

Safety Literature 9th July 2023**A process evaluation of a fall prevention intervention using the RE-AIM framework**

Somerville E, Yan Y, Stark S. OTJR 2023; ePub(ePub): ePub.

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DOI 10.1177/15394492231182398 **PMID** 37401744

Abstract

BACKGROUND: Home hazard removal programs are effective in reducing falls among older adults, but delivery in the United States is limited.

OBJECTIVES: We completed a process evaluation of the Home Hazard Removal Program (HARP), an intervention delivered by occupational therapists.

METHODS: Using the RE-AIM framework (reach, effectiveness, adoption, implementation, maintenance), we examined outcomes using descriptive statistics and frequency distribution. We examined differences between covariates using Pearson correlation coefficients and two-sample t tests.

RESULTS: 79.1% of eligible older adults participated (reach); they experienced a 38% reduction in fall rates (effectiveness). Ninety percent of recommended strategies were completed (adoption), 99% of intervention elements were delivered (implementation), and 91% of strategies were still used at 12 months (maintenance). Participants received an average of 258.6 minutes of occupational therapy. An average of US\$765.83 was spent per participant to deliver the intervention.

CONCLUSIONS: HARP has good reach, effectiveness, adherence, implementation, and maintenance and is a low-cost intervention.

Language: en

Keywords

older adults; occupational therapy; evidence-based practice; intervention; environment

Anticoagulant use in older persons at risk for falls: therapeutic dilemmas-a clinical review

Mitchell A, Elmasry Y, van Poelgeest E, Welsh TJ. Eur. Geriatr. Med. 2023; ePub(ePub): ePub.

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Abstract

PURPOSE: The aim of this clinical narrative review was to summarise the existing knowledge on the use of anticoagulants and potential adverse events in older people at risk of falls with a history of atrial fibrillation or venous thromboembolism. The review also offers practical steps prescribers can take when (de-)prescribing anticoagulants to maximise safety.

METHODS: Literature searches were conducted using PubMed, Embase and Scopus. Additional articles were identified by searching reference lists.

RESULTS: Anticoagulants are often underused in older people due to concerns about the risk of falls and intracranial haemorrhage. However, evidence suggests that the absolute risk is low and outweighed by the reduction in stroke risk. DOACs are now recommended first line for most patients due to their favourable safety profile. Off-label dose reduction of DOACs is not recommended due to reduced efficacy with limited reduction in bleeding risk. Medication review and falls prevention strategies should be implemented before prescribing anticoagulation. Deprescribing should be considered in severe frailty, limited life expectancy and increased bleeding risk (e.g., cerebral microbleeds).

CONCLUSION: When considering whether to (de-)prescribe anticoagulants, it is important to consider the risks associated with stopping therapy in addition to potential adverse events. Shared decision-making with the patient and their carers is crucial as patient and prescriber views often differ.

Language: en

Keywords

Falls; Anticoagulants; Atrial fibrillation; Deprescribing; Geriatric; Venous thrombosis

Balance confidence modulates the association of gait speed with falls in older fallers: a prospective cohort study

Tsang CSL, Lam FMH, Leung JCS, Kwok TCY. J. Am. Med. Dir. Assoc. 2023; ePub(ePub): ePub.

(Copyright © 2023, Lippincott Williams and Wilkins)

DOI 10.1016/j.jamda.2023.05.025 **PMID** 37393065

Abstract

OBJECTIVES: Self-perceived balance confidence (BC) and gait speed influence falls. Whether they modulate each other in fall prediction stays uncertain. This study examined whether and how BC modulated the association between gait speed and falls.

DESIGN: Prospective observational cohort study. **SETTING AND PARTICIPANTS:** Older adults who were community-dwelling, ≥ 65 years old, able to walk for 10 meters independently, and had 1 or more falls in the past year were assessed at a research clinic.

METHODS: Participants were followed up trimonthly for 12 months after the baseline. Optimal cutoff values for gait speed for prospective falls were identified by classification and regression tree analysis. Associations among gait speed, BC, and falls were estimated with negative binomial regression models. Subgroup analyses for high and low BC were performed. Covariates such as basic demographics, generic cognition, fall histories, and other physical functions were adjusted.

RESULTS: During the follow-up period, 65 (14%) of the 461 included participants (median age 69.0 ± 10.0 years, range 60-92) reported 83 falls in total. In both the pooled and subgroup analyses for the low- and high-BC groups, the high-speed subgroup (≥ 1.30 m/s) showed an increased fall risk compared with the moderate-speed subgroup (≥ 0.81 and < 1.30 m/s) (adjusted odds ratio [OR], 1.84-2.37; 95% CI, 1.26-3.09). A statistically significant linear association between gait speed and falls was shown in the high-BC group. In the low-BC group, a u-shaped association was evident (adjusted OR, 2.19-2.44; 95% CI, 1.73-3.19) with elevated fall risks in both the high- and low-speed subgroups compared with the moderate-speed subgroup (adjusted OR, 1.84-3.29; 95% CI, 1.26-4.60).

CONCLUSIONS AND IMPLICATIONS: BC modulated the association between gait speed and falls. There were linear and nonlinear associations between gait speed and falls in people with high and low BC, respectively. Clinicians and researchers should consider the effects of BC when predicting falls with gait speed.

Language: en

Keywords

walking; mobility; Falling; falls-efficacy

Characteristics and trend of injury mortality in residents in Yantai, Shandong, 2012-2021

Wei P, Tong J, Kunyan W, Shujun P, Hongjie Z. Disease Surveil. 2023; 38(3): 315-320.

