

Safety Literature 10th May 2020

Action seniors! Cost-effectiveness analysis of a secondary falls prevention strategy among community-dwelling older fallers

Davis JC, Khan KM, Hsu CL, Chan P, Cook WL, Dian L, Liu-Ambrose T. J. Am. Geriatr. Soc. 2020; ePub(ePub): ePub.

(Copyright © 2020, John Wiley and Sons)

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Abstract

BACKGROUND: The Otago Exercise Program (OEP) has demonstrated cost-effectiveness for the primary prevention of falls in a general community setting. The cost-effectiveness of exercise as a secondary falls prevention (ie, preventing falls among those who have already fallen) strategy remains unknown. The primary objective was to estimate the cost-effectiveness (incremental cost-effectiveness/utility ratio) of the OEP from a healthcare system perspective.

DESIGN: A concurrent 12-month prospective economic evaluation conducted alongside the Action Seniors! randomized critical trial (OEP compared with usual care).

SETTING: Vancouver Falls Prevention Clinic (Vancouver, BC, Canada; <http://www.fallsclinic.ca>).

PARTICIPANTS: A total of 344 community-dwelling older adults, aged 70 years and older, who attended a geriatrician-led Falls Prevention Clinic in Vancouver, after sustaining a fall in the previous 12 months.

MEASUREMENTS: Main outcome measures included: incidence rate ratio for falls, healthcare costs, incremental cost per fall prevented, and incremental cost per quality-adjusted life year (QALY) gained.

RESULTS: The OEP costs \$393 CAD per participant to implement. The incremental cost per fall prevented resulted in a savings of \$2 CAD. The incremental cost per QALY gained (where QALYs were estimated using the Euro-Qol 5D three-level version [EQ-5D-3L]) indicated the OEP was less effective than usual care. The incremental cost per QALY gained (where QALYs were estimated using the Short Form 6D [SF-6D]) indicated the OEP was more effective and less costly than usual care. The incremental QALYs estimated using the EQ-5D-3L and the SF-6D were not clinically significant and close to zero, indicating no change in quality of life.

CONCLUSION: Compared with usual care, healthcare system costs are saved and falls are prevented when older fallers who attend a geriatrician-led falls clinic are allocated to, and provided, the physiotherapist-guided exercise-based falls prevention program (the OEP).
Language: en

Keywords

falls; older adults; cost-effectiveness; cost-utility; economic evaluation; Otago Exercise Program

Association of hypnotic drug use with fall incidents in hospitalized elderly patients: a case-crossover study

Torii H, Ando M, Tomita H, Kobaru T, Tanaka M, Fujimoto K, Shimizu R, Ikesue H, Okusada S, Hashida T, Kume N. *Biol. Pharm. Bull.* 2020; 43(6): 925-931.

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Abstract

We investigated whether use of hypnotic drugs, including benzodiazepine receptor agonists, as well as ramelteon and suvorexant are associated with fall incidents in elderly inpatients aged no less than 75 years, who were hospitalized at an acute care general hospital in Japan, between November 1st, 2016 and October 31st, 2017. Multivariate analysis results were reported as odds ratio (OR) with 95% confidence interval (CI). Following to a case-crossover study protocol, the time windows of the case and the control days were assigned to the day or the days, which are one day or 2-8 d before the fall incidents, respectively. In the enrolled 111 patients, the accumulated total available numbers of the cases and the control days were 111 and 554 patient days, respectively. Hypnotic drug use was significantly associated with fall incidents (OR: 2.85, 95% CI: 1.03-7.90, $p = 0.04$). Especially benzodiazepine receptor agonists (OR: 5.79, 95% CI: 1.52-22.1, $p = 0.01$) showed statistically significant association with fall incidents. In contrast, neither ramelteon (OR: 7.95, 95% CI: 0.72-87.9, $p = 0.09$) nor suvorexant (OR: 0.25, 95% CI: 0.06-1.06, $p = 0.06$) were significantly associated with fall incidents. Thus, benzodiazepine receptor agonists, but not ramelteon or suvorexant, showed significant association with fall incidents. Therefore, special care should be taken especially when benzodiazepine receptor agonists are administered to elderly subjects. In contrast, fall risk may be much less in patients treated with ramelteon or suvorexant. These results could help us to conduct safer drug treatment for insomnia patients aged no less than 75 years.

