.3%, and the presence of coexisting fragility fractures can reduce the survival rate by approximately 20%. In Japan, the prevalence of osteoporosis is estimated to be 12.8 million, and the annual occurrence of hip fractures is approximately 193,400. Remarkably, coexisting hip or spinal fragility fractures caused by slight external force meet the Japanese diagnostic criterion for osteoporosis regardless of bone mineral density. However, only 191 deaths due to osteoporosis were published in 2021 in Japan. With the concern that some cases of hip and spinal fragility fractures were assigned an underlying cause of death of traumatic fracture instead of osteoporosis, this study aimed to elucidate the actual number of deaths due to osteoporosis in Japan.

METHODS: We used the data from Japan in 2018. First, the number of deaths due to osteoporosis and hip or spinal fractures was reviewed using published vital statistics. Second, we calculated the number of elderly deaths (age ≥ 80 years) resulting from hip or spinal fractures caused by falls on the same level using data from approximately 1.4 million annual individual death certificates. Combining the above data, the actual number of deaths due to osteoporosis was estimated.

RESULTS: Only 190 deaths due to osteoporosis were reported in the published data. The individual certificate data revealed 3437 elderly deaths due to hip or spinal fractures caused by falls on the same level, which could meet the criteria of osteoporotic fragility fractures. Accordingly, the estimated number of deaths caused by osteoporosis was calculated as 3,627, approximately 19 times the published value.

CONCLUSIONS: After researching the individual death certificate data focusing on the coexisting hip or spinal fragility fracture, it was implied that osteoporosis may have a higher mortality rate in Japan than what is published.

Language: en

Keywords: Osteoporosis; Death certificate; Fragility fracture; International classification of disease; Underlying cause of death

Cholinesterase inhibitors and falls, syncope and injuries in patients with cognitive impairment: a systematic review and meta-analysis

Ahuja M, Siddhpuria S, Karimi A, Lewis K, Wong E, Lee J, Reppas-Rindlisbacher C, Sood E, Gabor C, Patterson C. *Age Ageing* 2023; 52(11): afad205.

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Abstract

BACKGROUND: Cholinesterase inhibitors are commonly used to treat patients with neurocognitive disorders, who often have an elevated risk of falling. Effective use of these medications requires a thoughtful assessment of risks and benefits.

OBJECTIVE: To provide an update on previous reviews and determine the association between cholinesterase inhibitors and falls, syncope, fracture and accidental injuries in patients with neurocognitive disorders.

METHODS: Embase, MEDLINE, Cochrane Central Register of Controlled Trials, Cumulative Index of Nursing and Allied Health Literature and AgeLine were systematically searched through March 2023 to identify all randomised controlled trials of cholinesterase inhibitors (donepezil, galantamine, rivastigmine) in patients with cognitive impairment. Corresponding authors were contacted for additional data necessary for meta-analysis. Inclusion criteria consisted of adults ≥ 19 years, with a diagnosis of dementia, Parkinson's disease, mild cognitive impairment or traumatic brain injury. Data were extracted in duplicate for the aforementioned primary outcomes and all outcomes were analysed using random-effects meta-analysis.

RESULTS: Fifty three studies (30 donepezil, 14 galantamine, 9 rivastigmine) were included providing data on 25, 399 patients. Cholinesterase inhibitors, compared to placebo, were associated with reduced risk of falls (risk ratio [RR] 0.84 [95% confidence interval [CI] = 0.73-0.96, P = 0.009]) and increased risk of syncope (RR 1.50 [95% CI = 1.02-2.21, P = 0.04]). There was no association with accidental injuries or fractures.

CONCLUSION: In patients with neurocognitive disorders, cholinesterase inhibitors were associated with decreased risk of falls, increased risk of syncope and no association with accidental trauma or fractures. These findings will help clinicians better evaluate risks and benefits of cholinesterase inhibitors

Language: en

Keywords: dementia; older adults; falls; older people; systematic review; cholinesterase inhibitors; syncope

Epidemiological study of injuries in the emergency department of the University Hospital of Georgia

Akhobadze K, Chkhaberidze N, Pitskhelauri N, Kereselidze M, Chikhladze N, Grdzeldze N, Coman M, Dulf D, Peek-Asa C. *Georgian Med. News* 2023; (342): 125-129.