Vernacular Title

2012—2021年山东省烟台市居民伤害死因特征及趋势分析

(Copyright © 2023, Zhongguo ji bing yu fang kong zhi zhong xin chuan ran yu fang kong zhi suo "Ji bing jian ce" za zhi bian ji bu)

DOI 10.3784/jbjc.202211150502 PMID unavailable

Abstract

OBJECTIVE To analyze the distribution and incidence trend of injury mortality in residents in Yantai, and provide evidence for injury prevention and control in this area.

METHODS The surveillance data of injury deaths of residents in Yantai from 2012 to 2021 were collected. Excel 2019 and software SPSS 22.0 were used to calculate the crude mortality rate, standardized mortality rate of injury. The annual percent change (APC) and average annual percent change (AAPC) of the injury mortality rate and the standardized mortality rate were calculated by using Joinpoint regression model, and the trends were also examined.

RESULTS From 2012 to 2021, the crude mortality rate of injury in residents in Yantai was 53.02/100 000, and the standardized mortality rate was 35.48/100 000 with a downward trend with year (AAPC=−5.45%, $P<0.001$). The crude mortality rate of injury in men was 73.54/100 000, and the standardized mortality rate was 51.79/100 000 with a downward trend with year (AAPC=−6.67%, $P<0.001$). The top three causes of injury death in men were road traffic accident, fall and suicide. The crude mortality rate of injury in women was 31.86/100 000, and the standardized mortality rate was 18.78/100 000 with a downward trend with year (AAPC=−4.78%, $P<0.001$). The top three causes of injury death in women were road traffic accident, suicide, and fall. The crude mortality rate of injury in children and adolescents aged 0–14 years was 8.23/100 000, and the standardized mortality rate was 8.20/100 000 with a downward trend with year (AAPC=−8.79%, $P<0.01$). The top three causes of injury death in children and adolescents were road traffic accident, drowning and other unintentional injuries. The crude mortality rate of injury in residents aged 15–64 years was 43.45/100 000, and the standardized mortality rate was 35.13/100 000 with a downward trend with year (AAPC=−7.50%, $P<0.001$). The top three causes of injury death in residents aged 15–64 years were road traffic accident, suicide, and other unintentional injuries. The crude mortality rate of injury in residents aged ≥ 65 years was 137.27/100 000, and the standardized mortality rate was 126.86/100 000. There was no statistical difference in injury mortality rate over the

years (AAPC=-1.98%, $P>0.05$). The top three causes of injury death in residents aged ≥ 65 years were road traffic accident, fall, and suicide.

CONCLUSION From 2012 to 2021, the mortality rate of injury in residents in Yantai showed a downward trend. The mortality rate of injury in men was higher than that in women. Road traffic accident was the first cause of injury death. There were different distribution characteristics of injury deaths among people with different age. Therefore, it is necessary to take targeted prevention, control strategies and measures.

Language: zh

Key words: Injury / Cause of death analysis / Trend analysis

Fear of falling as a behavioral symptom in neurocognitive impaired patients: evidence from an underrepresented population

Castelblanco Toro SM, Jurado Delgado J, Meneses Bernal JF, Santacruz Escudero JM, Santamaría-García H. J. *Alzheimers Dis.* 2023; ePub(ePub): ePub.

(Copyright © 2023, IOS Press)

DOI 10.3233/JAD-230266 **PMID** 37393502

Abstract

BACKGROUND: Fear of falling (FoF) is a condition associated with falls, multi-morbidity, and functional impairment. To date it remains unknown which clinical, somatic, socio-demographic, behavioral, and emotional factors are associated with FoF and how these factors interact in people with Alzheimer's disease (AD) and behavioral variant frontotemporal dementia (bvFTD).

OBJECTIVE: Identify the association of FoF with clinical, socio-demographic, and neuropsychiatric factors in patients with AD and bvFTD.

METHODS: We evaluated 98 participants, 58 with AD and 40 with bvFTD at mild or moderate stages and assess FoF using the Falls Efficacy Scale-International. Additionally, we analyzed cognitive, physical performance variables, functional impairment, and affective and behavioral symptoms associated with FoF using standardized scales and a regression model analysis.

RESULTS: The prevalence of FoF in AD and bvFTD was 51% and 40%, respectively. In the AD group, physical performance [$F(3, 53)=4.318, p=0.009$], the behavioral symptoms model [$F(19, 38)=3.314, p=0.001$], and the anxiety model [$F(1, 56)=13.4, p\leq 0.01$] showed statistically significant values. In addition, the presence of hallucinations assessed with the Neuropsychiatric Inventory and social behavior assessed with the Mild Behavioral Impairment Checklist were significant. In contrast, in the bvFTD group, a homologous group of models was evaluated but we did not find any significant results.

CONCLUSION: FoF in people with AD was related to physical performance, neuropsychiatric symptoms such as apathy and hallucinations, and affective symptoms such as anxiety. However, this pattern was not seen in the bvFTD group, and therefore further studies are required.

Language: en

Keywords

Alzheimer's disease; fear of falling; behavioral symptoms; frontotemporal dementia; physical performance

Frailty is a risk factor for falls in the older adults: a systematic review and meta-analysis

Yang ZC, Lin H, Jiang GH, Chu YH, Gao JH, Tong ZJ, Wang ZH. *J. Nutr. Health Aging* 2023; 27(6): 487-595.

