

Safety Literature 9th February 2020

Clarifying differences in injury patterns between ground-level falls and falls from heights among the elderly in Japan

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Abstract

OBJECTIVES: With the progress of aging, fall injuries have become a global public health issue. This research was conducted to describe in detail situations of injury occurrence among the elderly by distinguishing between falls from heights and ground-level falls. We assume that different fall mechanisms occur in different situations and result in a wide range of consequences. **STUDY DESIGN:** This is a registry-based descriptive study.

METHODS: The analysis included 55,126 patients with fall injuries, aged 65 years and more, having an Injury Severity Score (ISS) ≥ 9 , and registered in a trauma registry in Japan between 2004 and 2015. We described patients' distribution in terms of age, severity, outcome, season, time, and injured body parts by gender and fall mechanisms.

RESULTS: Falls from heights (n = 15,748) were more common among men and those younger than 75 years. Ground-level falls (n = 39,378) were more common among women and those older than 75 years. The ISS was high in men and for those who fell from heights. Falls from heights were common in autumn, whereas ground-level falls were common in winter. Both mechanisms occurred frequently during the daytime. The head and lower extremities were the most commonly injured parts for those who fell from heights and ground-level falls, respectively. Injuries to the head, chest, spine, upper extremities, and pelvis were common among those who fell from heights. Injuries to the lower extremities were common in ground-level fallers. Among those who fell from heights, women had more frequent lower extremity injuries than did men. Among ground-level fallers, men had more frequent head injuries than did women. The highest case-fatality rate was recorded for abdominal injuries among those who fell from heights and head injuries among ground-level fallers. In both mechanisms of injury, the case-fatality rate of limbs was the lowest.

CONCLUSIONS: Our study showed different patterns between falls from heights and ground-level falls, whereas previous studies rarely distinguished between these two fall mechanisms.

Language: en

Keywords

Elderly; Fall; Fall from height; Ground-level fall; Japan; Japan Trauma Data Bank

Clinical predictors of intracranial bleeding in older adults who have fallen: a cohort study

de Wit K, Parpia S, Varner C, Worster A, McLeod S, Clayton N, Kearon C, Mercuri M. J. Am. Geriatr. Soc. 2020; ePub(ePub): ePub.

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Abstract

OBJECTIVES: Emergency department (ED) visits among older adults are frequently instigated by a fall at home. Some of these patients develop intracranial bleeding. The aim of this study was to identify the incidence of intracranial bleeding and the associated clinical features in older adults who present to the ED after falling.

DESIGN: Prospective cohort study. **SETTING:** Three Canadian EDs. **PARTICIPANTS:** A total of 2 176 patients age 65 years or older who presented to the ED with a fall were assessed, and 1753 were included. Inclusion criteria were a fall on level ground, off a bed, chair, or toilet, or from one or two steps within 48 hours. **MEASUREMENTS:** Emergency physicians recorded predefined clinical findings on initial assessment. The primary outcome was intracranial bleeding, diagnosed either by computed tomography at the index visit or within 42 days. Associations between baseline clinical findings and the presence of intracranial bleeding were assessed with multivariable logistic regression.

RESULTS: A total of 1753 patients (median age = 82 y) were enrolled, of whom 39% were male, 35% were on antiplatelet therapy, and 25% were on an anticoagulant. The incidence of intracranial bleeding was 5.0% (95% confidence interval [CI] = 4.1-6.1). Overall, 76 patients were diagnosed at the index ED visit, and 12 were diagnosed during follow-up. Multivariable regression identified four clinical variables that were independently associated with intracranial bleeding: new abnormalities on neurologic examination (odds ratio [OR] = 4.4; 95% CI = 2.4-8.1), bruise or laceration on the head (OR = 4.3; 95% CI = 2.7-7.0), chronic kidney disease (OR = 2.4; 95% CI = 1.3-4.6), and reduced Glasgow Coma Scale from normal (OR = 1.9; 95% CI = 1.0-3.4).

