

SafetyLit February 26 2018**A prospective investigation of neighborhood socioeconomic deprivation and physical activity and sedentary behavior in older adults**

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Prev. Med. 2018; ePub(ePub): ePub.

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Abstract

Neighborhood conditions may have an important impact on physical activity and sedentary behaviors in the older population. Most previous studies in this area are cross-sectional and report mixed findings regarding the effects of neighborhood environment on different types of physical activity. Moreover, little is known about the prospective relationship between neighborhood environment and sedentary behaviors. Our analysis included 136,526 participants from the NIH-AARP Diet and Health Study (age 51-70). Neighborhood socioeconomic deprivation was measured with an index based on census variables and developed using principal component analysis. Physical activity and sedentary behaviors were measured both at baseline (1995-1996) and follow-up (2004-2006). Multiple regression analyses were conducted to examine the prospective relationship between neighborhood deprivation and exercise, non-exercise physical activity, and sedentary behaviors, adjusting for baseline physical activity and sedentary behaviors as well as potential confounders. We found that more severe neighborhood socioeconomic deprivation was prospectively associated with reduced time for exercise (β Q5 vs Q1 (95% confidence interval), hour, -0.85 (-0.95, -0.75)) but increased time spent in non-exercise physical activities (1.16 (0.97, 1.34)), such as household activities, outdoor chores, and walking for transportation. Moreover, people from more deprived neighborhoods were also more likely to engage in prolonged (≥ 5 h/day) TV viewing (Odds ratio Q5 vs Q1 (95% confidence interval), 1.21 (1.15, 1.27)). In conclusion, neighborhood socioeconomic deprivation is associated with physical activity and sedentary behavior in the older population. These associations may differ for different types of physical activities.

PDF Y Endnote Y**BMI and central obesity with falls among community-dwelling older adults**

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Abstract

INTRODUCTION: This study examined the associations of BMI category and central obesity status, with falls among community-dwelling older adults in the U.S.

METHODS: Data were drawn from the 2012 and 2014 U.S. Health and Retirement Study, a nationally representative longitudinal panel study funded by the National Institute of Aging. The study participants were U.S. community-dwelling older adults aged ≥ 65 years (N=3,383). Multiple logistic regression and Poisson regression analyses examined the associations of BMI category and central obesity (waist circumference >102 cm in men and >88 cm in women) with experiencing a fall and fall

injury, after adjusting for all other covariates. A prospective analysis was conducted in which independent variables from 2012 were examined in relation to dependent variables measured in the same participants in 2014.

RESULTS: Overall, 35.2% of older adults experienced at least one fall in the past 2 years. Compared with those who were not, centrally obese older adults were more likely to experience a fall (AOR=1.37, 95% CI=1.01, 1.85) and fall more frequently (incidence rate ratio=1.15, 95% CI=1.03, 1.29). Fallers in the obese BMI category were less likely than normal-weight fallers to experience a fall injury (AOR=0.56, 95% CI=0.35, 0.91).

CONCLUSIONS: These findings suggest that (1) central obesity be measured when assessing older adults' fall risk and (2) specific community prevention strategies for centrally obese older adults be developed to better prevent falls and fall-related injuries.

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PDF Y Endnote Y

Can higher training practice dosage with treadmill slip-perturbation necessarily reduce risk of falls following overground slip?

Lee A, Bhatt T, Liu X, Wang Y, Pai YC.

Gait Posture 2018; 61: 387-392.

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DOI 10.1016/j.gaitpost.2018.01.037 **PMID** 29453101

Abstract

BACKGROUND: Perturbation training is an emerging paradigm to reduce idiopathic falls (without clinical signs or symptoms) in older adults. While a higher threat dosage (intensity) in motor learning often directly relates to greater adaptation, retention, and generalization, little is known whether increasing the practice dosage (repetition) of slip-perturbation training would necessarily improve its outcomes.

RESEARCH QUESTION: Can higher practice dosage of treadmill slip-perturbation training lead to greater generalization to an overground slip immediately after the training?

METHODS: Forty-five community-dwelling older adults (73.5 ± 5.6 years old) participated in the present study. They were conveniently assigned to three groups with equivalent treadmill walking duration: treadmill slip-perturbation training group with 40 practice dosage, 24 practice dosage, and zero practice dosage (without slip-perturbation). Later on during overground walking, all of them were exposed to the same generalization test (a novel slip on a walkway). Their recovery outcomes (fall, or no fall; balance loss, or no balance loss) and center of mass stability were compared.

RESULTS: Higher practice dosage did not show significantly less incidence of fall, balance loss, or greater stability in comparison to lower practice dosage ($p > .05$). The present study showed that there was no evidence of dose-response relationship when the practice dosage was set above the 24 trials of practice dosage in treadmill slip-perturbation training.

SIGNIFICANCE: Contrary to our hypothesis, increased practice dosage (40-slips) in treadmill slip-perturbation training from the commonly used threshold (24-slips) did not necessarily benefit immediate generalization from treadmill to overground walking among community-dwelling older

adults.

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PDF Y Endnote Y

Community screening for visual impairment in older people

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Abstract

BACKGROUND: Visual problems in older people are common and frequently under-reported. The effects of poor vision in older people are wide reaching and include falls, confusion and reduced quality of life. Much of the visual impairment in older ages can be treated (e.g. cataract surgery, correction of refractive error). Vision screening may therefore reduce the number of older people living with sight loss.