Language: en

Keywords

benzodiazepine receptor agonist; elderly patient; fall incident; hypnotic drug; ramelteon; suvorexant

Association of subsequent falls with evidence of dual-task interference while walking in community-dwelling individuals after stroke

Tsang CSL, Pang MYC. Clin. Rehabil. 2020; ePub(ePub): ePub.

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Abstract

OBJECTIVE: The aim of this study was to examine the fall predictive value of single-task walking tests and extent of interference observed in dual-task walking tests in ambulatory individuals post stroke.

DESIGN: This is an observational study with prospective cohort.

SETTING: The study was conducted at the university laboratory.

PARTICIPANTS: A total of 91 community-dwelling individuals with chronic stroke participated in the study.

MAIN OUTCOME MEASURES: Time required to complete a 10-m walk test with and without obstacle negotiation was measured in isolation and in conjunction with performance of a verbal fluency task (category naming). Fall incidence, circumstances, and related injuries were recorded by monthly telephone calls for 12 months.

RESULTS: A total of 91 individuals (mean (SD) age = 62.7 (8.3) years; mean (SD) post-stroke duration = 8.8 (5.3) years) participated in the study; 29 (32%) of them reported at least one fall during the follow-up period, with a total of 71 fall episodes. There was a significant difference in obstacle-crossing time under single-task (mean difference = 8.3 seconds) and dual-task (mean difference = 7.4 seconds) conditions, and also the degree of interference in mobility performance (increased dual-task obstacle-crossing time relative to the single-task obstacle-crossing time; mean difference = 3.3%) between the fallers and the non-fallers ($P < 0.05$). After adjusting for the effects of other relevant factors, a greater degree of interference in mobility performance remained significantly associated with a decreased risk of falling (adjusted odds ratio = 0.951, 95% CI = 0.907-0.997, $P = 0.037$).

CONCLUSION: The degree of mobility interference during dual-task obstacle-crossing was the most effective in predicting falls among all the single-task and dual-task walking measure parameters tested. This simple dual-task walking assessment has potential clinical utility in identifying people post stroke at high risk of future falls.

Language: en

Keywords

cognition; falls; walking; stroke; Dual-task interference

Co-creation with older adults to improve user-experience of a smartphone self-test application to assess balance function

Mansson L, Wiklund M, Öhberg F, Danielsson K, Sandlund M. *Int. J. Environ. Res. Public Health* 2020; 17(11): e3768.

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Abstract

This co-creation study aimed to develop a smartphone self-test application for balance and leg strength in collaboration between older adults and the research team. The paper describes older participants' preferences for, and their contribution to, the application design. Technology to assess movements is available in smartphones with built-in sensors, and one of the challenges is to develop a valuable self-test for older adults. The participants contributed to the design of the application's instructions and user interface. Multiple data collection methods were used: user-test with Think aloud method, mock-ups, homework assignment as co-researcher, audio and video recordings. Qualitative content analysis with a deductive-inductive approach was used, guided by the Optimized Honeycomb model for user experience (UX) as a categorization matrix. The analysis resulted in 17 subcategories within the seven facets of the UX Honeycomb model (findable, accessible, usable, desirable, credible, useful, and valuable), and describes the older participants' preferences and experiences. The main results were participants' desire to know why, to get clear and appropriate information, and expectations of the self-test to be useful. It was feasible and valuable to develop the self-test application in co-creation with the intended user-group, in order to get direct feedback and suggestions for the development.

Language: en

Keywords

accidental falls; aged; qualitative research; mHealth; mobile application; postural balance; muscle strength; community-based participatory research; self-assessment; UX Honeycomb model

Effects of cognitive and physical loads on dynamic and static balance performance of healthy older adults under single-, dual-, and multi-task conditions

Allahverdipour H, Dianat I, Mameh G, Asghari Jafarabadi M. Hum. Factors 2020; ePub(ePub): ePub.

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Abstract

OBJECTIVE: The aim of this study is to examine the effects of cognitive and physical loads on dynamic and static balance performance of healthy older adults under single-, dual-, and multi-task conditions.

BACKGROUND: Previous studies on postural control in older adults have generally used dual-task methodology, whereas less attention has been paid to multi-task performance, despite its importance in many daily and occupational activities.

