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### Comparisons of interventions for preventing falls in older adults: a systematic review and meta-analysis

Tricco AC, Thomas SM, Veroniki AA, Hamid JS, Cogo E, Striffler L, Khan PA, Robson R, Sibley KM, MacDonald H, Riva JJ, Thavorn K, Wilson C, Holroyd-Leduc J, Kerr GD, Feldman F, Majumdar SR, Jaglal SB, Hui W, Straus SE.

*J. Am. Med. Assoc. JAMA* 2017; 318(17): 1687-1699.

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#### Abstract

**IMPORTANCE:** Falls result in substantial burden for patients and health care systems, and given the aging of the population worldwide, the incidence of falls continues to rise.

**OBJECTIVE:** To assess the potential effectiveness of interventions for preventing falls. **DATA**

**SOURCES:** MEDLINE, Embase, Cochrane Central Register of Controlled Trials, and Ageline databases from inception until April 2017. Reference lists of included studies were scanned.

**STUDY SELECTION:** Randomized clinical trials (RCTs) of fall-prevention interventions for participants aged 65 years and older.

**DATA EXTRACTION AND SYNTHESIS:** Pairs of reviewers independently screened the studies, abstracted data, and appraised risk of bias. Pairwise meta-analysis and network meta-analysis were conducted.

**MAIN OUTCOMES AND MEASURES:** Injurious falls and fall-related hospitalizations.

**RESULTS:** A total of 283 RCTs (159 910 participants; mean age, 78.1 years; 74% women) were included after screening of 10 650 titles and abstracts and 1210 full-text articles. Network meta-analysis (including 54 RCTs, 41 596 participants, 39 interventions plus usual care) suggested that the following interventions, when compared with usual care, were associated with reductions in injurious falls: exercise (odds ratio [OR], 0.51 [95% CI, 0.33 to 0.79]; absolute risk difference [ARD], -0.67 [95% CI, -1.10 to -0.24]); combined exercise and vision assessment and treatment (OR, 0.17 [95% CI, 0.07 to 0.38]; ARD, -1.79 [95% CI, -2.63 to -0.96]); combined exercise, vision assessment and treatment, and environmental assessment and modification (OR, 0.30 [95% CI, 0.13 to 0.70]; ARD, -1.19 [95% CI, -2.04 to -0.35]); and combined clinic-level quality improvement strategies (eg, case management), multifactorial assessment and treatment (eg, comprehensive geriatric assessment), calcium supplementation, and vitamin D supplementation (OR, 0.12 [95% CI, 0.03 to 0.55]; ARD, -2.08 [95% CI, -3.56 to -0.60]). Pairwise meta-analyses for fall-related hospitalizations (2 RCTs; 516 participants) showed no significant association between combined clinic- and patient-level quality improvement strategies and multifactorial assessment and treatment relative to usual care (OR, 0.78 [95% CI, 0.33 to 1.81]).

**CONCLUSIONS AND RELEVANCE:** Exercise alone and various combinations of interventions were associated with lower risk of injurious falls compared with usual care. Choice of fall-prevention intervention may depend on patient and caregiver values and preferences.

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## Cross-cultural validation of the Modified Falls Efficacy Scale in Serbian community-dwelling women at risk for osteoporotic fracture

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*Menopause* 2017; ePub(ePub): ePub.

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### Abstract

**OBJECTIVE:** Cross-cultural validation of the Serbian version of the Modified Falls Efficacy Scale (MFES).

**METHODS:** This cross-sectional study involved 257 women aged 65 years and above who were referred for dual-energy x-ray absorptiometry examination at the Railway Healthcare Institute in Belgrade, Serbia, between January and April 2016. Data collection comprised of a sociodemographic questionnaire and Geriatric Depression Scale-Short Form (GDS-SF) questionnaire, and data related to fractures, level of physical activity, use of medications that can increase the risk of falls, and frequency of falls in the past 12 months. None of the study participants had been previously treated for osteoporosis. The internal consistency of the questionnaire items was assessed via Cronbach's alpha, whereas the interclass correlation coefficient (ICC) was used to calculate test-retest reliability based on the sample of 257 women. We also evaluated concurrent, convergent, and construct validity.