OBJECTIVES: The objective of this review was to assess the effects on vision of community vision screening of older people for visual impairment.

SEARCH METHODS: We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (which contains the Cochrane Eyes and Vision Trials Register) (2017, Issue 10); Ovid MEDLINE; Ovid Embase; the ISRCTN registry; ClinicalTrials.gov and the ICTRP. The date of the search was 23 November 2017.

SELECTION CRITERIA: We included randomised controlled trials (RCTs) that compared vision screening alone or as part of a multi-component screening package as compared to no vision screening or standard care, on the vision of people aged 65 years or over in a community setting. We included trials that used self-reported visual problems or visual acuity testing as the screening tool.

DATA COLLECTION AND ANALYSIS: We used standard methods expected by Cochrane. We graded the certainty of the evidence using GRADE.

MAIN RESULTS: Visual outcome data were available for 10,608 people in 10 trials. Four trials took place in the UK, two in Australia, two in the United States and two in the Netherlands. Length of follow-up ranged from one to five years. Three of these studies were cluster-randomised trials whereby general practitioners or family physicians were randomly allocated to undertake vision screening or no vision screening. All studies were funded by government agencies. Overall we judged the studies to be at low risk of bias and only downgraded the certainty of the evidence (GRADE) for imprecision. Seven trials compared vision screening as part of a multi-component screening versus no screening. Six of these studies used self-reported vision as both screening tool and outcome measure, but did not directly measure vision. One study used a combination of self-reported vision and visual acuity measurement: participants reporting vision problems at screening were treated by the attending doctor, referred to an eye care specialist or given information about resources that were available to assist with poor vision. There was a similar risk of "not seeing well" at follow-up in people screened compared with people not screened in meta-analysis of six studies (risk ratio (RR) 1.05, 95% confidence interval (CI) 0.97 to 1.14, 4522 participants high-certainty evidence). One trial reported "improvement in vision" and this occurred slightly less frequently in the screened group (RR 0.85, 95% CI 0.52 to 1.40, 230 participants, moderate-certainty evidence). Two trials compared vision screening (visual acuity testing) alone with no vision screening.

In one study, distance visual acuity was similar in the two groups at follow-up (mean difference (MD) 0.02 logMAR, 95% CI -0.02 to 0.05, 532 participants, high-certainty evidence). There was also little difference in near acuity (MD 0.02 logMAR, 95% CI -0.03 to 0.07, 532 participants, high-certainty evidence). There was no evidence of any important difference in quality of life (MD -0.06 National Eye Institute 25-item visual function questionnaire (VFQ-25) score adjusted for baseline VFQ-25 score, 95% CI -2.3 to 1.1, 532 participants, high-certainty evidence). The other study could not be included in the data analysis as the number of participants in each of the arms at follow-up could not be determined. However the authors stated that there was no significant difference in mean visual acuity in participants who had visual acuity assessed at baseline (39 letters) as compared to those who did not have their visual acuity assessed (35 letters, $P = 0.25$, 121 participants). One trial compared a detailed health assessment including measurement of visual acuity (intervention) with a brief health assessment including one question about vision (standard care). People given the detailed health assessment had a similar risk of visual impairment (visual acuity worse than 6/18 in either eye) at follow-up compared with people given the brief assessment (RR 1.07, 95% CI 0.84 to 1.36, 1807 participants, moderate-certainty evidence). The mean composite score of the VFQ-25 was 86.0 in the group that underwent visual acuity screening compared with 85.6 in the standard care group, a difference of 0.40 (95% CI -1.70 to 2.50, 1807 participants, high-certainty evidence).

AUTHORS' CONCLUSIONS: The evidence from RCTs undertaken to date does not support vision screening for older people living independently in a community setting, whether in isolation or as part of a multi-component screening package. This is true for screening programmes involving questions about visual problems, or direct measurements of visual acuity. The most likely reason for this negative review is that the populations within the trials often did not take up the offered intervention as a result of the vision screening and large proportions of those who did not have vision screening appeared to seek their own intervention. Also, trials that use questions about vision have a lower sensitivity and specificity than formal visual acuity testing. Given the importance of visual impairment among older people, further research into strategies to improve vision of older people is needed. The effectiveness of an optimised primary care-based screening intervention that overcomes possible factors contributing to the observed lack of benefit in trials to date warrants assessment; trials should consider including more dependent participants, rather than those living independently in the community.

PDF Y Endnote Y

Effectiveness of interventions aimed at improving physical and psychological outcomes of fall-related injuries in people with dementia: a narrative systematic review

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Syst. Rev. 2018; 7(1): e31.

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DOI 10.1186/s13643-018-0697-6 **PMID** 29463292

Abstract

BACKGROUND: The annual prevalence of falls in people with dementia ranges from 47 to 90%. Falls are a common reason for hospital admission in people with dementia, and there is limited research evidence regarding the care pathways experienced by this population. In addition to immediate management of an injury, prevention of further falls is likely to be an important part of any successful intervention. This review aims to assess the effectiveness of interventions for improving

the physical and psychological wellbeing of people with dementia who have sustained a fall-related injury.

METHODS: Systematic review methodologies were employed utilising searches across multiple databases (MEDLINE, CENTRAL, Health Management Information Consortium, EMBASE, CINAHL, Web of Science, Allied and Complementary Medicine Database, and Physiotherapy Evidence Database (PEDro)) and citation chaining. Studies including people with a known diagnosis of dementia living in the community and who present at health services with a fall, with or without injury, were included. Outcomes of interest included mobility, recurrent falls, activities of daily living, length of hospital stay, and post-discharge residence.