METHOD: The effects of single versus combined (dual-task and multi-task) cognitive (to speak out the name of the weekdays in a reverse order) and physical (with three levels including handling weights of 1, 2, and 3 kg in each hand) loads on dynamic and static balance performance of 42 older adults (21 males and 21 females) aged ≥ 60 years were examined. Dynamic and static balance measures were evaluated using the Timed Up and Go (TUG) and stabilometer (sway index) tests, respectively.

RESULTS: The TUG speed of female participants was generally slower than that of male participants. Age had no effect on balance performance measures. Under dual-task conditions, cognitive load decreased the dynamic balance performance, while the physical task levels had no effect. The dual-task conditions had no impact on the static balance performance. The effects of cognitive and physical loads on dynamic balance performance varied under dual- and multi-task conditions.

CONCLUSION: The findings highlight differences between dual- and multi-task protocols and add to the understanding of balance performance in older adults under cognitive and physical loads.

APPLICATION: The present study highlights differences between dual- and multi-task methodologies that need to be considered in future studies of balance and control in older adults.

Language: en

Keywords

cognitive load; dual task; multiple tasks; physical load; postural sway

Falls in older people with diabetes: Identification of simple screening measures and explanatory risk factors

Wettasinghe AH, Dissanayake DWN, Allet L, Katulanda P, Lord SR. Prim. Care Diabetes 2020; ePub(ePub): ePub.

(Copyright © 2020, Elsevier Publishing)

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Abstract

AIMS: To identify risk factors for falls in older people with diabetes mellitus (DM) and to develop a low-cost fall risk screening tool.

METHODS: Older adults with DM (n = 103; age = 61.6 + 6.0 years) were recruited from diabetic clinics. Demographic, DM specific factors, lower limb strength and sensation, cognition, fear of falling, hand reaction time, balance, mobility and gait parameters were assessed using validated methods. Falls were prospectively recorded over six months.

RESULTS: Past falls and female gender were identified as significant predictors of falls: history of falls and female gender increased fall rates by 4.62 (95% CI = 2.31-9.27) and 2.40 (95% CI = 1.04-5.54) respectively. Fall rates were significantly associated with Diabetic Neuropathy scores, HbA1c level, contrast sensitivity, quadriceps strength, postural sway, tandem balance, stride length and Timed Up and Go Test times. A multi-variable fall risk tool derived using five measures, revealed that absolute risk for multiple falls increased from 0% in participants with zero or one factor to 83% in participants with all five risk factors.

CONCLUSIONS: Simple screening items for fall risk in people with DM were identified, with parsimonious explanatory risk factors. These findings help guide tailored interventions for preventing falls in DM.

Language: en

Keywords

Aged; Accidental falls; Balance; Diabetes; Diabetic neuropathy; Muscle strength

Personal preferences of participation in fall prevention programmes: a descriptive study

Barmantloo LM, Olij BF, Erasmus V, Smilde D, Schoon Y, Polinder S. BMC Geriatr. 2020; 20(1): e185.

(Copyright © 2020, Holtzbrinck Springer Nature Publishing Group - BMC)

DOI 10.1186/s12877-020-01586-9 PMID unavailable

Abstract

BACKGROUND: Participation in fall prevention programmes is associated with lower risk of injurious falls among older adults. However participation rates in fall prevention interventions are low. The limited participation in fall prevention might increase with a preference based approach. Therefore, the aims of this study are to a) determine the personal preferences of older adults regarding fall prevention and b) explore the association between personal preferences and participation.

METHODS: We assessed the personal preferences of older adults and the association between their preferences, chosen programme and participation level. Nine different programmes, with a focus on those best matching their personal preferences, were offered to participants. Twelve weeks after the start of the programme, participation was assessed by questionnaire. Logistic regression was performed to test the association between preferences and participation and an ANOVA was performed to assess differences between the number of preferences included in the chosen programme and participation level.

RESULTS: Of the 134 participants, 49% preferred to exercise at home versus 43% elsewhere, 46% preferred to exercise alone versus 44% in a group and 41% indicated a programme must be free of charge while 51% were willing to pay. The combination of an external location, in a group and for a fee was preferred by 27%, whereas 26% preferred at home, alone and only for free. The presence of preferences or the extent to which the programme matched earlier preferences was not associated with participation.