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Abstract

[SafetyLit note: This article concerns the Eastern European nation.]

Injuries represent a significant burden on societies, resulting in deaths and health care costs incurred during Emergency Department visits and hospitalizations. This research aimed to estimate the burden of traumatic injury of patients treated and evaluated in the Emergency Department of the University Hospital in Georgia. A retrospective study was conducted at the University Hospital of Georgia for all trauma patients from January 1, 2018 to June 30, 2018. Visits were identified from existing electronic medical records, using the iCREATE Registry as a model. Data collected included patient demographics, injury characteristics, and injury costs. To estimate the direct costs of trauma treatment, data were obtained from the cost accounting database. A total of 2445 injured patients aged 0 to 91 years were medically examined during the study period and about 65% of them were male. Most of the injured patients were school-age children (31%). The leading mechanism of injury in the Emergency Departments were falls (45%). Most of the patients (78%) suffered from moderate injuries and needed only outpatient treatment. The total direct costs for all patients were \$248 628. Fall-related injury costs accounted for most direct medical costs (51%), followed by road traffic crashes related costs (23%). Road traffic injured patients had the highest total mean costs (\$269). Injuries result in a substantial number of Emergency Department visits and significant medical costs in Georgia. Understanding the characteristics of these injuries is essential for targeting injury prevention.

Language: en

Step length is associated with comprehensive frailty status in community-dwelling older people

Ando M, Kamide N, Sakamoto M, Shiba Y. *Geriatr. Gerontol. Int.* 2023; ePub(ePub): ePub.

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Abstract

AIM: To examine spatial-temporal gait parameters associated with comprehensive frailty status in community-dwelling, independent older people.

METHODS: This cross-sectional study included 225 older people (≥ 65 years) living independently in the community. The Kihon Checklist was used to assess comprehensive frailty status, and participants were classified as robust, pre-frailty, or frailty. A sheet-type plantar pressure sensor was used to evaluate the following gait parameters, which were extracted at the usual and fast pace: gait speed, cadence, stride time, step length-to-height ratio (step length/height), step width, stance duration, double-support time, and variability of each gait parameter. Ordinal logistic regression analysis adjusted for confounding factors was performed to determine the association between gait parameters and frailty status. In addition, the ability to discriminate frailty status was evaluated by receiver operating characteristic (ROC) curve analysis for gait parameters that were significantly associated with frailty status.

RESULTS: Frailty status was pre-frailty in 79 (35.1%) and frailty in 30 (13.3%) participants. Ordinal logistic regression analysis showed a significant association of step length/height (%) at both usual and fast pace with frailty status, even after adjustment for confounding factors (usual pace: odds ratio [OR] = 0.93 [95% confidence interval, CI: 0.86-0.99]; fast pace: OR = 0.93 [95% CI: 0.87-0.99]). ROC curve analysis identified step length/height at fast pace in women as the best discriminator between frailty and non-frailty (area under the curve 0.69, cut-off value 43.4%, sensitivity 50%, specificity 82%).

CONCLUSIONS: Step length appears to be a useful gait parameter for discriminating frailty status in community-dwelling, independent older people. *Geriatr Gerontol Int* 2023; ••: ••-••.

Language: en

Keywords: frailty; older people; community-dwelling; gait parameters; step length

Assessing the frequency of fall risk screening in older adults on chronic opioids in primary care

Gerner A, Jan S, Shah M, Snelson C, Greenberg J, Rolls J. JAAPA 2023; 36(12): e1.

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Abstract

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

Language: en

Environmental interventions for preventing falls in older people living in the community

Herness J, Sanders J, James J. *Am. Fam. Physician* 2023; 108(5): 450-451.