**RESULTS:** Cronbach's alpha for the total assay score was 0.98. Correlations among the items ranged from 0.84 to 0.93. While ICC for the scale as a whole was 0.99 (95% confidence interval 0.98-0.99), ICC pertaining to individual items ranged from 0.82 to 0.99. Concurrent validity analysis revealed a significant positive correlation between MFES scores and the reported level of physical activity ( $\rho=0.34$ ;  $P<0.01$ ). Convergent validity was tested through the ratio of MFES and sociodemographic variables. The findings indicated presence of a significant negative correlation between the MFES scores and age ( $\rho=-0.32$ ;  $P<0.01$ ), age of menopause onset ( $\rho=-0.16$ ;  $P=0.01$ ), and GDS-SF scores ( $\rho=-0.12$ ;  $P=0.04$ ), and positive correlation between MFES and the level of social activity ( $\rho=0.22$ ;  $P<0.01$ ). Significant differences were noted between the MFES scores of participants who had no history fractures and those who did ( $U=5277.50$ ;  $P<0.01$ ), and between scores of women who reported falling in the past 12 months and those who did not ( $U=4968.50$ ;  $P<0.01$ ). Similarly, significant differences ( $P<0.01$ ) in the scores pertaining to each MFES item were observed between women who had experienced falls in the past ( $n=101$ ) and those who had not ( $n=156$ ).

**CONCLUSION:** The Serbian version of the MFES is a reliable and valid instrument that can be used in both clinical practice and research to describe and measure self-perceived fear of falling in older individuals.

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### **Educating and engaging older adults in the Sure Steps® fall prevention program**

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Home Healthc. Now 2017; 35(10): 542-548.

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#### **Abstract**

Falls are the leading cause of fatal and nonfatal injuries among adults 65 years and older. Each year, one in three older adults experiences a fall, and people who fall are more likely to fall again. According to the National Council on Aging (2017), instituting evidence-based falls prevention programs can significantly decrease falls. The purpose of this article is to describe a pilot study that examined the impact of the Sure Steps Fall Prevention Program on incidence of falls among adults 65 and older living in their home. A convenience sample of 10 community-dwelling participants aged 65 and older was recruited. After the Sure Steps Fall Prevention Program was implemented, participants were contacted by telephone monthly for 1 year. None of the participants reported falls during that time. Based on the findings of this pilot study, the Visiting Nurse Association implemented the Sure Steps Fall Prevention Program into their other four clinical sites.

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### **Educational inequalities in falls mortality among older adults: population-based multiple cause of death data from Sweden**

Ahmad Kiadaliri A, Turkiewicz A, Englund M.

*J. Epidemiol. Community Health* 2017; ePub(ePub): ePub.

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**DOI** 10.1136/jech-2017-209616 **PMID** 29101216

#### **Abstract**

**BACKGROUND:** Falls are the leading cause of fatal injuries among elderly adults. While socioeconomic status including education is a well-documented predictor of many individual health outcomes including mortality, little is known about socioeconomic inequalities in falls mortality among adults. This study aimed to assess educational inequalities in falls mortality among older adults in Sweden using multiple cause of death data.

**METHODS:** All residents aged 50–75 years in the Skåne region, Sweden, during 1998–2013 (n=566 478) were followed until death, relocation outside Skåne or end of 2014. We identified any mention of falls on death certificates (n=1047). We defined three levels of education. We used an additive hazards model and Cox regression with age as time scale adjusted for marital status and country of birth to calculate slope and relative indices of inequality (SII/RII). We also computed the population attributable fraction of lower educational attainment. Analyses were performed separately for men and women.

**RESULTS:** Both SII and RII revealed statistically significant educational inequalities in falls mortality among men in favour of high educated (SII (95% CI): 15.5 (9.8 to 21.3) per 100 000 person-years; RII: 2.19 (1.60 to 3.00)) but not among women. Among men, 34% (95% CI 19 to 46) of falls deaths were attributable to lower education.