CONCLUSION: The incidence of intracranial bleeding in our study was 5.0%. We found significant associations between intracranial bleeding and four simple clinical variables. We did not find significant associations between intracranial bleeding and antiplatelet or anticoagulant use.

Language: en

Keywords

diagnosis; falls; older adults; traumatic brain injury

Do different muscle strength levels affect stability during unplanned gait termination?

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Abstract

PURPOSE: Unplanned gait termination (UGT) widely occurs in various sports and daily life as a kind of stress response to unexpected stimulus. However, the body stability may be greatly affected when the body completely stops. The purpose of this study was to examine the association between muscle strength levels and body stability during UGT through comparing the plantar pressure.

METHODS: Twenty healthy participants (10 male and 10 female) with different lower limbs muscle strength and power were asked to perform planned gait termination (PGT) and unplanned gait termination (UGT) on an 8-m walkway. Related plantar pressure data including maximum pressure, maximum force, contact area and center of pressure were recorded with Footscan pressure platform.

RESULTS: Two types of gait termination have significant differences in the plantar pressure distribution. Maximum pressure and maximum force in the lateral metatarsal increased significantly during UGT, compared to PGT. At the same time, data from the current study suggested that there might be a correlation between the muscle strength levels of individual and the stability during the gait termination, especially between the muscle power and UGT, which means that the more excellent muscle power an individual has, the more stable the body is when UGT is performed.

CONCLUSIONS: The findings suggest that different muscle strength levels could affect stability during unplanned gait termination.

Language: en

Does long-term recreational gymnastics prevent injurious falls in older women? A prospective 20-year follow-up

Uusi-Rasi K, Karinkanta S, Kannus P, Tokola K, Sievänen H. BMC Geriatr. 2020; 20(1): e37.

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DOI 10.1186/s12877-020-1428-0 PMID 32007107

Abstract

BACKGROUND: Exercise interventions focusing on balance and strength training have been shown to be effective for falls prevention. The aim of this 20-year register-based follow-up was to examine whether long-term participation in recreational female gymnastics is associated with a lower risk of medically-attended injurious falls.

METHODS: Health care register data of 187 women (103 recreational gymnasts and 84 sedentary controls) from the original cohort of 243 women were assessed. The mean age (sd) at baseline was 62.8 (5.4) years and the mean follow-up time was 19.4 (2.7) years (range from 5.6 to 21.0 years). Injurious falls were scrutinized from medical records. An injurious fall was defined as an event in which falling was mentioned as a reason for making contact with health-care professionals. Negative binomial regression was used to estimate incidence rate ratios (IRR) for injurious falls, and Cox-regression models for calculating hazard ratios (HR) for injured fallers with the control group as reference.

RESULTS: Recreational gymnasts had about 30% less injurious falls compared to controls, the mean IRR (95% CI) being 0.71 (0.51 to 0.96). The HR for injured fallers was 0.73 (0.52 to 1.02) favoring the recreational gymnasts. There were no statistically significant between-group differences for fractures.

CONCLUSIONS: Long-term recreational gymnastics appears to reduce the risk of injurious falls in old age.

Language: en

Keywords

Exercise; Falls; Fractures; Older women; Physical activity

Gait characteristics during inadvertent obstacle contacts in young, middle-aged and older adults

Muir BC, Bodratti LA, Morris CE, Haddad JM, van Emmerik REA, Rietdyk S. *Gait Posture* 2020; 77: 100-104.

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Abstract

BACKGROUND: When stepping over obstacles, analyses have focused on the successful trials to understand adaptive gait. However, examination of the inadvertent trips that occasionally occur in the laboratory can provide a rich source of information regarding the gait characteristics underlying trip-related falls. **RESEARCH QUESTION:** What gait variables during obstacle crossing are associated with inadvertent obstacle contacts, and are these variables different across the lifespan? **METHODS:** Three age groups included: young adults (20-35 years, N = 20), middle-aged adults (50-64 years, N = 15), and older adults (65-79 years, N = 19). A stationary, visible obstacle (26 cm tall) was placed in the middle of a walkway. Foot trajectories and head angles were compared between contact and non-contact trials.