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Abstract

Programs that assess and address fall hazards in the home decrease the rate of falls among older people living in the community. In a group of 1,000 older patients at risk who would otherwise experience 1,319 falls in a year, a home-based fall-hazard intervention would prevent 343 falls (95% CI, 118 to 514 fewer falls). These programs are even more effective when targeted for patients at high risk (e.g., those who have fallen previously). Assistive devices (e.g., eyeglasses, specialized footwear, bed alarm systems) and patient education programs alone do not decrease the rate of falls. None of these interventions affect health-related quality of life...

Language: en

An observational pilot evaluation of the Walk with Ease program for reducing fall risk among older adults

Lamoureux NR, Lansing J, Welk GJ. Arch. Public Health 2023; 81(1): e203.

(Copyright © 2023, Institute for Hygiene and Epidemiology)

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Abstract

BACKGROUND: Physical activity is an effective method of reducing fall risk among older adults. Previous evaluations of the six-week Walk with Ease (WWE) program have documented benefits to functional outcomes, but the potential effects on reducing fall risk have not been evaluated. This pilot study evaluates outcomes of a community delivered WWE program for potential suitability as a fall risk reduction program.

METHODS: A total of 59 older adults (age > 60) enrolled in a group version of WWE delivered by trained community-based leaders. Complete data (pre- and post-program) from functional fitness tests and behavioral instruments were obtained from 41 participants (aged 74.4 ± 6.6 years, 70% female). Functional outcomes included the 10-foot timed up and go (TUG), 30-second chair stand (CST) and 4-stage balance test (BT) included as part of STEADI, as well as a two-minute step test (ST) and normal gait speed test (GST). Survey assessments included STEADI fall risk screening, self-reported physical activity, and fear of falling measures. Analyses focused on reporting pre-post effect sizes, but paired t-tests were used to test statistical significance of differences.

RESULTS: Improvements in functional performance approached significance for both CST ($d = 0.31$, $p = 0.06$) and ST ($d = 0.26$, $p = 0.12$), but all other tests were nonsignificant. Survey results demonstrated significant increases in self-reported walking ($d = 0.54$, $p = 0.02$) and moderate-to-vigorous physical activity (MVPA; $d = 0.56$, $p = 0.004$), but perceived fear of falling and overall fall risk scores had smaller, non-significant, effects (d ranging from 0.01 to 0.31). Stratified analysis suggested that participants screened at an elevated risk for falls at baseline consistently had larger effects on all functional and survey assessments, though the analysis was underpowered to test significance.

CONCLUSIONS: Walk with Ease participation significantly increased self-reported physical activity but did not significantly improve physical function or reduce fall risk. However, consistently larger effect sizes among participants screened as at-risk for falls suggest that the program may be beneficial for those with elevated risk for falls or functional limitations. Further research is needed to document the consistency of these effects among participants with elevated fall risk status.

Language: en

Keywords: Physical activity; Fall prevention; Healthy aging

We should be screening for benign paroxysmal positional vertigo (BPPV) in all older adults at risk of falling: a commentary on the World Falls Guidelines

Li Y, Smith RM, Whitney SL, Seemungal BM, Ellmers TJ. Age Ageing 2023; 52(11): afad206.

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Abstract

Benign paroxysmal positional vertigo (BPPV) is amongst the commonest causes of dizziness and falls in older adults. Diagnosing and treating BPPV can reduce falls, and thereby reduce fall-related morbidity and mortality. Recent World Falls Guidelines recommend formal assessment for BPPV in older adults at risk of falling, but only if they report vertigo. However, this recommendation ignores the data that (i) many older adults with BPPV experience dizziness as vague unsteadiness (rather than vertigo), and (ii) others may experience no symptoms of dizziness at all. BPPV without vertigo is due to an impaired vestibular perception of self-motion, termed 'vestibular agnosia'. Vestibular agnosia is found in ageing, neurodegeneration and traumatic brain injury, and results in dramatically increased missed BPPV diagnoses. Patients with BPPV without vertigo are typically the most vulnerable for negative outcomes associated with this disorder. We thus recommend simplifying the World Falls Guidelines: all older adults (>60 years) with objective or subjective balance problems, irrespective of symptomatic complaint, should have positional testing to examine for BPPV.