**CONCLUSIONS:** There was an inverse association between education and deaths from falls among men but not women. The results suggest that individual's education should be considered in falls reduction interventions.

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### **Effect of vitamin D on falls and physical performance**

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*Endocrinol. Metab. Clin. North Am.* 2017; 46(4): 919-933.

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#### **Abstract**

Recent understanding has highlighted the importance of extraskeletal role of vitamin D. Despite numerous observational and interventional studies over the last two decades, the apparent divergent clinical findings have intensified the controversy regarding this role of vitamin D in older adults. This article reviews the existing literature and summarizes the current knowledge of vitamin D status and vitamin D supplementation on falls and physical performance, describes the putative mechanisms underlying this association, and reflects on the controversy surrounding vitamin D recommendations in older adults.

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### **Examining the effect of medication adherence on risk of subsequent fracture among women with a fragility fracture in the U.S. Medicare population**

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*J. Manag. Care Spec. Pharm.* 2017; 23(11): 1178-1190.

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(Copyright © 2017, Academy of Managed Care Pharmacy)

**DOI** 10.18553/jmcp.2017.17054 **PMID** 29083977

#### **Abstract**

**BACKGROUND:** In the United States, osteoporosis affects approximately 10 million people, of whom 80% are women, and it contributes a significant clinical burden to the community. Poor adherence to osteoporosis medications adds to the overall burden of illness.

**OBJECTIVE:** To examine the association of osteoporosis medication adherence and the risk of a subsequent fracture among Medicare-enrolled women with a previous fragility fracture.

**METHODS:** This study was a retrospective observational analysis of U.S. administrative claims data among female Medicare beneficiaries who had a nontrauma closed fragility fracture between January 1, 2011, and December 31, 2011. Patients were required to have continuous medical and pharmacy enrollment 12 months pre- and postfracture date. In addition, patients were required to have an osteoporosis medication prescription for a bisphosphonate (alendronate, risedronate, pamidronate, etidronate, zoledronate, and tiludronate), calcitonin, denosumab, raloxifene, or

teriparatide during the follow-up period. Adherence was calculated using cumulative medication possession ratio (MPR) from the treatment initiation date in 30-day increments. MPR was stratified into high adherence (MPR  $\geq$  80%), moderate adherence ( $50\% \leq$  MPR  $<$  80%), and low adherence (MPR  $<$  50%). Outcomes included first subsequent fracture after treatment initiation; patients were censored at treatment discontinuation, or end of the 12-month period posttreatment initiation. Covariates included demographics, comorbidities, osteoporosis medications, medications associated with falls, and health care utilization. Cox regression was used to model subsequent fractures with time-dependent cumulative MPR.

**RESULTS:** Of the 1,292,248 Medicare enrollees who had a fracture in 2011, a total of 103,852 (8.0%) women aged  $\geq$  65 years with a fragility fracture were identified. Overall, 27,736 (26.7%) patients were treated with osteoporosis medication within 12 months of the fragility fracture (mean time to treatment initiation was  $85.0 \pm 84.6$  days). Over half of the patients were highly adherent (MPR  $\geq$  80%) to osteoporosis medications during the follow-up ( $n = 14,112$ ; 50.9%). Almost a third of the patients had low adherence (MPR  $<$  50%;  $n = 9,022$ , 32.5%), followed by patients with moderate adherence ( $50\% \leq$  MPR  $<$  80%;  $n = 4,602$ , 16.6%). After adjusting for demographics and clinical characteristics, patients with low and moderate adherence to osteoporosis medications were 33% (hazard ratio [HR] = 1.33; 95% CI = 1.17-1.50,  $P <$  0.001) and 19% (HR = 1.19; 95% CI = 1.02-1.38,  $P = 0.026$ ) more likely to have a subsequent fracture, respectively, compared with patients with high adherence. Low adherence patients had a 32% and 34% increased risk for a hip/pelvis/femur fracture (HR = 1.32; 95% CI = 1.09-1.59,  $P = 0.005$ ) and a clinical vertebral fracture (HR = 1.34; 95% CI = 1.09-1.63,  $P = 0.005$ ), respectively, compared with high adherence patients.