RESULTS were independently reviewed and quality assessed by two researchers, and data extracted using a customised form. A narrative synthesis was performed due to heterogeneity of the included studies.

RESULTS: Seven studies were included. Interventions clustered into three broad categories: multidisciplinary in-hospital post-surgical geriatric assessment; pharmaceuticals; and multifactorial assessment. Multidisciplinary care and early mobilisation showed short-term improvements for some outcomes. Only an annual administration of zoledronic acid showed long-term reduction in recurrent falls.

CONCLUSIONS: Due to high heterogeneity across the studies, definitive conclusions could not be reached. Most post-fall interventions were not aimed at patients with dementia and have shown little efficacy regardless of cognitive status. Minor improvements to some quality of life indicators were shown, but these were generally not statistically significant.

CONCLUSIONS were also limited due to most studies addressing hip fracture; the interventions provided for this type of injury may not be suitable for other types of fractures or soft tissue injuries, or for use in primary care. **SYSTEMATIC REVIEW REGISTRATION:** PROSPERO CRD42016029565.

PDF Y Endnote Y

Factors associated with developing a fear of falling in subjects with primary open-angle glaucoma

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BMC Ophthalmol. 2018; 18(1): e39.

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DOI 10.1186/s12886-018-0706-5 **PMID** 29433472

Abstract

BACKGROUND: To investigate the relationship between clinical risk factors, including visual field (VF) defects and visual acuity, and a fear of falling, among patients with primary open-angle glaucoma (POAG).

METHODS: All participants answered the following question at a baseline ophthalmic examination: Are you afraid of falling? The same question was then answered every 12 months for 3 years. A binocular integrated visual field was calculated by merging a patient's monocular Humphrey field analyzer VFs, using the 'best sensitivity' method. The means of total deviation values in the whole, superior peripheral, superior central, inferior central, and inferior peripheral VFs were calculated. The relationship between these mean VF measurements, and various clinical factors, against patients' baseline fear of falling and future fear of falling was analyzed using multiple logistic regression.

RESULTS: Among 392 POAG subjects, 342 patients (87.2%) responded to the fear of falling question at least twice in the 3 years study period. The optimal regression model for patients' baseline fear of falling included age, gender, mean of total deviation values in the inferior peripheral VF and number of previous falls. The optimal regression equation for future fear of falling included age, gender, mean of total deviation values in the inferior peripheral VF and number of previous falls.

CONCLUSION: Defects in the inferior peripheral VF area are significantly related to the development of a fear of falling.

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German version of the Community Balance and Mobility Scale : translation and evaluation of measurement properties

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DOI 10.1007/s00391-018-1374-z **PMID** 29435642

Abstract

BACKGROUND: Tools to detect subtle balance deficits in high-functioning community-dwelling older adults are lacking. The Community Balance and Mobility Scale (CBM) is a valuable tool to measure balance deficits in this group; however, it is not yet available in the German language.

OBJECTIVE: The aim was 1) to translate and cross-culturally adapt the CBM into the German language and 2) to investigate the measurement properties of the German CBM (G-CBM).

MATERIAL AND METHODS: The original CBM was translated into the German language according to established guidelines. A total of 51 older adults (mean age 69.9 ± 7.1 years) were recruited to measure construct validity by comparing the G-CBM against standardized balance and/or mobility assessments including the Fullerton Advanced Balance Scale (FAB), Berg Balance Scale (BBS), 3 m Tandem Walk (3MTW), 8 Level Balance Scale (8LBS), 30 s Chair Stand Test (30CST), Timed Up and Go (TUG) test, gait speed, and the Falls Efficacy Scale International (FES-I). Intrarater and interrater reliability and internal consistency reliability were estimated using intraclass correlations (ICC) and Cronbach's alpha, respectively. Ceiling effects were calculated as the percentage of the sample scoring the maximum score.

RESULTS: The G-CBM correlated excellently with FAB and BBS ($\rho = 0.78-0.85$; $P < 0.001$), good with 3MTW, TUG, and FES-I ($\rho = -0.55$ to -0.61 ; $P < 0.001$), and moderately with 8LBS, 30CST, and habitual gait speed ($\rho = 0.32-0.46$; $P < 0.001$). Intrarater (ICC RESULTS: = 0.998; $P < 0.001$) and interrater (ICC RESULTS: = 0.996; $P < 0.001$) reliability, and internal consistency reliability ($\alpha = 0.998$) were also high. The G-CBM did not show ceiling effects.

CONCLUSION: The G-CBM is a valid and reliable tool for measuring subtle balance deficits in older high-functioning adults. The absence of ceiling effects emphasizes the use of this scale in this cohort. The G-CBM can now be utilized in clinical practice.

PDF Y Endnote Y

Inappropriate use of medication by elderly, polymedicated, or multipathological patients with chronic diseases

Pérez-Jover V, Mira JJ, Carratala-Munuera C, Gil-Guillen VF, Basora J, Lopez-Pineda A, Orozco-Beltran D.

Int. J. Environ. Res. Public Health 2018; 15(2): e15020310.