CONCLUSION: Despite the fact that preferences can vary greatly among older adults, local programmes should be available for at least the two largest subgroups. This includes a programme at home, offered individually and for free. In addition, local healthcare providers should cooperate to increase the accessibility of currently available group programmes.

Language: en

Keywords

Exercise; Accidental falls; Aging; Prevention and control; Patient preference

The predictive value of sarcopenia and falls for 2-year major osteoporotic fractures in community-dwelling older adults

Su Y, Lam FMH, Leung J, Cheung WH, Ho SC, Kwok T. *Calcif. Tissue Int.* 2020; ePub(ePub): ePub.

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Abstract

To evaluate the associations of sarcopenia and previous falls with 2-year major osteoporotic fractures (MOFs) in community-dwelling older adults. Four thousand Chinese men and women ≥ 65 years recruited from Hong Kong communities were prospectively followed up. Measures of muscle mass, grip strength, gait speed and falls in the previous year were recorded at baseline, the 2nd year and the 4th year visit for each subject. The associations of fall history, sarcopenia and its components with 2-year MOFs were evaluated using generalized linear mixed models. Poor grip strength and poor gait speed were significantly associated with a higher 2-year MOFs risk, with an adjusted OR (95% CI) per one SD decrease of 1.48 (1.17, 1.87) and 1.17 (1.00, 1.36), respectively. Falls in the previous year was a significant predictor for 2-year MOFs risk, with an adjusted OR (95% CI) per one added fall of 1.85 (1.40, 2.44) in men and 1.26 (1.01, 1.58) in women. The adjusted OR (95% CI) of height adjusted appendicular lean muscle mass (ALM/height²) per one SD decrease and sarcopenia for 2-year MOFs risk were 1.34 (0.87, 2.06) and 1.72 (0.92, 3.21) in men, and were 0.73 (0.57, 0.93) and 0.76 (0.39, 1.47) in women, respectively (P for interaction by gender = 0.012 and 0.017, respectively). Poor sarcopenia-related physical performance and falls in the previous year were significant predictors for 2-year MOFs in community-dwelling older adults. The predictive value of ALM by DXA for near-term fracture risk is limited and different across genders.

Language: en

Keywords

Epidemiology; Falls; Sarcopenia; Physical performance

A model for the evaluation of fatality likelihood associated with falls from heights

Spearpoint M, Hopkin C. Fire Safety J. 2020; 112: e102973.

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Abstract

The likelihood of a fatality associated with of a fall from height depends on factors such as the distance fallen, the age of the casualty and the impact surface. In this work a review of the literature and an examination of the energy involved in a fall has been used to formulate an empirical approach to predict the likelihood of a fatal outcome using these three features. The predictive capability of the approach is assessed against data presented in the literature with reasonable success. Application of the method for an adult falling onto a hard surface predicts a 50% fatality likelihood at 15 m and a 90% fatality likelihood at 23.8 m. This paper provides a convenient method to predict the likelihood of fatality associated with falls from heights that can account for the height of the fall, the age of the casualty, the impact surface and the injuries sustained. Within the context of fire safety design, the model provides a pathway to assessing the likelihood of a fatality occurring should people need to escape from a building by means of an external window or similar.

Language: en

Assessment of fall-related self-efficacy: characteristics that influence the perception of patients with chemotherapy-induced peripheral neuropathy

Yamamoto S, Fujikawa N, Asano K, Toki M, Takao A, Arao H. *Asia Pac. J. Oncol. Nurs.* 2020; 7(2): 190-195.

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Abstract

OBJECTIVE: The present study aims to describe fall-related self-efficacy as perceived by patients with chemotherapy-induced peripheral neuropathy (CIPN). The characteristics of patients associated with low perceived self-efficacy of preventing falls were investigated.

Methods: A cross-sectional study of four hospitals in Japan. In this study, 100 outpatients who were receiving chemotherapy for cancer and experiencing CIPN were recruited. Participants completed an anonymous, self-administered questionnaire. Self-efficacy was measured with the falling self-efficacy (FSE) scale, and the severity and impact of CIPN was assessed with the Comprehensive Assessment Scale for CIPN in Survivors of Cancer (CAS-CIPN). Data about the demographic information of the patients, cancer diagnosis and treatment, pain and fatigue symptoms, and history of previous falls were collected. Logistic regression analysis was used to assess relationships between variables.