**CONCLUSIONS:** Medicare-enrolled women with low and moderate adherence to osteoporosis medications had a higher risk of a subsequent fracture compared with high adherence patients. These results highlight the importance of improving osteoporosis medication adherence among women enrolled in Medicare.

**DISCLOSURES:** This study was funded by Eli Lilly. Xie, Keshishian, and Baser are employees of STATinMED Research, a paid consultant to Eli Lilly in connection with the study design, data analysis, and development of the manuscript for this study. Boytsov, Burge, Lombard, and Zhang are employees and stock owners of Eli Lilly. At the time of research, Krohn was an employee of Eli Lilly. Study concept and design were contributed by Burge and Lombard, along with the other authors. Xie, Baser, and Keshishian took the lead in data collection, assisted by the other authors. Data interpretation was performed by Krohn and Zhang, with assistance from the other authors. The manuscript was written by Keshishian and Boytsov, along with the other authors, and revised by Boytsov, Keshishian, and Burge, along with the other authors.

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#### **Falls self-efficacy and falls incidence in community-dwelling older people: the mediating role of coping**

Loft CC, Jones FW, Kneebone II.

*Int. Psychogeriatr.* 2017; ePub(ePub): ePub.

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(Copyright © 2017, Cambridge University Press)

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#### **Abstract**

**BACKGROUND:** A cognitive behavioral model predicts that coping responses mediate the relationship between falls related psychological concerns and falls incidence, in community-dwelling older people. If empirical support could be found for this pathway then interventions could be developed to reduce falls risk by targeting coping strategies. Therefore, this study aimed to begin the process of testing whether coping responses mediate the association between falls self-efficacy (a principal element of falls related psychological concerns) and falls incidence, in community-dwelling older people.

**METHOD:** In a cross-sectional design, 160 community-dwelling older people (31 male, 129 female; mean age 83.47 years) completed the Falls Efficacy Scale-International, the Revised-Ways of Coping Questionnaire, the Turning to Religion subscale of the COPE, and a falls questionnaire. Data were analyzed via mediation analysis using a bootstrapping approach.

**RESULTS:** Lower falls self-efficacy was associated with higher falls incidence, and more self-controlling coping was found to be a partial mediator of this association, with a confidence interval for the indirect effect of (0.003, 0.021) and an effect size of  $\kappa^2 = 0.035$ . The association was not mediated by the other measured coping responses; namely, turning to religion, distancing, seeking social support, accepting responsibility, escape-avoidance, planful problem-solving, and positive reappraisal.

**CONCLUSIONS:** Self-controlling coping may mediate the association between falls self-efficacy and falling. If longitudinal studies confirm this finding then coping could be targeted in interventions to reduce falls.

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#### **Global performance of executive function is predictor of risk of frailty and disability in older adults**

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*J. Nutr. Health Aging* 2017; 21(9): 980-987.

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#### **Abstract**

**INTRODUCTION:** The executive function is a complex set of skills affected during the aging process and translate into subclinical cerebrovascular disease. Postural instability or motor slowness are some clinical manifestations, being consubstantial with the frailty phenotype, genuine expression of aging. Executive dysfunction is also considered a predictor of adverse health events in the elderly.

**AIM:** To study whether the executive dysfunction can be used as an early marker for frailty and the viability of use as a predictor of mortality, hospitalization and/or disability in a Mediterranean population.

**DESIGN:** A population-based cohort study using data from the Toledo Study for Healthy Aging (TSHA).

**METHODS:** 1690 Spanish elders aged  $\geq 65$  years underwent a neuropsychological evaluation in order to measure executive function. To assess whether the accumulation of dysfunctions (in severity and amplitude) could increase the predictive value of adverse health events in relation to each dimension separately an executive dysfunction cumulative index was constructed. Cox proportional



hazards model was used to examine mortality and hospitalization over 5.02 and 3.1 years of follow-up, respectively.