RESULTS: Twelve participants contacted the obstacle: seven young adults (3.5% of young adult trials), two middle-aged adults (1.3%), and three older adults (1.6%). Young and middle-aged adults contacted primarily with the trail limb, while older adults contacted primarily with the lead limb. Contacts occurred for different reasons: Most young adult contact trials had appropriate foot placement, but inadequate elevation; middle-aged and older adults demonstrated inappropriate foot placement before the obstacle, leading to foot contact during the swing phase. **SIGNIFICANCE:** Lower contact rates in the middle-aged and older adults indicates that the cautious strategies adopted during obstacle crossing are effective. Higher contact rates in young adults may indicate trial-and-error exploratory behavior. Inappropriate foot placement in the middle-aged and older adults may indicate impaired ability to gather obstacle position information during the approach phase.

Language: en

Keywords

Adaptive gait; Aging; Falls; Foot placement; Trips; Vision

Interventions for preventing falls in people after stroke

Denissen S, Staring W, Kunkel D, Pickering RM, Lennon S, Geurts ACH, Weerdesteyn V, Verheyden GSAF. Stroke 2020; ePub(ePub): ePub.

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Abstract

[Abstract unavailable]

Language: en

Keywords

exercise; falls; quality of life; systematic review

Opioid use and the risk of falls, fall injuries and fractures among older adults: a systematic review and meta-analysis

Yoshikawa A, Ramirez G, Smith ML, Foster M, Nabil AK, Jani SN, Ory MG. *J. Gerontol. A Biol. Sci. Med. Sci.* 2020; ePub(ePub): ePub.

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Abstract

BACKGROUND: There is increasing concern about opioid use as a pain treatment option among older adults. Existing literature implies an association between opioid use and fracture, increasing the risk of death and disabilities; yet, this relationship with other fall-related outcomes has not been fully explored. We performed a meta-analysis to evaluate the associations between opioid use and adverse health outcomes of falls, fall injuries, and fractures among older adults.

METHODS: A systematic literature search was conducted using nine databases (Medline, Embase, CINAHL, PsycInfo, Global Health, Northern Light Sciences Conference Abstracts, Cochrane CENTRAL, WHO International Clinical Trials Registry Platform, and ClinicalTrials.gov). We log-transformed effect sizes (RR, OR, and HR) to compute pooled risk estimates comparable across the studies. The random-effects model was applied to calculate the pooled risk estimates due to heterogeneity. Meta-regressions explored differences in risk estimates by analysis method, study design, setting, and study quality.

RESULTS: Thirty studies, providing 34 relevant effect sizes, met the inclusion criteria for this meta-analysis. Overall, opioid use was significantly associated with falls, fall injuries, and fractures, with effect sizes ranging from 0.15 to 0.71. In meta-regressions, no selected factors explained heterogeneity.

CONCLUSION: While heterogeneity is present, results suggest an increased risk of falls, fall injuries, and fractures among older adults who used opioids.

FINDINGS highlight the need for opioid education and non-opioid related pain management interventions among older adults to decrease fall-related risk.