(Copyright © 2023, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s12603-023-1935-8 **PMID** 37357334

Abstract

OBJECTIVES: There is little evidence in the literature about the relationship between frailty and falls in older adults. Our objective was to explore the relationship between frailty and falls, and to analyze the effect factors (e.g., gender, different frailty assessment tools, areas, level of national economic development, and year of publication) of the association between frailty and falls among older adults.

DESIGN: Systematic review and meta-analysis. **SETTING AND PARTICIPANTS:** Cohort studies that evaluated the association between frailty and falls in the older adults were included. We excluded any literature outside of cohort studies.

METHODS: We did a systematic literature search of English databases PubMed, Scopus, Web of Science, EBSCOhost, and SciELO, as well as the Chinese databases CNKI, WANFANG, and VIP from 2001 until October 2022. The eligible studies were evaluated for potential bias using the Newcastle-Ottawa Scale (NOS). Study selection, data extraction and assessment of study quality were each conducted by two investigators. In Stata/MP 17.0 software, we calculated pooled estimates of the prevalence of falls by using a random-effects model, Subgroup analysis was conducted based on gender, different frailty assessment tools, areas, level of economic development, and year of publication. The results are presented using a forest plot.

RESULTS: Twenty-nine studies were included in this meta-analysis and a total of 1,093,270 participants aged 65 years and above were enrolled. Among the older adults, frailty was significantly associated with a higher risk for falls, compared with those without frailty (combined RR-relative risk = 1.48, 95% CI-confidence interval: 1.27-1.73, I²=98.9%). In addition, the results of subgroup analysis indicated that men had a higher risk for falls than women among the older adults with frailty (RR 1.94, 95% CI: 1.18-3.2 versus RR 1.44, 95% CI: 1.24-1.67). Subgroup analysis by different frailty assessment tools revealed an increased risk of falls in older adults with frailty when assessed using the Frailty Phenotype (combined RR 1.32, 95%CI: 1.17-1.48), FRAIL score (combined RR 1.82, 95%CI: 1.36-2.43), and Study of Osteoporotic Fractures index (combined RR 1.54, 95%CI: 1.10-2.16). Furthermore, subgroup analysis by areas and level of national economic development found the highest fall risk in Oceania (combined RR 2.35, 95%CI: 2.28-2.43) and the lowest in Europe (combined RR 1.20, 95%CI: 1.05-1.38). Developed countries exhibited a lower fall risk compared to developing countries (combined RR 1.44, 95%CI: 1.21-1.71). Analysis by year of publication showed the highest fall risk between 2013-2019 (combined RR 1.79, 95%CI: 1.45-2.20) and the lowest between 2001-2013 (combined RR 1.21, 95%CI: 1.13-1.29).

CONCLUSION: Frailty represents a significant risk factor for falls in older adults, with the degree of risk varying according to the different frailty assessment tools employed, and notably highest when using the FRAIL scale. Additionally, factors such as gender, areas, level of national economic development, and healthcare managers' understanding of frailty may all impact the correlation between frailty and falls. Thus, it's imperative to select suitable frailty diagnostic tools tailored to the specific characteristics of the population in question. This, in turn, facilitates the accurate identification of frailty in older adults and informs the development of appropriate preventive and therapeutic strategies to mitigate fall risk.

Language: en

Keywords

frailty; falls; Elder people

Latent classes based on fall risk factors in community-dwelling older adults: the 2017 National Survey of Older Persons

Kim MY, Ok JS, Choi H. *Int. J. Nurs. Pract.* 2023; ePub(ePub): ePub.

(Copyright © 2023, John Wiley and Sons)

DOI 10.1111/ijn.13178 **PMID** 37394658

Abstract

AIMS: This work aimed to classify the elderly according to fall risk factors and to identify the characteristics of the latent classes.

BACKGROUND: Falls mainly occur due to combinations of various risk factors, and each older adult has a different combination of risk factors.

DESIGN: This was a secondary data analysis using data from the 2017 National Survey of Older Persons conducted by the Korean Ministry of Health and Welfare.

METHODS: Latent class analysis and multiple logistic regression were performed using data from 1556 older adults who experienced at least one fall during 1 year (1 January 2016 to 31 December 2016). Indicator variables included eight fall risk factors.

RESULTS: A 3-class solution was selected according to acceptable goodness of fit. The 'healthy falls risk class' included over half of the cohort, and the comprised older adults did not show typical health problems. The 'complex falls risk class' included older people with physical and mental problems, and the 'musculoskeletal falls risk class' included older people with osteoarthritis and back pain.

CONCLUSION: The results identified combinations of fall risk factors and characteristics among community-dwelling older adults that may contribute to the planning of effective fall prevention programmes.

Language: en

Keywords

prevention; aged; risk factors; older adults; falls; nursing

Management of fall risk among older adults in diverse primary care settings

Shear K, Rice H, Garabedian PM, Bjarnadottir R, Latham N, Horgas AL, Harle CA, Dykes PC, Lucero R. J. Appl. Gerontol. 2023; ePub(ePub): ePub.

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DOI 10.1177/07334648231185757 **PMID** 37387449

Abstract

OBJECTIVES: Falls are persistent among community-dwelling older adults despite existing prevention guidelines. We described how urban and rural primary care staff and older adults manage fall risk and factors important to integration of computerized clinical decision support (CCDS).