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Abstract

The growth of the aging population leads to the increase of chronic diseases, of the burden of multimorbidity, and of the complexity polypharmacy. The prevalence of medication errors rises in patients with polypharmacy in primary care, and this is a major concern to healthcare systems. This study reviews the published literature on the inappropriate use of medicines in order to articulate recommendations on how to reduce it in chronic patients, particularly in those who are elderly, polymedicated, or multipathological. A systematic review of articles published from January 2000 to October 2015 was performed using MEDLINE, EMBASE, PsychInfo, Scopus, The Cochrane Library, and Index Medicus databases. We selected 80 studies in order to analyse the content that addressed the question under consideration. Our literature review found that half of patients know what their prescribed treatment is; that most of elderly people take five or more medications a day; that in elderly, polymedicated people, the probability of a medication error occurring is higher; that new tools have been recently developed to reduce errors; that elderly patients can understand written information but the presentation and format is an important factor; and that a high percentage of patients have remaining doubts after their visit. Thus, strategies based on the evidence should be applied in order to reduce medication errors.

PDF Y Endnote Y

Machine learning algorithms based on signals from a single wearable inertial sensor can detect surface- and age-related differences in walking

Hu B, Dixon PC, Jacobs JV, Dennerlein JT, Schiffman JM.

J. Biomech. 2018; ePub(ePub): ePub.

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Abstract

The aim of this study was to investigate if a machine learning algorithm utilizing triaxial accelerometer, gyroscope, and magnetometer data from an inertial motion unit (IMU) could detect surface- and age-related differences in walking. Seventeen older (71.5 ± 4.2 years) and eighteen young (27.0 ± 4.7 years) healthy adults walked over flat and uneven brick surfaces wearing an inertial measurement unit (IMU) over the L5 vertebra. IMU data were binned into smaller data segments using 4-s sliding windows with 1-s step lengths. Ninety percent of the data were used as training inputs and the remaining ten percent were saved for testing. A deep learning network with long short-term memory units was used for training (fully supervised), prediction, and implementation. Four models were trained using the following inputs: all nine channels from every sensor in the IMU (fully trained model), accelerometer signals alone, gyroscope signals alone, and

magnetometer signals alone. The fully trained models for surface and age outperformed all other models (area under the receiver operator curve, AUC = 0.97 and 0.96, respectively; $p \leq .045$). The fully trained models for surface and age had high accuracy (96.3, 94.7%), precision (96.4, 95.2%), recall (96.3, 94.7%), and f1-score (96.3, 94.6%). These results demonstrate that processing the signals of a single IMU device with machine-learning algorithms enables the detection of surface conditions and age-group status from an individual's walking behavior which, with further learning, may be utilized to facilitate identifying and intervening on fall risk.

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PDF Y Endnote Y

On the comparison of wearable sensor data fusion to a single sensor machine learning technique in fall detection

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Abstract

In the context of the ageing global population, researchers and scientists have tried to find solutions to many challenges faced by older people. Falls, the leading cause of injury among elderly, are usually severe enough to require immediate medical attention; thus, their detection is of primary importance. To this effect, many fall detection systems that utilize wearable and ambient sensors have been proposed. In this study, we compare three newly proposed data fusion schemes that have been applied in human activity recognition and fall detection. Furthermore, these algorithms are compared to our recent work regarding fall detection in which only one type of sensor is used. The results show that fusion algorithms differ in their performance, whereas a machine learning strategy should be preferred. In conclusion, the methods presented and the comparison of their performance provide useful insights into the problem of fall detection.

PDF Y Endnote Y

Route previewing results in altered gaze behaviour, increased self-confidence and improved stepping safety in both young and older adults during adaptive locomotion

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DOI 10.1007/s00221-018-5203-9 **PMID** 29435606

Abstract

Older adults with falls risk tend to look away prematurely from targets for safe foot placement to view future hazards; behaviour associated with increased anxiety and stepping inaccuracies. We aimed to determine the effectiveness of route previewing in reducing anxiety and optimizing gaze behaviour and stepping performance of younger and older adults. Nine younger and nine older adults completed six walks with three task complexities over two sessions. Each trial used either an

isolated stepping target, or a target followed by either one or two obstacles. Participants with eyes closed, on hearing a signal, opened their eyes and initiated walking (go trials) or stood previewing the route for 10 s before starting (preview trials). Kinematic data were collected using a Vicon motion analysis system. Gaze behaviour was recorded using a Dikablis eye tracker. On average, both older and younger adults fixated the target for significantly longer during walking when they had previewed the route than when they had not. Self-confidence scores were also significantly higher following 'preview trials' than 'go trials'. Stepping performance significantly improved following route previewing (reduced Medial lateral foot placement variability for both groups and reduced anterior/posterior foot placement error in older adults only). These findings implicate route previewing as a potential intervention to increase self-confidence and reduce the risk of tripping in older adults.

PDF Y Endnote Y

Saccade frequency response to visual cues during gait in Parkinson's disease: the selective role of attention

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Eur. J. Neurosci. 2018; ePub(ePub): ePub.

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Abstract

Gait impairment is a core feature of Parkinson's disease (PD) with implications for falls risk. Visual cues improve gait in PD but the underlying mechanisms are unclear. Evidence suggests that attention and vision play an important role however the relative contribution from each is unclear. Measurement of visual exploration (specifically saccade frequency) during gait allows for real-time measurement of attention and vision. Understanding how visual cues influence visual exploration may allow inferences of the underlying mechanisms to response which could help to develop effective therapeutics. This study aimed to examine saccade frequency during gait in response to a visual cue in PD and older adults, and investigate the roles of attention and vision in visual cue response in PD. A mobile eye-tracker measured saccade frequency during gait in 55 people with PD and 32 age-matched controls. Participants walked in a straight line with and without a visual cue (50cm transverse lines) presented under single and dual-task (concurrent digit span recall). Saccade frequency was reduced when walking in PD compared to controls, however visual cues ameliorated saccadic deficit. Visual cues significantly increased saccade frequency in both PD and controls under both single and dual-task. Attention rather than visual function was central to saccade frequency and gait response to visual cues in PD. In conclusion, this study highlights the impact of visual cues on visual exploration when walking and the important role of attention in PD. Understanding these complex features will help inform intervention development. This article is protected by copyright. All rights reserved.