Language: en

Keywords: older adults; falls; older people; benign paroxysmal positional vertigo; dizziness; vertigo

Low physical activity and depression are the prominent predictive factors for falling in older adults: the Birjand Longitudinal Aging Study (BLAS)

Mortazavi S, Delbari A, Vahedi M, Fadayeveatan R, Moodi M, Fakhrzadeh H, Khorashadizadeh M, Sobhani A, Payab M, Ebrahimpur M, Ejtahed HS, Sharifi F. BMC Geriatr. 2023; 23(1): e758.

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PMCID: PMC10662773

Abstract

BACKGROUND: Falling in the older adults has many irreparable consequences, including hospitalization to long-term care centers and loss of independence, depression and social isolation, financial burden, and death. The present study was conducted to estimate the incidence of falls and their associated factors among community-dwelling older adults.

METHODS: This program is a population-based prospective cohort study (≥ 60 years) in Birjand City from 2019 to 2020. A total of 1418 participants were included in the study, and 1344 participants were analyzed according to the inclusion criteria. Thirty-nine risk factors were evaluated. Basic information included demographic information, lifestyle factors, general health and medical history, and mental and functional health.

RESULT: The incidence of falls among community-dwelling older adults in the previous approximately 24 months in the present study was 9.26% in women and 2.65% in men. In the multiple Cox proportional regression model based on fall risk factors, there was a strong significant relationship between male sex (HR = 0.37, CI = 0.21 to 0.64), being physically active (HR = 0.59, CI = 0.36 to 0.96), moderate-to-severe depression (HR = 2.97, CI = 1.47 to 6.01), severe depression (HR = 3.26, CI = 1.24 to 8.54), and high risk of falls according to the TUG test (HR = 1.73, CI = 1.10 to 2.72).

CONCLUSIONS: Inactivity and depression were recognized as important factors in falls in older adults. It is recommended for older adults to have an active lifestyle to prevent falls and to prioritize the diagnosis and treatment of depression in older adults. Women as a group at higher risk should be considered in prevention programs. In addition, the use of the TUG test to identify high-risk older adults should be considered.

Language: en

Keywords: Aged; Humans; Female; Male; Risk Factors; Incidence; Prospective Studies; Physical activity; Depression; Aging; Older adults; *Exercise; *Depression/diagnosis/epidemiology; Fall risk factors; Independent Living

Effects of overground gait training assisted by a wearable exoskeleton in patients with Parkinson's disease

Otlet V, Vandamme C, Warlop T, Crevecoeur F, Ronsse R. J. Neuroengineering Rehabil. 2023; 20(1): e156.

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DOI: 10.1186/s12984-023-01280-y

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Abstract

BACKGROUND: In the recent past, wearable devices have been used for gait rehabilitation in patients with Parkinson's disease. The objective of this paper is to analyze the outcome of a wearable hip orthosis whose assistance adapts in real time to the patient's gait kinematics via adaptive oscillators. In particular, this study focuses on a metric characterizing natural gait variability, i.e., the level of long-range autocorrelations (LRA) in series of stride durations.

METHODS: Eight patients with Parkinson's disease (Hoehn and Yahr stages 1[Formula: see text]2.5) performed overground gait training three times per week for four consecutive weeks, assisted by a wearable hip orthosis. Gait was assessed based on performance metrics such as the hip range of motion, speed, stride length and duration, and the level of LRA in inter-stride time series assessed using the Adaptive Fractal Analysis. These metrics were measured before, directly after, and 1 month after training.

RESULTS: After training, patients increased their hip range of motion, their gait speed and stride length, and decreased their stride duration. These improvements were maintained 1 month after training. Regarding long-range autocorrelations, the population's behavior was standardized towards a metric closer to the one of healthy individuals after training, but with no retention after 1 month.

CONCLUSION: This study showed that an overground gait training with adaptive robotic assistance has the potential to improve key gait metrics that are typically affected by Parkinson's disease and that lead to higher prevalence of fall. **TRIAL REGISTRATION:** ClinicalTrials.gov Identifier NCT04314973. Registered on 11 April 2020.