METHODS: Interviews, contextual inquiries, and workflow observations were analyzed using content analysis and synthesized into a journey map. Sociotechnical and PRISM domains were applied to identify workflow factors important to sustainable CCDS integration.

RESULTS: Participants valued fall prevention and described similar approaches. Available resources differed between rural and urban locations. Participants wanted evidence-based guidance integrated into workflows to bridge skills gaps.

DISCUSSION: Sites described similar clinical approaches with differences in resource availability. This implies that a single intervention would need to be flexible to environments with differing resources. Electronic Health Record's inherent ability to provide tailored CCDS is limited. However, CCDS middleware could integrate into different settings and increase evidence use.

Language: en

Keywords

prevention; falls; evidence-based practice; clinical decision support; person centered care

Overestimation of balance ability among older adults at risk for falls

Ickert EC, Hughes T, Berg-Carramusa CA, Dudash S, Kearns L. J. Aging Health 2023; ePub(ePub): ePub.

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DOI 10.1177/08982643231186630 **PMID** 37358257

Abstract

OBJECTIVE: This study examined alignment of subjective balance confidence with Stopping Elderly Accidents, Deaths and Injuries (STEADI) fall risk.

METHODS: Cross-sectional analysis of 155 community-dwelling adults (60 + y/o) from 2016 to 2018 who completed a STEADI fall assessment. Descriptive statistics, Chi-Square analysis, and biserial point correlations were applied.

RESULTS: Adults who overestimate balance confidence, 55.6% (n = 50) reported a fall in the past year, 62.2% (n = 56) were worried about falling, 48.9% (n = 44) felt unsteady when standing/walking, and 70.0% (n = 63) had a score of ≥ 4 on the Stay Independent Questionnaire (SIQ). Physical performance for these adults were mean TUG score 10.9s (SD = 3.4), mean 30 second chair stands 10.8 (SD = 3.5), and mean 4-stage balance score 3.1 (SD = .76).

DISCUSSION: Older adults are more likely to overestimate their subjective balance confidence. Individuals are equally likely to have reported a fall in the past year if they were "at fall risk," regardless of their subjective balance confidence.

Language: en

Keywords

older adults; falls; geriatric; balance confidence; STEADI

Physical activity and injurious falls in older Australian women: adjusted associations and modification by physical function limitation and frailty in the Australian Longitudinal Study on Women's Health

Kwok WS, Dolja-Gore X, Khalatbari-Soltani S, Byles J, Oliveira JS, Pinheiro MB, Naganathan V, Tiedemann A, Sherrington C. Age Ageing 2023; 52(6).

(Copyright © 2023, Oxford University Press)

DOI 10.1093/ageing/afad108 **PMID** 37389559

Abstract

OBJECTIVES: To investigate associations between leisure-time physical activity (LPA) and injurious falls in older women and explore modification of associations by physical function and frailty.

METHODS: Women born during 1946-51 from the Australian Longitudinal Study on Women's Health, injurious falls (self-reported fall with injury and/or medical attention) and self-reported weekly LPA (duration and type). We undertook cross-sectional and prospective analyses using data from 2016 [$n = 8,171$, mean (SD) age 68 (1)] and 2019 surveys ($n = 7,057$). Associations were quantified using directed acyclic graph-informed logistic regression and effect modification examined using product terms.

RESULTS: Participation in LPA as recommended by World Health Organization (150-300 min/week) was associated with lower odds of injurious falls in cross-sectional (adjusted Odds Ratio (OR) 0.74, 95% CI 0.61-0.90) and prospective analyses (OR 0.75, 95% CI 0.60-0.94). Compared with those who reported no LPA, cross-sectionally, odds of injurious falls were lower in those who reported brisk walking (OR 0.77, 95% CI 0.67-0.89) and vigorous LPA (OR 0.86, 95% CI 0.75-1.00). No significant association was found between different types of LPA and injurious falls prospectively. Only cross-sectionally, physical function limitation and frailty modified the association between LPA and injurious falls, with tendencies for more injurious falls with more activity in those with physical limitation or frailty, and fewer injurious falls with more activity among those without physical function limitation or frailty.

CONCLUSION: Participation in recommended levels of LPA was associated with lower odds of injurious falls. Caution is required when promoting general physical activity among people with physical limitation or frailty.

Language: en

Keywords

older adults; physical activity; accidental falls; older people; directed acyclic graph

Prevalent falls, fall frequencies and health-related quality of life among community-dwelling older Chinese adults

Lu H, Dong XX, Li DL, Wu Q, Nie XY, Xu Y, Wang P, Pan CW. Qual. Life Res. 2023; ePub(ePub): ePub.

(Copyright © 2023, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s11136-023-03474-2 **PMID** 37395987

Abstract

PURPOSE: Fall is a serious health hazard to older adults. The aim of our study was to investigate the relationship between falls and health-related quality of life (HRQOL) in mainland China.

METHODS: Data from 4579 Chinese community-dwelling older adults was analyzed. Data of falls was self-reported by participants, the HRQOL of older adults was measured by the 3-Level EQ-5D (EQ-5D-3L, 3L). Regression models were built to explore the associations of falls (experience and frequency) with the 3L data (index score, EQ-VAS score and health problems). The potential interaction effects between falls and gender on HRQOL were assessed using a likelihood ratio test, sex-stratified analysis was also performed to separately investigate the associations in men and women.