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Should we consider steps with variable height for a safer stair negotiation in older adults?

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Abstract

BACKGROUND: Effects of exercise on foot clearances are important. In older adults variations in foot clearances during walking may lead to a fall, but there is a lack of information concerning stair negotiation in older adults. Whether a condition of post exercise changes foot clearances between steps of a staircase in older adults still unknown.

OBJECTIVE: To determine differences in clearances when older adults negotiate different steps of a staircase before and after a session of aerobic exercise.

METHODS: Kinematics data from 30 older adults were acquired and the toe and heel clearances were determined for each step. Clearances were compared between the steps.

RESULTS: Smaller clearances were found at the highest step during ascending and descending, which was not changed by exercise. Smaller clearances suggest higher risk of tripping at the top of the staircase, regardless of exercise.

CONCLUSION: A smaller step at the top of a short flight of stairs could reduce chances of tripping in older adults. It suggests that steps with variable height could make stair negotiation safer in older adults. This hypothesis should be tested in further studies.

PDF N Endnote Y

Socioeconomic inequality in one-year mortality of elderly people with hip fracture in Taiwan

Hsu IL, Chang CM, Yang DC, Chang YH, Li CC, Hu SC, Li CY.

Int. J. Environ. Res. Public Health 2018; 15(2): e15020352.

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DOI 10.3390/ijerph15020352 **PMID** 29462914

Abstract

Hip fracture commonly results in considerable consequences in terms of disability, mortality, long-term institutional care and cost. Taiwan launched its universal health insurance coverage in 1995, which largely removes financial barriers to health care. This study aims to investigate whether socioeconomic inequality in one-year mortality exists among Taiwanese elderly people. This population-based cohort study included 193,158 elderly patients (≥ 65 years) admitted for hip fracture between 2000 and 2012. With over a one-year follow-up, 10.52% of the participants died from all causes. The mortality rate was low in the northern part of Taiwan and in urban and high-family-income areas. Multiple Poisson regression models further suggested that the level of $>Q1-Q3$ and $>Q3$ -Max showed significantly reduced odds ratio of one-year mortality at 0.90 (95% confidence interval (CI), 0.87-0.93) and 0.77 (95% CI, 0.74-0.81), respectively, compared with that of the lowest family income level (i.e., Min.-Q1). Despite a monotonic decline in overall one-year mortality during the study period, socioeconomic inequality in one-year mortality rate remained evident. The annual percentage change in one-year mortality was higher (-2.86) in elderly people from families with high

income (>Q3-Max.) than that for elderly patients from family with low income (Min.-Q1, -1.94). Accessibility, rather than affordability, to health care for hip fracture is probably responsible for the observed socioeconomic inequality.

PDF Y Endnote Y

The prevalence of unexplained falls and syncope in older adults presenting to an Irish urban emergency department

Bhangu J, Hall P, Devaney N, Bennett K, Carroll L, Kenny RA, McMahon CG.

Eur. J. Emerg. Med. 2018; ePub(ePub): ePub.

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Abstract

AIM: There is growing evidence of an overlap between unexplained falls and syncope in older adults. Our aim was to examine the prevalence and associated resource utilization of these conditions in an urban emergency department (ED).

PATIENTS AND METHODS: A single-centre, prospective, observational study was carried out over a 6-month period. Consecutive patients older than 50 years who presented to the ED because of a fall, collapse or syncope were included. Univariate analysis of demographic data is presented as percentages, mean (SD), 95% confidence intervals (CIs) and medians (interquartile range). Logistic regression modelling was used to examine the association between falls and resource utilization.

RESULTS: A total of 561 patients fulfilled the inclusion criteria during the study period. Unexplained fallers accounted for 14.3% (n=80; 95% CI: 13.3-15.3) and syncope for 12.7% (n=71; 95% CI: 11.7-13.6) of all fall presentations. Overall, 50% (n=282; 95% CI: 48.20-52.34) of patients required admission to hospital. Patients with syncope [odds ratio (OR)=2.48, 95% CI: 1.45-4.23], and unexplained falls (OR=2.36, 95% CI: 1.37-4.08) were more likely to require admission than those with an explained falls. Unexplained fallers were nearly five times more likely to suffer recurrent falls (OR=4.97, 95% CI: 2.89-8.56).

CONCLUSION: One in four older fallers presenting to ED have symptoms suggestive of syncope or an unexplained fall. There are significant biological consequences of recurrent falls including greater rates of cognitive decline, gait and mobility disturbances, depression and frailty. Recognition that syncope can present as an unexplained fall in older adults is important to ensure that appropriate early modifiable interventions are initiated.

PDF Will get ILL Endnote Y

Trajectory of physical activity after hip fracture: an analysis of community-dwelling individuals from the English Longitudinal Study of Ageing

Aboelmagd T, Dainty JR, Macgregor A, Smith TO.