**RESULTS:** Executive dysfunction is a powerful predictor of mortality, frailty and disability. Cumulative differences in executive function are associated with high risk of frailty and disability, thus, for each one point increment in the executive function index, the risk of death increased by 7 %, frailty by 13% and disability by 11% ( $P < 0.05$ ). Moreover, the executive impairment exhibits a strong positive tendency with age, comorbidity and mortality.

**CONCLUSIONS:** Cumulative differences in four executive dimensions widely used in clinical practice improves the ability to predict frailty and disability compared to each dimension separately.

#### **PDF Y Endnote Y**

##### **Implementation of a fall screening program in a high risk of fracture population**

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*Arch. Osteoporos.* 2017; 12(1): e96.

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#### **Abstract**

Fall prevention is an important way to prevent fractures in person with osteoporosis. We developed and implemented a fall screening program in the context of routine osteoporosis care. This program was found to be feasible and showed that a significant proportion of persons with osteoporosis are at risk of falling.

**PURPOSE:** Falls are the most common cause of fracture in persons with osteoporosis. However, osteoporosis care rarely includes assessment and prevention of falling. We thus sought to assess the feasibility of a fall screening and management program integrated into routine osteoporosis care.

**METHODS:** The program was developed and offered to patients with osteoporosis or osteopenia seen at an outpatient clinic between May 2015 and May 2016. Feasibility was measured by physical therapist time required to conduct screening and ease of integrating the screening program into the usual clinic workflow. Self-report responses and mobility testing were conducted to describe the fall and fracture risk profile of osteoporosis patients screened. Effects on fall-related care processes were assessed via chart abstraction of patient participation in fall prevention exercise.

**RESULTS:** Of the 154 clinic patients who presented for a clinic visit, 68% met screening criteria and completed in two thirds of persons. Screening was completed in a third of the time typically allotted for traditional PT evaluations and did not interfere with clinic workflow. Forty percent of those screened reported falling in the last year, and over half had two or more falls in the past year. Over half reported a balance or lower extremity impairment, and over 40% were below norms on one or more performance tests. Most patients who selected a group exercise fall prevention program completed all sessions while only a quarter completed either supervised or independent home-based programs.

**CONCLUSIONS:** Implementation of a fall risk screening program in an outpatient osteoporosis clinic appears feasible. A substantial proportion of people with osteoporosis screened positive for being at risk of falling, justifying integration of fall prevention into routine osteoporosis care.

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### **Methodological challenges in a study on falls in an older population of Cape Town, South Africa**

Kalula SZ, Ferreira M, Swingler GH, Badri M, Sayer AA.

*Afr. Health Sci.* 2017; 17(3): 912-922.

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**DOI** 10.4314/ahs.v17i3.35 **PMID** 29085420 **PMCID** PMC5656198

#### **Abstract**

**BACKGROUND:** Falls are a major cause of disability, morbidity and mortality in older persons, but have been under researched in developing countries.

**OBJECTIVE:** To describe challenges encountered in a community-based study on falls in a multi-ethnic population aged  $\geq 65$  years in a low-income setting.

**METHODS:** The study was conducted in four stages: A pilot study (n=105) to establish a sample size for the survey. An equipment validation study (n=118) to use for fall risk determination. A cross-sectional baseline (n=837) and a 12-month follow-up survey (n=632) to establish prevalence and risk factors for falls.

**RESULTS:** Prevalence rate of 26.4% (95% CI 23.5-29.5%) and risk factors for recurrent falls: previous falls, self-reported poor mobility and dizziness were established. Adaptations to the gold standard prospective fall research study design were employed: 1) to gain access to the study population in three selected suburbs, 2) to perform assessments in a non-standardised setting, 3) to address subjects' poverty and low literacy levels, and high attrition of subjects and field workers.

**CONCLUSION:** Studies on falls in the older population of low- to middle-income countries have methodological challenges. Adaptive strategies used in the Cape Town study and the research experience reported may be instructive for investigators planning similar studies in such settings.

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### **Moving from laboratory to real life conditions: influence on the assessment of variability and stability of gait**

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*Gait Posture* 2017; 59: 248-252.