RESULTS: A total of 368 (8.0%) participants had the experience of fall during the last year. Falls (experience and frequency) were significantly related to EQ-5D-3L index and EQ-VAS scores, fall experience contributed to pain/discomfort and anxiety/depression problems, while fall frequency was associated with physical-related problems and pain/discomfort. Significant interactions between falls and sex in several EQ-5D measures were also observed, and men had larger magnitude of associations than women.

CONCLUSION: Falls were negative associated with overall HRQOL as well as separate HRQOL dimensions among older adults. It also appears that the HRQOL influence on older men is more evident than older women.

Language: en

Keywords

Falls; China; Older adults; EQ-5D; Health-related quality of life

Preventing falls of the elderly at home: applying the precaution adoption process model

Jadgal MS, Movahed E, Dashti S, Khazir Z, Zareipour M. J. Educ. Health Promot. 2023; 12: e115.

(Copyright © 2023, Medknow Publications)

DOI 10.4103/jehp.jehp_673_22 **PMID** 37397121

Abstract

BACKGROUND: Falling in the elderly causes a variety of issues such as dependence, decreased self-efficacy, depression and limitation in daily activities, hospitalization and imposition of costs on the individual and society. The aim of this study was to investigate the prevention of falls in the elderly at home by applying the Precaution Adoption Process Model.

MATERIALS AND METHODS: In this quasi-experimental study, 200 elderly people participated, 100 of whom were in the intervention group and 100 in the control group. The sample was provided via stratified random sampling. The data collection instruments were a researcher-made questionnaire including demographic details, as well as the Precaution Adoption Process Model (PAPM) questionnaire. Educational intervention was performed during four 45-minute sessions, following which the data was analyzed through SPSS 20 software and was evaluated based on the Chi-squared, Mann-Whitney U, Wilcoxon, and Fisher's exact tests.

RESULTS: Investigating the distribution of participants in the phases of the PAPM indicated that most participants of both the intervention and control groups were in the passive fall prevention phase before treatment. However, after the intervention, most participants of the intervention group were in the active phases of fall prevention, while there were not any significant changes in the control group. Moreover, comparing the mean of the structures of knowledge, sensitivity, severity, benefits, perceived self-efficiency, and the cues to action in terms of preventing falls after the intervention, showed a significant increase in these structures in the intervention group compared to the control group ($P < 0.001$). Eventually, the findings of the study showed a significant decrease in the percentage of falls of the participants of the intervention group compared to that of the control group after the intervention ($P = 0.004$).

CONCLUSIONS: Educational intervention on the basis of the PAPM promoted the elderly precaution from passive phases to active phases of preventing falls, thereby resulting in a decrease in the number of falls of elderly people.

Language: en

Keywords

Elderly; home; PAPM; prevention of falls

The effect of virtual reality technology on anti-fall ability and bone mineral density of the elderly with osteoporosis in an elderly care institution

Zhao R, Zhao X, Guan J, Zhang C, Zhu K. Eur. J. Med. Res. 2023; 28(1): e204.

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DOI 10.1186/s40001-023-01165-9 **PMID** 37386503

Abstract

OBJECTIVE: To explore the impact of virtual reality (VR) training on anti-fall ability and bone mineral density (BMD) among elderly patients admitted to a healthcare institution.

METHODS: People (aged 50) with osteoporosis in an elderly care institution in Anhui Province June 2020 to October 2021 were selected and randomly divided into VR group (n = 25) and control group (n = 25). In VR group, the virtual reality rehabilitation training system was used for training, while control group was treated with traditional fall prevention exercise intervention. The changes of Berg Balance Scale (BBS), timed up and go test (TUGT), functional gait assessment (FGA), bone mineral density (BMD) and falls during 12 months of training were compared between the two groups.

RESULTS: BBS and FGA were positively correlated with BMD of the lumbar vertebrae and femoral neck, and TUGT was negatively correlated with BMD of the lumbar vertebrae and femoral neck. After 12 months of training, the BBS score, TUGT evaluation and FGA evaluation of the two groups were significantly improved compared with those prior to training ($P < 0.05$). However, there was no significant difference in the lumbar spine and femoral neck BMD between the two groups 6 months after the intervention. The femoral neck and lumbar spine BMD of the VR group improved, and it was significantly higher than that of the control group 12 months after the intervention. Nevertheless, there was no significant difference in terms of the incidence of adverse events between the two groups.

CONCLUSION: VR training can improve anti-fall ability and increase femoral neck and lumbar spine BMD and can effectively prevent and reduce the risk of injury among elderly people with osteoporosis.

Language: en

Keywords

Falls; Virtual reality; Bone mineral density; Elderly care institutions; Osteoporosis

Assessing balance after randomization: keeping our evidence on even ground

Landy DC. Am. J. Sports Med. 2023; 51(8): 1969-1970.

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DOI 10.1177/03635465231178801 **PMID** 37392076

Abstract

The principles of evidenced-based medicine have been increasingly used since the 1990s to help health care providers and surgeons understand and compare treatment options.^{3,10} This process promotes research quality through more objective and standardized evaluations, which has highlighted the randomized controlled trial (RCT).² Through randomization, RCTs attempt to create 2 or more similar groups from a shared study population. In theory, randomization will balance known and unknown confounders across groups. Having equivalent groups at baseline reduces the potential that between-group differences are responsible for treatment effects. This is a large part of why the evidence from RCTs is often referred to as level 1.