Results: A total of 81 (81.0%) participants with CIPN completed the questionnaire. They reported experiencing fear of falling during their daily activities, which include the act of standing up, walking, and using the stairs. Small events, such as unstable postures and uncomfortable situations, affected their confidence of preventing falls. Logistic regression revealed that low FSE scores were significantly associated with female sex ($P = 0.022$), low body mass index (BMI; $P = 0.026$), and the CAS-CIPN score ($P < 0.001$).

Conclusions: Female patients with CIPN and low BMI might have an increased need for enhanced fall-related self-efficacy. A comprehensive assessment of CIPN in patients at risk of low FSE scores is likely to be beneficial.

Language: en

Keywords

fall; Adverse effects; ambulatory care; chemotherapy; peripheral neuropathy

Epidemiology of traumatic falls after Hurricane Maria in Puerto Rico

Ramírez-Martínez L, Chamah-Nicolás M, Nieves-Plaza M, Ruiz-Rodríguez J, Ruiz-Medina P, Ramos-Meléndez EO, Rodríguez-Ortiz P. *Inj. Epidemiol.* 2020; 7(1): e19.

(Copyright © 2020, The author(s), Publisher Holtzbrinck Springer Nature Publishing Group - BMC)

DOI 10.1186/s40621-020-00236-3 PMID unavailable

Abstract

BACKGROUND: Hurricanes are among the most devastating natural disasters, playing a significant role in public health. Currently, the epidemiology of fall-related injuries after the occurrence of a tropical storm is not well described. This study aims to compare the demographical patterns, clinical profile, hospital course, and costs of patients admitted to the Puerto Rico Trauma Hospital before and after Hurricane Maria.

METHODS: A retrospective study was performed to compare fall-related injuries after the hurricane (September 20, 2017 - January 20, 2018) with a control period (same period in 2014-2016). Comparison between the groups was done using chi-square, Mann-Whitney test, and logistical regression.

RESULTS: After the hurricane, there was an increase in the proportion of fall-related admissions in subjects aged 40-64 years (39.2% vs. 50.6%) and a decrease among those aged 18-39 years (16.0% vs. 5.9%), when compared with the previous years. A greater proportion of patients presented with work related injuries (3.9% vs. 9.4%). No significant differences were identified for sex, Glasgow Coma Scale, Injury Severity Score, and hospital outcomes (hospital and intensive care unit days, mechanical ventilation, and mortality). Intracranial injuries were marginally higher post-Maria ($p = 0.06$). In multivariate analysis, during the post-Maria period, an increased risk of fall-related injuries was observed among subjects ≥ 40 years (OR: 3.20) and injuries related to recovery work (OR: 2.64) ($p < 0.05$).

CONCLUSIONS: Our study shows that there is an increased risk of fall-related injuries among middle-aged individuals after a hurricane, causing significant changes in epidemiology. This study helps to elucidate the health consequences of falls and, in doing so, improves healthcare preparedness, interventions, and planning for future natural disasters.

Language: en

Keywords

Injury; Trauma; Falls; Natural disasters; Hurricane; Fall-related injuries

Key gait findings for diagnosing three syndromic categories of dynamic instability in patients with balance disorders

Schniepp R, Möhwald K, Wuehr M. J. Neurol. 2020; ePub(ePub): ePub.

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Abstract

With the emergence of affordable, clinical-orientated gait analysis techniques, clinicians may benefit from a general understanding of quantitative gait analysis procedures and their clinical applications. This article provides an overview of the potential of a quantitative gait analysis for decision support in three clinically relevant scenarios of early stage gait disorders: scenario I: gait ataxia and unsteadiness; scenario II: hypokinesia and slow gait; scenario III: apparently normal gait with a specific fall tendency in complex mobility situations. In a first part, we justify the advantages of standardized data collection and analysis procedures including data normalization and dimensionality reduction techniques that facilitate clinical interpretability of instrument-based gait profiles. We then outline typical patterns of pathological gait and their modulation during different walking conditions (variation of speed, sensory perturbation, and dual tasking) and highlight key aspects that are particularly helpful to support and guide clinical decision-making.