Language: en

Keywords: Long-range autocorrelations; Parkinson's disease; Walking assistance; Wearable device

The role of community paramedicine in fall prevention: a SWOT analysis

Quatman CE, Wiseman JM, Dickinson C, Leach MC, Hislop M, Kegelmeyer DA, Kloos AD, Quatman-Yates CC. *J. Am. Geriatr. Soc.* 2023; ePub(ePub): ePub.

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PMID: 37974544

Abstract

BACKGROUND: Millions of older US adults fall annually, leading to catastrophic injuries, over 32,000 deaths and healthcare costs of over \$55 billion. This study evaluated perceived benefits and limitations of using community paramedicine for fall prevention strategies from the lens of older adults, caregivers, and healthcare providers.

METHODS: Semi-structured focus groups were held with individuals from three stakeholder groups: (1) community-dwelling older adults (age ≥ 60), (2) caregivers, and (3) healthcare providers. The Strengths-Weaknesses-Opportunities-Threats (SWOT) framework was used to quantitatively analyze stakeholder perceptions of using community paramedicine for fall prevention strategies.

RESULTS: A total of 10 focus groups were held with 56 participants representing older adults (n = 15), caregivers (n = 16), and healthcare providers (n = 25). Community paramedicine was supported as a model of fall prevention by older adults, caregivers, and healthcare providers. Participants identified strengths such as visibility to the home environment, ability to implement home modifications, implicit trust in emergency medical services (EMS), and capacity to redirect resources toward prevention. Additionally, participants acknowledged opportunities such as providing continuity of care across the healthcare spectrum, improving quality and safety of care and potentially reducing unnecessary emergency department use. Participants endorsed weaknesses and threats such as funding, concerns of patients about stigma, and struggles with medical data integration.

CONCLUSIONS: The results of this study illuminate the opportunity to leverage community paramedicine to address a variety of perceived barriers in order to design and implement better solutions for fall prevention efforts.

Language: en

Keywords: community paramedicine; fall prevention; healthy aging

Association between self-reported falling risk and risk of hospitalization for patients with chronic obstructive pulmonary disease

Ritchey KC, Yohannes AM, Locke ER, Chen S, Simpson T, Battaglia C, Trivedi RB, Swenson ER, Edelman J, Fan VS. *Respir. Med.* 2023; ePub(ePub): ePub.

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Abstract

RATIONALE: The association between self-report falling risk in persons with COPD and hospitalization has not been previously explored.

OBJECTIVE: To examine whether self-reported risk is associated with hospitalizations in patients with COPD.

METHODS: A secondary analysis from a prospective observational cohort study of veterans with COPD. Participants completed questions from the Stopping Elderly Accidents, Deaths and Injuries (STEADI) tool kit at either baseline or at the end of the 12-month study. A prospective or cross-sectional analysis examined the association between responses to the STEADI questions and risk of all-cause or COPD hospitalizations.

RESULTS: Participants (N = 388) had a mean age of 69.6 ± 7.5 years, predominately male (96 %), and 144 (37.1 %) reported having fallen in the last year. More than half reported feeling unsteady with walking (52.6 %) or needing to use their arms to stand up from a chair (61.1 %). A third were concerned about falling (33.3 %). Three questions were associated with all-cause (not COPD) hospitalization in both unadjusted and adjusted cross-sectional analysis (N = 213): “fallen in the past year” (IRR 1.77, 95 % CI 1.10 to 2.86); “unsteady when walking” (IRR 1.88, 95 % CI 1.14 to 3.10); “advised to use a cane or walker” (IRR 1.89, 95 % CI 1.16 to 3.08).

CONCLUSIONS: The prevalence of self-reported falling risk was high in this sample of veterans with COPD. The association between falling risk and all-cause hospitalization suggests that non-COPD hospitalizations can negatively impact intrinsic risk factors for falling. Further research is needed to clarify the effects of all-cause hospitalization on falling risk in persons with COPD.