Even though RCTs are highly valued, they still require critical evaluation to ensure their results live up to the hype. We are lucky that a culture of evidence exists within sports medicine where the importance of identifying and promoting quality is well appreciated.⁵ As a part of this, it is important that authors, reviewers, editors, and readers continue to evolve with respect to our understanding of research quality and its assessment. While new methodologies such as mediation analysis and machine learning are creating an obvious need for new insights, it may be even more important that we continue to improve with respect to the quality and consistency of reviewing more common study designs such as the RCT.

While randomization attempts to balance patient characteristics across study groups, this may not be achieved.¹ For instance, researchers may take a study population of patients with a chronic rotator cuff tear and randomize them to 2 different treatments. Through chance alone, the 2 study groups may differ with respect to an important factor. It is possible that one group may have a greater proportion of patients with full-thickness tears or a greater proportion of women. This lack of balance may confound estimates of treatment effect and produce biased results. It is possible that the improved outcomes seen in one group are not because of the treatment but rather baseline differences...

Language: en

Keywords

epidemiology; randomized controlled trials; biostatistics; treatment outcome

Factors contributing to falls in people with multiple sclerosis: the exploration of the moderation and mediation effects

Jawad A, Baattaiah BA, Alharbi MD, Chevidikunnnan MF, Khan F. Mult. Scler. Relat. Disord. 2023; 76: e104838.

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Abstract

The prevalence of multiple sclerosis (MS) has significantly increased in recent decades. People with MS have a high risk of falling; these falls may lead to serious injuries, affecting their quality of life **PURPOSE:** The aim of this study is to assess the factors affecting falls in people with MS and map out the most significant ones. This study also aims to determine whether fatigue has a moderation effect and balance has a mediation effect on falls in people with MS **METHODS:** In total, 103 people with MS with a mean age of 32.09 ± 7.17 were enrolled. All subjects were assessed for multiple variables including balance using the Berg Balance Scale (BBS), speed of gait using the Timed Up and Go (TUG) test, fear of falling using the Falls Efficacy Scale-International (FES-I), level of fatigue using the Modified Fatigue Impact Scale (MFIS), and lower limb muscle strength using a handheld digital dynamometer **RESULTS:** Simple binary logistic regression analysis showed significant results for BBS (OR: 10.88; 95% CI: 4.24-27.96; $p < 0.0001$), TUG (OR: 1.18; 95% CI: 1.09-1.28; $p < 0.0001$), FES-I (OR: 1.06; 95% CI: 1.02-1.10; $p = 0.001$), and MFIS (OR: 1.04; 95% CI: 1.02-1.07; $p < 0.0001$) as factors affecting falls. According to multivariate analysis, balance (OR: 3.924; 95% CI: 1.307-11.780, $p = 0.015$), speed of gait (OR: 1.122; 95% CI: 1.023-1.231; $p = 0.015$), and fatigue (OR: 1.029; 95% CI: 1.002-1.058; $p = 0.038$) were the strongest predicting factors of falls. Hayes's PROCESS analysis showed that fatigue had a significant moderation effect on the relationship between gait speed and falls (MFIS; β ; 0.10; $p < 0.0001$; 95% CI: 0.07-0.14) and balance had a mediation effect on the relationship between gait speed and falls (BBS; indirect effect; 0.08; 95% CI: 0.02-0.13) **CONCLUSIONS:** People with MS with impaired balance, slower gait speeds, higher levels of fatigue, and a fear of falling were at a high risk of falling. The relationship between gait speed and falls can be mediated by impaired balance and moderated by the level of fatigue. Our data suggest that targeting balance and fatigue while developing rehabilitation interventions could decrease the incidence of falls among people with MS.

Language: en

Keywords

Fatigue; Falls; Balance; Gait; Multiple sclerosis

Farm operations and slips, trips, and falls among corn farm workers in Thailand

Vudhironarit C, Arphorn S, Thanachoksawang C, Theppitak C, Kiatkitroj K, Lertvarayut T, Phuaram J, Hara K, Ishimaru T. Ind. Health 2023; ePub(ePub): ePub.

(Copyright © 2023, National Institute of Industrial Health, Japan)

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Abstract

Slips, trips, and falls (STFs) represent a main source of injury among farm workers. The purpose of this study was to evaluate the association between farm operations and STFs among corn farm workers. We conducted a cross-sectional study using a self-administered questionnaire among corn farm workers in Nan and Saraburi provinces, Thailand from July 5 to 23, 2022. Poisson regression analysis was used. Among 338 participants, 122 (36.1%) had experienced an STF in the previous 6 months. Conducting very frequent, frequent, or occasional pest management was associated with a higher incidence rate ratio (IRR) of STFs than never or rarely pest management (adjusted IRR 1.93, 95% confidence interval [CI] = 1.23 to 3.04, $p=0.004$). People with marginal or unsatisfactory work break lengths had a higher incidence rate of STFs than those with satisfactory work breaks (adjusted IRR 1.40, 95% CI = 1.03 to 1.89, $p=0.030$). We found that corn farm workers in our study often experienced STFs, which was associated with a high frequency of pest management practices and inadequate work breaks. Reducing the physical burden of pest management may be effective as an STF prevention strategy.

Language: en

Keywords

Agriculture; Occupational safety; Occupational injury; Fall; Farm worker

Incidence, circumstances and consequences of falls in subjects with stroke: one year of follow-up

Del Castillo M, Mosteiro MA, Navarro J, Rivas ME, Gianella M, Ahumada M.
Rehabilitación 2023; 57(4): e100809.