Language: en

Keywords

Dementia; Ataxia; Hypokinesia; Instrumented gait analysis; Multi-condition gait examination; Pattern recognition

Neuropsychiatric symptoms as predictors of falls in long-term care residents with cognitive impairment

Roitto HM, Öhman H, Salminen K, Kautiainen H, Laurila J, Pitkälä KH. *J. Am. Med. Dir. Assoc.* 2020; ePub(ePub): ePub.

(Copyright © 2020, Lippincott Williams and Wilkins)

DOI 10.1016/j.jamda.2020.04.003 PMID unavailable

Abstract

OBJECTIVES: Falls and neuropsychiatric symptoms (NPS) are common among long-term care residents with cognitive impairment. Despite the high prevalence of falls and NPS, little is known about their association. The aim of our study was to explore how NPS, particularly the severity of NPS and specific NPS subgroups, are associated with falls and how psychotropics modify this association.

DESIGN: Longitudinal cohort study.

SETTING AND PARTICIPANTS: In total, 532 long-term care residents aged 65 years or older in Helsinki, Finland.

METHODS: NPS were measured with Neuropsychiatric Inventory (NPI) at baseline. Participants were grouped into 3 groups: no significant NPS (NPI points 0–3), low NPS burden (NPI 4–12), and high NPS burden (NPI >12). The number of falls, injuries, fractures, and hospitalizations were collected from medical records over 12 months following baseline assessment.

RESULTS: Altogether, 606 falls occurred during the follow-up year. The falls led to 121 injuries, 42 hospitalizations, and 20 fractures. Falls and injuries increased significantly with NPS burden ($P < .001$): 330 falls in the high NPS group ($n = 184$), 188 falls in the low NPS group ($n = 181$), and 88 falls in the no significant NPS group ($n = 167$). The risk of falling showed a curvilinear association with NPI total score. Of NPS subgroups, psychosis and hyperactivity were associated with a higher incidence rate ratio of falls, whereas apathy had a protective association even after adjustment for age, sex, and mobility. Affective symptoms were not associated with falls. Psychotropics did not modify the association between NPS burden and falls.

CONCLUSIONS AND IMPLICATIONS: The results of this study show that NPS, especially NPS severity, may predict falls and fall-related negative consequences. Severity of NPS should be taken into account when assessing fall risk in long-term care residents with cognitive impairment.

Language: en

Keywords

Falls; cognitive impairment; long-term care; neuropsychiatric inventory; neuropsychiatric symptoms

Psychoactive drug use and falls among community-dwelling Turkish older people

Naharci MI, Oguz EO, Celebi F, Oguz SO, Yilmaz O, Tasci I. North. Clin. Istanbul. 2020; 7(3): 260-266.

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DOI 10.14744/nci.2019.30316 PMID unavailable

Abstract

OBJECTIVE: Data on the relationship between fall and psychoactive drug use among Turkish older people are limited. This study aims to investigate the prevalence of falls and the associations between psychoactive drug use and falls in community-dwelling Turkish older people.

METHODS: This single center study was performed using the medical records of subjects aged over 65 years admitted to the geriatric care unit. Demographic and lifestyle factors, clinical characteristics, medications, and data on mood, cognitive status, and functional performance were obtained from the comprehensive geriatric assessment records. Based on a fall history in the last 12 months, subjects were grouped as fallers and non-fallers. Subjects treated with a psychoactive drug were identified.

RESULTS: Among the total of 429 subjects, there were 184 (42.9%) fallers and 245 (57.1%) non-fallers. Of those, 33.3% were on psychoactive drug treatment. The proportion of psychoactive drug users was higher in the fallers group compared to non-fallers (45.1% vs. 24.5%, $p < 0.001$). Multivariable logistic regression analysis showed age ≥ 75 years (OR=1.83; CI: 1.09-3.09; $p = 0.023$), female gender (OR=2.70; CI: 1.6-4.50; $p < 0.001$), and psychoactive drug use (OR=2.14; CI 1.32-3.48; $p = 0.002$) as independent predictors of falls.

CONCLUSION: We found that about one-third of geriatric outpatients were on psychoactive drug treatment in Turkey that was independently associated with the risk of falls.

Language: en

Keywords

Aged; falls; psychoactive drugs