Language: en

Keywords

Hip Fracture; Medication; Pain



Rhythm-motor dual task intervention for fall prevention in healthy older adults

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Abstract

This study aimed to investigate the effects of a rhythm-motor dual task intervention on cognitive and gait control for older adults in relation to fall prevention. Ten healthy older adults participated in a rhythm-motor dual task intervention and 10 participated in the control group. The intervention group received 16 30-min intervention sessions for 8 weeks. During the intervention sessions, participants engaged in walking or bimanual tapping as a primary motor task with concurrent rhythm tasks including playing instruments and rhythmic chanting or singing. At pretest and post-test, measures of cognition, balance/mobility, and gait were administered. A significant difference between groups was found for part B of the Trail Making Test (TMT-B) measure that involved executive control of attention. Also, changes in the gait ratio in the dual task condition of walking while playing an instrument were significantly different between groups. The findings in this study support the use of the rhythm-motor dual task intervention for increasing available cognitive resources and improving gait control, which are critical factors in fall prevention.

Language: en

Keywords

dual task; fall prevention; healthy elderly; instrument playing; music intervention

The link between falls, social isolation and loneliness: a systematic review

Petersen N, König HH, Hajek A. Arch. Gerontol. Geriatr. 2020; 88: e104020.

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Abstract

BACKGROUND: The chances of experiencing a fall among those aged 60 years and older increase as risk factors accumulate. In the last few decades, several studies have identified different risk factors for falls in older people, including the role of social isolation and loneliness. This systematic review provides an overview of published literature that analyzes the bidirectional relation between falls and social isolation or loneliness. **MATERIAL AND METHODS:** Two databases (PubMed and Europe PMC) were used to search for publications investigating the relationship between falls, social isolation and/or loneliness in older people. Similar articles and references were screened against the inclusion criteria.

RESULTS: 17 studies met the inclusion criteria and were included. Only a few studies assessed the association between falls and social isolation/loneliness among older people. Therefore, articles examining the association between falls and living alone status among people aged 60 and older were included as well. In all studies loneliness, social isolation, and living alone were significantly associated with falls in older people.

CONCLUSIONS: The findings emphasize the importance of the relationship between falls and social isolation, loneliness and living alone among older people. As there are only a few studies assessing the relationship between falls and loneliness or social isolation, further research in this field should be conducted. In particular, longitudinal studies that utilize standardized measurement instruments should be carried out.

Language: en

Keywords

Falls; Loneliness; Social exclusion; Social isolation

Urinary and fecal incontinence are independently associated with falls risk among older women and men with complex needs: A national population study

Schluter PJ, Askew DA, Jamieson HA, Arnold EP. *Neurourol. Urodyn.* 2020; ePub(ePub): ePub.

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Abstract

AIMS: To determine the relationships between urinary incontinence (UI), fecal incontinence (FI), and falls risk among community-dwelling older women and men with complex needs, after controlling for confounders.

METHODS: All community care recipients in New Zealand undergo standardized needs assessments, using the Home Care International Residential Assessment Instrument (interRAI-HC), which elicits information over multiple domains, including UI and FI frequency and falls. Consenting women and men aged greater than or equal to 65 years with at least one interRAI-HC assessment undertaken between 1 July 2012 and 1 June 2018 were investigated using multilevel mixed effects ordinal regression models, stratified by sex.

RESULTS: Overall, 57 781 (61.8%) women and 35 681 (38.2%) men were eligible, contributing 138 302 interRAI-HC assessments. At first assessment, the average age was 82.0 years (range: 65-109 years); high falls risk was common, found among 8.8% of women and 12.4% of men; and 43.7% of women and 33.7% of men reported some incontinence. For women, the adjusted odds of increasing falls risk was 1.24 (95% CI: 1.18, 1.30) for those with occasional UI, 1.36 (95% CI: 1.29, 1.43) for those with frequent UI, and 1.19 (95% CI: 1.13, 1.26) for those with any FI compared with their continent counterparts. Among men, the adjusted odds were 1.49 (95% CI: 1.41, 1.58) for any UI and 1.18 (95% CI: 1.10, 1.27) for any FI.

CONCLUSION: UI and FI are common, have separate associations with falls risk among women and men, and would benefit from routine screening in primary health care for older adults.