Vernacular Title

Incidencia, circunstancias y consecuencias de caídas en sujetos con accidente cerebrovascular: un año de seguimiento

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Abstract

INTRODUCTION: Falls are among the most frequent complications following stroke (CVA), and have a negative impact on rehabilitation.

OBJECTIVES: To study the incidence, circumstances, and consequences of falls in stroke patients up to 12months after starting outpatient kinetic treatment.

MATERIALS AND METHODS: Prospective design, case series. Consecutive sampling. Patients admitted to the day hospital between June 2019 and May 2020. Included: adults with a diagnosis of first supratentorial stroke and functional ambulatory category score ≥ 3 .

EXCLUSION CRITERIA: other condition affecting locomotion. **MAIN VARIABLES:** number of falls, circumstances, and consequences. Clinical, demographic, and functional characteristics were measured.

RESULTS: Twenty-one subjects were included, 13 suffered at least one fall. The subjects reported 41 falls: 15 were to the most affected side, 35 inside the home, 28 without the indicated equipment, they were alone when the event occurred on 29 occasions, and in two situations medical assistance was required. There were statistically significant differences ($P < .05$) in functional performance (balance, gait velocity) between those who fell and those who did not. No significant differences were found between gait endurance and falls.

CONCLUSION: More than half suffered a fall, alone, to the weaker side, and without the appropriate equipment. With this information the incidence could be reduced by preventive measures.

Language: es

Keywords

Accident prevention; Rehabilitation; Accidente cerebrovascular; Accidentes por caídas; Falling accidents; Prevención de accidentes; Rehabilitación; Stroke

Novel interventions significantly reduce falls with fractures: a meta-analysis and systematic review

Tay JL, Xie HT. *Geriatr. Nurs.* 2023; 52: 181-190.

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DOI 10.1016/j.gerinurse.2023.06.004 **PMID** 37390566

Abstract

INTRODUCTION: Worldwide, falls lead to possible complications such as prolonged hospitalization, prolonged bed rest, pressure injuries, fractures and mortality. **AIMS:** The study aimed to evaluate the effectiveness of novel fall prevention strategies that utilized technology in preventing falls.

METHODS: The meta-analysis and systematic review was guided by the Cochrane guidelines for systematic reviews of interventions. The authors searched databases for specified keywords.

RESULTS: A total of 22 studies were included. Interventions included multi-modal fall prevention interventions, camera surveillance, motion sensors and bed/chair exit alarms. Video monitoring was equivocal in reducing fall rates. Exit alarms statistically significantly reduce falls between groups but not within groups. The interventions were not statistically significant in reducing falls with minor injuries but they were statistically significant in reducing falls with serious injuries including fractures.

CONCLUSION: A comprehensive fall prevention care plan, rather than one specific intervention, is necessary to prevent falls effectively.

Language: en

Keywords

Injuries; Fractures; Exit alarms; Fall prevention; Video monitoring

Preliminary race-ethnicity-based analyses of fall risk among people with multiple sclerosis

Buehler RA, Yang F. *Mult. Scler. Relat. Disord.* 2023; 77: e104857.

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Abstract

BACKGROUND: Mounting evidence suggests differences in the disease characteristics of multiple sclerosis (MS) across ethnic and racial groups. Although it is widely recognized that falls are a significant concern for people with MS (PwMS), no study has explored if the fall risk is related to race/ethnicity in PwMS. The primary purpose of this pilot study was to examine whether the risk of falls is different between age-matched White, Black, and Latinx PwMS.

METHODS: Fifteen White, 16 Black, and 22 Latinx, age-matched ambulatory PwMS were selected from previous studies. Demographic and disease information, the fall risk (annual fall prevalence, proportion of recurrent fallers, and the number of falls) in the preceding year, and a battery of fall risk factors (including the disability level, gait speed, and cognition) were compared between race/ethnicity groups. The fall history was gathered using the valid fall questionnaire. The disability level was assessed by the Patient Determined Disease Steps score. Gait speed was measured using the Timed 25-Foot Walk test. The short Blessed Orientation-Memory-Concentration test evaluates participants' cognitive function. SPSS 28.0 was used for all statistical analyses and a significance level of 0.05 was applied.

RESULTS: Among the demographic measurements, age ($p = 0.052$), sex ($p = 0.17$), body mass ($p = 0.338$), age at diagnosis ($p = 0.623$), and disease duration ($p = 0.280$) were comparable across groups while the body height was significantly different between racial groups ($p < 0.001$). Binary logistic regression analysis did not detect a significant relationship between the faller status and racial/ethnic group ($p = 0.571$) after controlling the body height and age. Similarly, the recurrent faller status was not associated with our participants' race/ethnicity ($p = 0.519$). There was no difference in the number of falls in the past year between racial groups ($p = 0.477$). The fall risk factors of disability level ($p = 0.931$) and gait speed ($p = 0.252$) were similar among the groups. However, the White group had a significantly better Blessed Orientation-Memory-Concentration score than the Black ($p = 0.037$) and Latinx ($p = 0.036$) groups. No significant difference in the Blessed Orientation-Memory-Concentration score was observed between the Black and Latinx groups ($p = 0.857$).