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Abstract

INTRODUCTION: To analyse physical activity participation in a community-dwelling people in England with hip fracture the interval prior to fracture, in the fracture recovery period, and a minimum of two years post-fracture.

MATERIALS AND METHODS: 215 individuals were identified from the English Longitudinal Study of Ageing cohort (2002-2014) who sustained a hip fracture following a fall and for whom data were available on physical activity participation relating to the period pre-fracture, within-fracture recovery phase and post-fracture (minimum of two years). Physical activity was assessed using the validated ELSA physical activity questionnaire. Prevalence of 'low' physical activity participation was calculated and multi-level modelling analyses were performed to explore physical activity trajectories over the follow-up phase, and whether age, depression, gender and frailty were associated with physical activity participation.

RESULTS: Prevalence of low physical activity participation within two years prior to hip fracture was 16.7% (95% Confidence Intervals (CI): 11.6% to 21.8%). This increased at the final follow-up phase to 21.3% (95% CI: 15.1% to 27.6%). This was not a statistically significant change ($P = 0.100$). Age ($P = 0.005$) and frailty ($P < 0.001$) were statistically significant explanatory variables ($P = 0.005$) where older age and greater frailty equated to lower physical activity participation. Neither gender ($P = 0.288$) nor depression ($P = 0.121$) were significant explanatory variables.

CONCLUSION: Physical activity levels do not significantly change between pre-fracture to a minimum of two years post-hip fracture for community-dwelling individuals. This contrasts with previous reports of reduced mobility post-hip fracture, suggesting that 'physical activity' and 'mobility' should be considered as separate outcomes in this population.

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What do we know about behavioral crises in dementia? A systematic review

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J. Alzheimers Dis. 2018; 62(1): 99-113.

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Abstract

BACKGROUND: Behavioral crises in dementia are represented by a wide variety of symptoms, regularly require external intervention from professionals, and are reported as a risk factor for hospital admission. Little is known about the factors that are associated with them.

OBJECTIVE: To determine the factors associated with dementia-related behavioral crises.

METHODS: We searched MEDLINE, CINAHL, PsycINFO, EMBASE, and AMED databases. An additional lateral search including reference lists was conducted. Two researchers screened all records for potential eligibility. Narrative synthesis was used to bring together the findings.

RESULTS: Out of the 5,544 records identified, 24 articles (18 distinct studies) met the eligibility criteria. Aggression and agitation were the most common behaviors present at crises. Delusions, wandering/absconding, and hallucinations were also key behaviors contributing to crises. Behavioral crises predominantly happened in the severe stages of dementia (according to MMSE scores), in people with dementia residing in their own homes and in long-term care, and were the catalyst for admissions to psychiatric inpatient settings, specialist-care units, long-term care settings, or for referrals to psychiatric community services. Lack of consistency in assessment of behavior, and

management of agitation/aggression in dementia crises were evident.

CONCLUSION: Interventions to reduce the likelihood of people with dementia-related behaviors reaching crisis point need to focus on both family and care home settings and incorporate aggression and agitation management. Future research should focus on determining the factors that could be addressed to prevent behavioral crises and the interventions and models of care that may help to prevent crises.

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Yoga meditation (YoMed) and its effect on proprioception and balance function in elders who have fallen: a randomized control study

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Complement. Ther. Med. 2018; 36: 129-136.

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DOI 10.1016/j.ctim.2017.12.010 **PMID** 29458919

Abstract

OBJECTIVE: Yoga has been shown to improve muscle strength, flexibility, and balance. However, the impact of meditation on dynamic factors such as gait, reactive balance and proprioception has yet to be examined. The purpose of this study was to test if a novel yoga meditation program (YoMed) is as effective as a standard proprioceptive training in improving proprioception, balance and power in older individuals who have fallen.

DESIGN: Sixteen older persons were randomly assigned to either the YoMed Group (YM) or Proprioception Training Group (PT). Each group received 45 min of training, 3 days per week, for 6 weeks. Pretest and post-test outcome measures were used to quantify the comparative effects of the interventions.

SETTING: Research Laboratory.

INTERVENTIONS: Yoga meditation and proprioceptive training.

MAIN OUTCOME MEASURES: The Balance Error Scoring System (BESS), the Tenetti Balance and Gait Assessment, dynamic posturography, joint position sense, joint kinesthesia and leg extensor power.

RESULTS: The primary findings of the study were that neither the YM or PT intervention groups showed statistical improvements in any variable with the exception of the dynamic posturography overall score (DMA), which showed a significant improvement by the YM group ($d = 1.238$; $p = 0.049$). Additionally changes in a number of variables that did not reach significance demonstrated effect sizes in the medium to high range.

CONCLUSION: These results indicate the potential for the YoMed program to be used as a clinical intervention in older individuals. Given these results a longer study using a larger sample size and individuals at higher risk of falling is warranted.