Language: en

Keywords: Older adults; Veterans; COPD; Fall risk screening; STEADI

Critical features of multifactorial interventions for effective falls reduction in residential aged care: a systematic review, intervention component analysis and qualitative comparative analysis

Suen J, Kneale D, Sutcliffe K, Kwok W, Cameron ID, Crotty M, Sherrington C, Dyer S. Age Ageing 2023; 52(11): afad185.

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PMID: 37993405

Abstract

BACKGROUND: Multifactorial fall prevention trials providing interventions based on individual risk factors have variable success in aged care facilities. To determine configurations of trial features that reduce falls, intervention component analysis (ICA) and qualitative comparative analysis (QCA) were undertaken.

METHODS: Randomised controlled trials (RCTs) from a Cochrane Collaboration review (Cameron, 2018) with meta-analysis data, plus trials identified in a systematic search update to December 2021 were included. Meta-analyses were updated. A theory developed through ICA of English publications of trialist's perspectives was assessed through QCA and a subgroup meta-analysis.

RESULTS: Pooled effectiveness of multifactorial interventions indicated a falls rate ratio of 0.85 (95% confidence interval, CI, 0.65-1.10; I² = 85%; 11 trials). All tested interventions targeted both environmental and personal risk factors by including assessment of environmental hazards, a medical or medication review and exercise intervention. ICA emphasised the importance of co-design involving facility staff and managers and tailored intervention delivery to resident's intrinsic factors for successful outcomes. QCA of facility engagement plus tailored delivery was consistent with greater reduction in falls, supported by high consistency (0.91) and coverage (0.85). An associated subgroup meta-analysis demonstrated strong falls reduction without heterogeneity (rate ratio 0.61, 95%CI 0.54-0.69, I² = 0%; 7 trials).

CONCLUSION: Multifactorial falls prevention interventions should engage aged care staff and managers to implement strategies which include tailored intervention delivery according to each resident's intrinsic factors. Such approaches are consistently associated with a successful reduction in falls, as demonstrated by QCA and subgroup meta-analyses. Co-design approaches may also enhance intervention success.

Language: ee

Keywords: older people; systematic review; fall prevention; aged care; facility engagement; multifactorial

Anterior knee pain as a potential risk factor for falls in older adults: insights from the osteoarthritis initiative data

Xiong T, Ou Y, Chen S, Liu S, Yi X, Deng X, Cheng T, Hao L. BMC Public Health 2023; 23(1): e2288.

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Abstract

BACKGROUND: Knee joint pain has been demonstrated to be a separate risk factor for falling. A common pain site in the knee, anterior knee pain (AKP), is believed to be associated with early knee osteoarthritis (KOA). This study investigated the relationship between falls and AKP in people with or at risk for KOA.

METHODS: Four years of follow-up data from the Osteoarthritis Initiative cohort trial, a large-scale, multicenter observational investigation, were analyzed in this study. A patellar quadriceps tenderness/tendinitis knee exam was performed to evaluate AKP. Falls were self-reported. The associations between falls (recurrent falls: ≥ 2 falls/year; any falls: ≥ 1 fall(s)/year) and AKP were analyzed using the generalized estimation equation of repeated logistic regression and adjusted for confounding variables.

RESULTS: The study analyzed data from 3,318 participants, split into two groups: those with AKP (720 participants) and those without AKP (2,598 participants). The primary outcome of the study, which focused on repeated falls, revealed that participants with AKP were 1.27 times more likely to experience repeated falls compared to those without AKP (95% CI: 1.07-1.52, $P = 0.007$). However, when considering any falls experienced by an individual as an additional outcome, it is important to note that our findings did not indicate a significant predictive effect of AKP on any falls investigated. Sensitivity analyses, which excluded knee arthroplasty cases, yielded consistent results with the aforementioned findings.

CONCLUSIONS: Older adults with AKP experience a higher frequency of falls compared to those without AKP in individuals diagnosed with KOA or at a high risk of developing KOA.

Language: en

Keywords: Aged; Humans; Risk Factors; Accidental falls; Older adults; *Accidental Falls; Pain; *Osteoarthritis, Knee/complications/epidemiology; Knee; Knee Joint/surgery; Osteoarthritis