CONCLUSION: As the initial attempt, our preliminary study suggests that the annual risk of being a faller or recurrent faller may not be affected by PwMS' race/ethnicity. Similarly, the physical functions (quantified by the Patient Determined Disease Steps and the gait speed) are comparable between racial/ethnic groups. However, the cognitive function may differ among age-matched racial groups of PwMS. Given the small sample size, caution is warranted when interpreting our findings. Despite the limitations, our study provides pilot

knowledge about how race/ethnicity affects the fall risk in PwMS. Due to the limited sample size, it is too soon to definitively conclude that race/ethnicity has ignorable impacts on fall risk in PwMS. Further studies with larger sample sizes and more fall risk metrics are needed to clarify the effects of race/ethnicity on fall risk in this population.

Language: en

Keywords

Race; Cognitive function; Diversity; Fall prevention; Physical function

Relationship between functional limitations due to subjective cognitive decline and falling focusing exercise intensity: results from the Korean Community Health Survey

Lee HJ, Yang JM, Kim JH. J. Public Health Res. 2023; 12(2): e22799036231180991.

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Abstract

BACKGROUND: To explore the association between functional limitation due to subjective cognitive decline (SCD) and falling by focusing on exercise intensity in the Korean population aged 45 years and older. **STUDY DESIGN:** The 2019 Korean Community Health Survey (KCHS) was used to analyze 35,387 people by applying individual weights imposed from the raw data.

METHODS: To analyze the association between functional limitation due to SCD and falling in the Korean population aged 45 years and older, weighted logistic regression analysis and weighted zero-inflated Poisson regression analysis were used.

RESULTS: In both the middle-aged group and the older adult group, the functional limitation due to SCD had a higher fall experience rate and more falls than the non-functional limitation due to SCD group. Additionally, the middle-aged group and the moderate or vigorous physical exercise (MVPE) group had a higher fall experience rate and number of falls than the non-MVPE group; however, the older adult group walking regularly and performing MVPE had a lower fall experience rate and number of falls than the non-exercise group.

CONCLUSIONS: Active participation in exercise is encouraged and should lead to fewer falls in older adults. Furthermore, a group with functional limitations due to SCD should be provided with exercise guidelines and a community program and facilities that enable regular participation should be developed.

Language: en

Keywords

Falling; functional limitations; physical exercise; subjective cognitive decline

Smartwatch-based prediction of single-stride and stride-to-stride gait outcomes using regression-based machine learning

Bailey CA, Mir-Orefice A, Uchida TK, Nantel J, Graham RB. Ann. Biomed. Eng. 2023; ePub(ePub): ePub.

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Abstract

Spatiotemporal variability during gait is linked to fall risk and could be monitored using wearable sensors. Although many users prefer wrist-worn sensors, most applications position at other sites. We developed and evaluated an application using a consumer-grade smartwatch inertial measurement unit (IMU). Young adults ($n = 41$) completed seven-minute conditions of treadmill gait at three speeds. Single-stride outcomes (stride time, length, width, and speed) and spatiotemporal variability (coefficient of variation of each single-stride outcome) were recorded using an optoelectronic system, while 232 single- and multi-stride IMU metrics were recorded using an Apple Watch Series 5. These metrics were input to train linear, ridge, support vector machine (SVM), random forest, and extreme gradient boosting (xGB) models of each spatiotemporal outcome. We conducted Model \times Condition ANOVAs to explore model sensitivity to speed-related responses. xGB models were best for single-stride outcomes [relative mean absolute error (% error): 7-11%; intraclass correlation coefficient (ICC(2,1)) 0.60-0.86], and SVM models were best for spatiotemporal variability (% error: 18-22%; ICC(2,1) = 0.47-0.64). Spatiotemporal changes with speed were captured by these models (Condition: $p < 0.00625$).

RESULTS support the feasibility of monitoring single-stride and multi-stride spatiotemporal parameters using a smartwatch IMU and machine learning.

Language: en

Keywords

Machine learning; Gait; Inertial measurement unit; Smartwatch; Spatiotemporal variability; Wearable sensors

Understanding the circumstances of paediatric fall injuries: a machine learning analysis of NEISS narratives

Omaki E, Shields W, Rouhizadeh M, Delgado-Barroso P, Stefanos R, Gielen A. *Inj. Prev.* 2023; ePub(ePub): ePub.

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Abstract

OBJECTIVES: Falls are the leading cause of non-fatal injury among young children. The aim of this study was to identify and quantify the circumstances contributing to medically attended paediatric fall injuries among 0-4 years old.

METHODS: Cross-sectional data for falls among kids under 5 years recorded between 2012 and 2016 in the National Electronic Injury Surveillance System was obtained. A sample of 4546 narratives was manually coded for: (1) where the child fell from; (2) what the child fell onto; (3) the activities preceding the fall and (4) how the fall occurred. A natural language processing model was developed and subsequently applied to the remaining uncoded data to yield a set of 91 325 cases coded for what the child fell from, fell onto, the activities preceding the fall, and how the fall occurred. Data were descriptively tabulated by age and disposition.

RESULTS: Children most often fell from the bed accounting for one-third (33%) of fall injuries in infants, 13% in toddlers and 12% in preschoolers. Children were more likely to be hospitalised if they fell from another person (7.4% vs 2.6% for all other sources; $p<0.01$). After adjusting for age, the odds of a child being hospitalised following a fall from another person were 2.1 times higher than falling from other surfaces (95% CI 1.6 to 2.7).

CONCLUSIONS: The prevalence of injuries due to falling off the bed, and the elevated risk of serious injury from falling from another person highlights the need for more robust and effective communication to caregivers on fall injury prevention.

Language: en

Keywords

Child; Fall; Descriptive Epidemiology