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Biomechanical assessment of dynamic balance: specificity of different balance tests

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Abstract

Dynamic balance is vitally important for most sports and activities of daily living, so the assessment of dynamic stability has become an important issue. In consequence, a large number of balance tests have been developed. However, it is not yet known whether these tests (i) measure the same construct and (ii) can differentiate between athletes with different balance expertise. We therefore studied three common dynamic balance tests: one-leg jump landings, Posturomed perturbations and simulated forward falls. Participants were 24 healthy young females in regular training in either gymnastics (n = 12) or swimming (n = 12). In each of the tests, the participants were instructed to recover balance as quickly as possible. Dynamic stability was computed by time to stabilization and margin of stability, deduced from force plates and motion capture respectively. Pearson's correlations between the dynamic balance tests found no significant associations between the respective dynamic stability measures. Furthermore, independent t-tests indicated that only jump landings could properly distinguish between both groups of athletes. In essence, the different dynamic balance tests applied did not measure the same construct but rather task-specific skills, each of which depends on multifactorial internal and external constraints. Our study therefore contradicts the traditional view of considering balance as a general ability, and reinforces that dynamic balance measures are not interchangeable. This highlights the importance of selecting appropriate balance tests.

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A systematic review of approaches to modelling lower limb muscle forces during gait: applicability to clinical gait analyses

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Abstract

Computational methods to estimate muscle forces during walking are becoming more common in biomechanical research but not yet in clinical gait analysis. This systematic review aims to identify the current state-of-the-art, examine the differences between approaches, and consider applicability of the current approaches in clinical gait analysis. A systematic database search identified studies including estimated muscle force profiles of the lower limb during healthy walking. These were rated for quality and the muscle force profiles digitised for comparison. From 13,449 identified studies, 22 were finally included which used four modelling approaches: static optimisation, enhanced static optimisation, forward dynamics and EMG-driven. These used a range of different musculoskeletal models, muscle-tendon characteristics and cost functions. There is visually broad agreement between and within approaches about when muscles are active throughout the gait cycle. There remain, considerable differences (CV 7%-151%, range of timing of peak forces in gait cycle 1%-31%) in patterns and magnitudes of force between and within modelling approaches. The main source of this variability is not clear. Different musculoskeletal models, experimental protocols, and modelling

approaches will clearly have an effect as will the variability of joint kinetics between healthy individuals. Limited validation of modelling approaches, particularly at the level of individual participants, makes it difficult to conclude if any of the approaches give consistently better estimates than others. While muscle force modelling has clear potential to enhance clinical gait analyses future research is needed to improve validation, accuracy and feasibility of implementation in clinical practice.

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Gait adaptations in response to obstacle type in fallers with Parkinson's disease

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Abstract

BACKGROUND: Gait impairment places older adults and people with Parkinson's disease (PD) at an increased risk of falls when walking over obstacles. Increasing the height of obstacles results in greater challenge to balance however little is known about the demands encountered when negotiating obstacles of greater depth which may be greater for PD who often walk with a short, shuffling gait.

RESEARCH QUESTION: To describe gait adaptation in older adults and people with PD when walking over long and tall obstacles.

METHODS: 20 people with PD and 13 older adults with a history of falls walked across an instrumented walkway under four conditions: level walking, and over a small, long and tall obstacle. Differences due to group, step and obstacle type were evaluated using General Linear Models.

RESULTS: An increased step duration, longer single limb support and a wider step ($p < .033$) were observed when crossing the tall obstacle for both older adults and PD. The PD group completed the crossing steps more slowly than controls, with a shorter step and longer single limb support ($p < .043$). Obstacle type did not significantly influence step length. **SIGNIFICANCE:** The greatest temporal-spatial adaptations were elicited when participants negotiated the tall obstacle. Electing a wider step when crossing the tall obstacle was a strategy common to both faller groups (older adults and PD). The tall obstacle presented added challenge for PD who spent longer in single limb support during the crossing steps compared to controls. The long obstacle did not cause a disproportionate change in step length in people with PD, and we suggest that the obstacle may have acted as a visual cue in this group.

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Increased morbidity and mortality associated with falls among patients with cirrhosis

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Abstract

BACKGROUND: Injuries are more morbid and complicated to manage in patients with cirrhosis. However, data are limited regarding the relative risk of injury and severity of injury from falls in patients with cirrhosis compared to those without cirrhosis.

METHODS: We examined the nationally representative National Emergency Department Sample, an all-payer database including all patients presenting with falls 2009-2012. We determined the relative risks for and clinical associations with severe injuries. Outcomes included hospitalization, length of stay, costs, and in-hospital death. Outcomes were compared to patients with congestive heart failure.

RESULTS: We identified 102,977 visits involving patients with cirrhosis and 26,996,120 involving patients without cirrhosis who presented with a fall. Overall and compared to patients with congestive heart failure, the adjusted risk of severe injury was higher for patients with cirrhosis. These included intracranial hemorrhage (2.33 CI 2.02-2.68), skull fracture (1.75 CI 1.53-2.00) and pelvic fracture (1.71 CI 1.56-1.88) but lower for less severe injuries such as concussion (0.95, CI 0.86-1.06) and lower-leg fracture (0.86, CI 0.80-0.91). Risk factors significantly positively associated with severe injury on multivariate analysis were hepatic encephalopathy, alcohol abuse, and infection. Cirrhosis was associated with increased risk of in-hospital death, longer length of stay and higher costs after a fall. All outcomes were worse compared to patients with congestive heart failure

CONCLUSION: Falls are common in patients with cirrhosis and they are more likely to incur severe injuries, with increased hospital costs and risk of death. Poor outcomes are most associated with ascites, hepatic encephalopathy, alcohol abuse, and infection, highlighting the subgroups at highest risk and most likely to benefit from preventative interventions.