Language: en

Keywords

community care assessment; epidemiology; falls risk; fecal incontinence; longitudinal analysis; population health; urinary incontinence

Effect of kidney transplant on balance and fall risk

Tekkarismaz N, Doruk Analan P, Ozelsancak R, Torun D, Caliskan K, Haberal M. *Exp. Clin. Transplant.* 2020; 18(Suppl 1): 73-77.

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Abstract

OBJECTIVES: Kidney transplant offers an improved quality of life and prolonged survival for patients with end-stage renal disease. This study aimed to compare balance and fall risk between kidney transplant recipients and healthy adults and to determine the relationship between biochemical parameters and fall risk and balance in kidney transplant recipients. As far as we know, this is the first study in the literature that evaluated whether balance changes occur in kidney transplant recipients using the Tetrax Interactive Balance System (Sunlight Medical Ltd., Ramat Gan, Israel).

MATERIALS AND METHODS: Our study included 131 kidney transplant recipients (80 male/53 female; mean age of 39 ± 12 y) and 158 healthy volunteers (86 male/69 female; mean age of 40 ± 15 y). Groups were statistically matched in age, male/female patients, and body mass index. Fall index percentages were calculated using the Tetrax posturography device. Risk of falling was compared between kidney transplant recipients and healthy participants. Kidney transplant recipients were divided into 3 groups based on risk of falling. Demographic and clinical characteristics of kidney transplant recipients were recorded, and statistical analyses were performed to analyze these parameters versus balance measurements.

RESULTS: Risk of falling was not significantly different between groups according to Tetrax measurements (32.4 ± 23.4 vs 31.6 ± 21.7 ; $P = .08$). Serum creatinine levels were significantly higher in kidney transplant recipients with a higher risk of falling (1.17 ± 0.37 vs 1.63 ± 1.18 mg/dL; $P = .01$). The use of oral antidiabetic drugs was shown to increase the risk of falling ($P = .02$).

CONCLUSIONS: Although patients with end-stage renal disease are thought to have balance impairments, kidney transplant recipients in our study had balance control similar to that shown in the healthy population. Graft function in kidney transplant recipients is important for the balance system.

Language: en

Exercise to reduce mobility disability and prevent falls after fall-related leg or pelvic fracture: RESTORE randomized controlled trial

Sherrington C, Fairhall N, Kirkham C, Clemson L, Tiedemann A, Vogler C, Close JCT, O'Rourke S, Moseley AM, Cameron ID, Mak JCS, Lord SR. *J. Gen. Intern Med.* 2020; ePub(ePub): ePub.

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DOI 10.1007/s11606-020-05666-9 PMID 32016702

Abstract

BACKGROUND: Disability and falls are common following fall-related lower limb and pelvic fractures.

OBJECTIVE: To evaluate the impact of an exercise self-management intervention on mobility-related disability and falls after lower limb or pelvic fracture.

DESIGN: Randomized controlled trial. **PARTICIPANTS:** Three hundred thirty-six community dwellers aged 60+ years within 2 years of lower limb or pelvic fracture recruited from hospitals and community advertising. **INTERVENTIONS:** RESTORE (Recovery Exercises and STEpping On afterR fracturE) intervention (individualized, physiotherapist-prescribed home program of weight-bearing balance and strength exercises, fall prevention advice) versus usual care. **MAIN MEASURES:** Primary outcomes were mobility-related disability and rate of falls. **KEY RESULTS:** Primary outcomes were available for 80% of randomized participants. There were no significant between-group differences in mobility-related disability at 12 months measured by (a) Short Physical Performance Battery (continuous version, baseline-adjusted between-group difference 0.08, 95% CI - 0.01 to 0.17, $p = 0.08$, $n = 273$); (b) Activity Measure Post Acute Care score (0.18, 95% CI - 2.89 to 3.26, $p = 0.91$, $n = 270$); (c) Late Life Disability Instrument (1.37, 95% CI - 2.56 to 5.32, $p = 0.49$, $n = 273$); or in rate of falls over the 12-month study period (incidence rate ratio 0.96, 95% CI 0.69 to 1.34, $n = 336$, $p = 0.83$). Between-group differences favoring the intervention group were evident in some secondary outcomes: balance and mobility, fall risk (Physiological Profile Assessment tool), physical activity, mood, health and community outings, but these should be interpreted with caution due to risk of chance findings from multiple analyses.