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**DOI** 10.1016/j.gaitpost.2017.10.024 **PMID** 29100144

#### **Abstract**

The availability of wearable sensors allows shifting gait analysis from the traditional laboratory settings, to daily life conditions. However, limited knowledge is available about whether alterations associated to different testing environment (e.g. indoor or outdoor) and walking protocols (e.g. free or controlled), result from actual differences in the motor behaviour of the tested subjects or from the sensitivity to these changes of the indexes adopted for the assessment. In this context, it was hypothesized that testing environment and walking protocols would not modify motor control stability in the gait of young healthy adults, who have a mature and structured gait pattern, but rather the variability of their motor pattern. To test this hypothesis, data from trunk and shank inertial sensors were collected from 19 young healthy participants during four walking tasks in



different environments (indoor and outdoor) and in both controlled (i.e. following a predefined straight path) and free conditions.

RESULTS confirmed what hypothesized: variability indexes (Standard deviation, Coefficient of variation and Poincaré plots) were significantly influenced by both environment and walking conditions. Stability indexes (Harmonic ratio, Short term Lyapunov exponents, Recurrence quantification analysis and Sample entropy), on the contrary, did not highlight any change in the motor control. In conclusion, this study highlighted an influence of environment and testing condition on the assessment of specific characteristics of gait (i.e. variability and stability). In particular, for young healthy adults, both environment and testing conditions affect gait variability indexes, whereas neither affect gait stability indexes.

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### **The 3-m backwards walk and retrospective falls: diagnostic accuracy of a novel clinical measure**

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*J. Geriatr. Phys. Ther.* 2017; ePub(ePub): ePub.

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#### **Abstract**

**BACKGROUND AND PURPOSE:** Several measures of fall risk have been previously developed and include forward walking, turning, and stepping motions. However, recent research has demonstrated that backwards walking is more sensitive at identifying age-related changes in mobility and balance compared with forward walking. No clinical test of backwards walking currently exists. Therefore, this article describes a novel clinical test of backwards walking, the 3-m backwards walk (3MBW), and assessed whether it was associated with 1-year retrospective falls in a population of healthy older adults. Diagnostic accuracy of the 3MBW was calculated at different cutoff points and compared with existing clinical tests.

**METHODS:** This study was a retrospective cohort study including residents of a retirement community without a history of neurological deficits. Demographics, medical history, and falls in the past year were collected, and clinical tests included the 3MBW and the Timed Up and Go (TUG), the 5 times sit-to-stand, and the 4-square step test. Frequency distributions and t tests compared baseline characteristics of people who reported falling with people who did not. Diagnostic accuracy (sensitivity and specificity) was calculated for a series of cutoffs for the 3MBW, the TUG ( $\geq 8$ , 10, and 13.5 seconds), 5 times sit-to-stand ( $\geq 12$  and  $\geq 15$  seconds), and 4-step square test ( $> 15$  seconds). Receiver operating curve analyses were used to define 3MBW optimal cutoffs, and the difference between the overall area under the curve (AUC) was statistically tested. SPSS 24.0 and MedCalc 17.1 were used for all analyses.

**RESULTS AND DISCUSSION:** Fifty-nine adults with a mean (SD) age of 71.5 (7.6) years participated, with 25 people reporting falls in the past year. The mean (SD) time for the 3MBW was 4.0 (2.1) seconds. People who fell had a significantly slower 3MBW time (4.8 vs 3.5 seconds for people who did not fall,  $P = .015$ ), but not a significantly slower 4-step square test (9.5 vs 8.1 seconds,  $P = .056$ ), TUG (9.3 vs 8.0 seconds,  $P = .077$ ), and 5 times sit-to-stand (12.5 vs 10.3 seconds,  $P = .121$ ). The

highest overall AUC for any measure was for the 3MBW at 3.5 seconds (0.707, 95% confidence interval = 0.570-0.821; sensitivity = 74%, specificity = 61%), which was significantly higher than the TUG at 8 seconds (AUC = 0.560,  $P = .023$ ) and 13.5 seconds (AUC = 0.528,  $P = .011$ ), the 4-step square test (AUC = 0.522,  $P = .004$ ), but not significantly higher than the TUG at 10 seconds ( $P = .098$ ) and the 5 times sit-to-stand at 12 ( $P = .092$ ) or 15 seconds ( $P = .276$ ). On the 3MBW, more than 75% of people who were faster than 3.0 seconds did not report any falls, and 94% of people who did not report falling were faster than 4.5 seconds. Of the people who were slower than 4.5 seconds, 81% reported falling.