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Lycra splinting garments for adults with intellectual disabilities who fall due to gait or balance issues: a feasibility study

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Abstract

BACKGROUND: Adults with intellectual disabilities (IDs) experience high rates of falls and have high rates of gait or balance issues which contribute to falls. Lycra splinting garments (LSGs) have potential to improve gait or balance, but they have never before been tested with adults with IDs who fall due to gait or balance issues. The aim of this study was to test in adults with IDs, the feasibility of using LSGs to improve movement and function and reduce falls, whilst also exploring usability and likely compliance.

METHOD: A convenience sample of nine adults with IDs wore tailored LSGs over a 6-week

assessment period. Laboratory-based foot clearance, balance, and gait measures were collected pre- and post-LSG-wear. Falls charts and questionnaires on usability and likely compliance were also completed.

RESULTS: Seven participants experienced a reduction in falls during their six weeks of LSG wear; most notably in the group of five participants who wore lycra splinting socks, compared with only two in the group of four who wore lycra splinting shorts or leggings only.

CONCLUSION: Lycra splinting socks are likely to bring about positive outcomes for adults with IDs who fall due to gait/balance issues on an individual case by case basis over time, but further research is required to test this hypothesis under randomised controlled trial conditions. Potential benefits of more intrusive LSGs are outweighed by reported problems with usability and compliance.

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Monitoring walker assistive devices: a novel approach based on load cells and optical distance measurements

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Sensors (Basel) 2018; 18(2): s18020540.

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Abstract

This paper presents a measurement system intended to monitor the usage of walker assistive devices. The goal is to guide the user in the correct use of the device in order to prevent risky situations and maximize comfort. Two risk indicators are defined: one related to force unbalance and the other related to motor incoordination. Force unbalance is measured by load cells attached to the walker legs, while motor incoordination is estimated by synchronizing force measurements with distance data provided by an optical sensor. The measurement system is equipped with a Bluetooth link that enables local supervision on a computer or tablet. Calibration and experimental results are included in the paper.

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Technologies for advanced gait and balance assessments in people with multiple sclerosis

Shanahan CJ, Boonstra FMC, Cofré Lizama LE, Strik M, Moffat BA, Khan F, Kilpatrick TJ, van der Walt A, Galea MP, Kolbe SC.

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DOI 10.3389/fneur.2017.00708 **PMID** 29449825 **PMCID** PMC5799707

Abstract

Subtle gait and balance dysfunction is a precursor to loss of mobility in multiple sclerosis (MS). Biomechanical assessments using advanced gait and balance analysis technologies can identify these subtle changes and could be used to predict mobility loss early in the disease. This update critically

evaluates advanced gait and balance analysis technologies and their applicability to identifying early lower limb dysfunction in people with MS. Non-wearable (motion capture systems, force platforms, and sensor-embedded walkways) and wearable (pressure and inertial sensors) biomechanical analysis systems have been developed to provide quantitative gait and balance assessments. Non-wearable systems are highly accurate, reliable and provide detailed outcomes, but require cumbersome and expensive equipment. Wearable systems provide less detail but can be used in community settings and can provide real-time feedback to patients and clinicians. Biomechanical analysis using advanced gait and balance analysis technologies can identify changes in gait and balance in early MS and consequently have the potential to significantly improve monitoring of mobility changes in MS.

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The risk of traumatic brain injury occurring among patients with Parkinson's disease: a 14-year population-based study

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Abstract

BACKGROUND: Previous studies have implicated traumatic brain injury (TBI) as a risk factor for Parkinson's disease (PD). However, the incidence risk of new-onset TBI among patients with PD is not well established. This study investigated the contribution of PD to new-onset TBI associations.

MATERIAL AND METHODS: The study selected 6,076 patients with PD and using 1:2 propensity score matching 12,152 general population cohorts in a longitudinal population database in Taiwan. The Cox proportional hazard regression model was used to estimate the hazard ratio (HR) of TBI adjusted with the potential confounding factors.

RESULTS: The incidence of TBI in patients with PD (2.57%) and compared cohorts (1.81%) was significantly different ($p=0.0007$). Patients with PD had a higher risk of TBI (HR =1.63; 95% confidence interval [CI], 1.32-2.01) compared to the general population. Patients with PD with TBI incidence had a higher Charlson's comorbidity index score than the general population with TBI outcome ($p<0.0001$). Fall is the major cause of TBI in patients with PD.

CONCLUSIONS: This study demonstrated that patients with PD have a high risk of TBI, and the major cause of TBI in patients with PD is fall.

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The risks of sarcopenia, falls and fractures in patients with type 2 diabetes mellitus

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Maturitas 2018; 109: 70-77.

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Abstract

Fracture risk in patients with type 2 diabetes mellitus (T2DM) is increased, and the mechanism is multifactorial. Recent research on T2DM-induced bone fragility shows that bone mineral density (BMD) is often normal or even slightly elevated. However, bone turnover may be decreased and bone material and microstructural properties are altered, especially when microvascular complications are present. Besides bone fragility, extra-skeletal factors leading to an increased propensity to experience falls may also contribute to the increased fracture risk in T2DM, such as peripheral neuropathy, retinopathy and diabetes medication (e.g. insulin use). One of the probable additional contributing factors to the increased fall and fracture risks in T2DM is sarcopenia, the age-related decline in skeletal muscle mass, quality and function. Although the association between sarcopenia, fall risk, and fracture risk has been studied in the general population, few studies have examined the association between T2DM and muscle tissue and the risks of falls and fractures. This narrative review provides an overview of the literature regarding the multifactorial mechanisms leading to increased fracture risk in patients with T2DM, with a focus on sarcopenia and falls.

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