CONCLUSIONS: No statistically significant intervention impacts on mobility-related disability and falls were detected, but benefits were seen for secondary measures of balance and mobility, fall risk, physical activity, mood, health, and community outings. **TRIAL REGISTRATION:** Australian New Zealand Clinical Trials Registry:

ACTRN12610000805077.

Language: en

Keywords

exercise; fall prevention; hip fracture; randomized controlled trial

Making fall risk assessment clinically relevant in an adult psychiatric setting

Mathew L, Steigman D, Driscoll D, Moran-Peters JA, Fischer IM, Cordle P, Hyde VMB, Eckardt S. J. Psychosoc. Nurs. Ment. Health Serv. 2020; 58(2): 21-26.

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DOI 10.3928/02793695-20191106-01 PMID 32003861

Abstract

The purpose of this non-experimental descriptive study was to measure psychiatric clinical nurses' (N = 25) perceptions of the Edmonson Psychiatric Falls Risk Assessment Tool© (EPFRAT) compared to the Morse Fall Scale (MFS) and to evaluate patient falls with injury rates 12 months before and after the study. The setting was a 27-bed, adult psychiatric unit in a community-based teaching hospital located in the Northeast region of the United States. The EPFRAT and MFS were used to assess fall risk in 216 patients over 3 months.

FINDINGS indicated that the EPFRAT was more user-friendly and relevant; improved nurses' clinical judgment in identifying high-risk patients; and nurses were supportive toward changing practice from using the MFS to EPFRAT for fall risk assessment. Falls with injury rates decreased by 0.52 per 1,000 patient care days post-implementation of the EPFRAT. [Journal of Psychosocial Nursing and Mental Health Services, 58(2), 21-26.].

Language: en

Pharmacy students' ability to identify fall risk-increasing drugs using an innovative assessment tool

Wahler RG, Piccione C, Maerten-Rivera J. *Am. J. Pharm. Educ.* 2019; 83(10): e7461.

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Abstract

Objective. To evaluate change in the ability of third-year pharmacy students to identify drugs that increase fall risk after training in and experience using the Medication Falls Risk Assessment Tool (MFRAT). **Methods.** An assessment was administered to students prior to MFRAT use and after MFRAT use. The assessment consisted of 10 medication regimens for various chronic conditions (50 distinct drug choices with 30 correct answers and 20 distractors), and students were to identify fall risk increasing drugs (FRIDs). Using a flipped-classroom approach, students viewed an online presentation on FRIDs and then participated in instructor guided, in-class application of the MFRAT using student-collected data from an actual patient case. Students completed medication therapy management (MTM) documentation. The assessment data for students who had previously used the MFRAT (experienced) were analyzed separately from first time users (inexperienced). **Results.** Three assessment scores were evaluated: number correct (maximum 30; higher score is better), number of distractors (maximum 20; lower score better), and a combined total score (maximum 50; higher score better). In inexperienced users (n=104), pre- and post-assessment means improved significantly for correct score (24.9 vs 29.5) and total score (39.4 vs 44.3). Among experienced users (n=10), pre- and post-assessment means improved significantly for correct responses (27.3 vs 29.7), distractors (7.0 vs 3.5), and total score (40.3 vs 46.2). **Conclusion.** The ability of both pharmacy students who had used the MFRAT previously and those who had not to correctly identify FRIDs increased on the post-assessment.

Language: en

Keywords

accidental falls; flipped-classroom; medication therapy management; pharmacy students; risk assessment clinical decision support tool