**CONCLUSIONS:** In a study of healthy older adults, the 3MBW demonstrated similar or better diagnostic accuracy for falls in the past year than most commonly used measures. People walking faster than 3.0 seconds on the 3MBW were unlikely to have reported falling, whereas people slower than 4.5 seconds were very likely to have reported falling. Further validation of the 3MBW in prospective studies, larger samples, and clinical populations is recommended.

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##### **The temporal association between executive function and life-space mobility in old age**

Poranen-Clark T, von Bonsdorff MB, Rantakokko M, Portegijs E, Eronen J, Pynnönen K, Eriksson JG, Viljanen A, Rantanen T.

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#### Abstract

**BACKGROUND:** Life-space mobility, an indicator of community mobility, describes person's movements in terms of the distance from home, the frequency of movement and the need of assistance for movement. Executive function (EF) is a higher order cognitive function that supervises motor control, and plays a key role in a person's ability to function independently. Cognitive impairment often co-occurs with restricted life-space mobility, however, the direction of the longitudinal associations between EF and life-space mobility is unclear. The aim of this study was to investigate the temporal associations between EF and life-space mobility among community-dwelling older people.

**METHODS:** 108 community-dwelling persons aged 76 to 91 years participated in the two-year follow-up study. Executive function was measured with the Trail Making Test (TMT). The Life-Space Assessment (range 0-120, higher scores indicate more mobility) was used to assess life-space mobility. Cross-lagged model design was used to examine longitudinal relationship between EF and life-space mobility. The model was adjusted for age and gender.

**RESULTS:** Average age of participants at baseline was 82.2 (SD 4.1) years and 59% were women. Better EF at baseline predicted higher life-space mobility at follow-up (path coefficient = 3.81, 95% Confidential Interval; 0.84, 6.78,  $p = 0.012$ ), while baseline life-space mobility did not predict EF at follow-up.

**CONCLUSION:** Executive function was a determinant of life-space mobility. Supporting EF may enhance maintaining independence and active participation in old age.

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**Trends in fall-related ambulance use and hospitalisation among older adults in NSW, 2006-2013: a retrospective, population-based study**

Paul SS, Harvey L, Carroll T, Li Q, Boufous S, Priddis A, Tiedemann A, Clemson L, Lord SR, Muecke S, Close JC, Lo S, Sherrington C.

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**Abstract**

**OBJECTIVE** and importance of study: To describe characteristics and temporal trends of fall-related ambulance service use and hospital admission in older adults in New South Wales (NSW), Australia. Such information will facilitate a more targeted approach to planning and delivery of health services to prevent falls and their adverse sequelae in different groups of older adults. **STUDY TYPE:** Retrospective population-based descriptive study.

**METHODS:** Fall-related ambulance use and hospital admissions for all falls and injurious falls in NSW residents aged  $\geq 65$  years between 2006 and 2013 were obtained from two discrete sources of routinely collected data. Rates of use are presented descriptively.

**RESULTS:** There were 314 041 occasions of fall-related ambulance use by older adults and 331 311 fall-related hospitalisations, of which 69% ( $n = 227\ 753$ ) were for injurious falls. Fractures accounted for 57% of injurious hospitalisations. Slips and trips were the most common mechanism of falls requiring hospitalisation (52%). Residents of aged care facilities had a greater proportion of fall injury hospitalisations compared with people living in the community (85% and 65%, respectively).

**CONCLUSIONS:** Rates of fall-related ambulance use and hospitalisation were similar and continued to increase over time. Increased effort is needed to prevent falls and associated injury among older people in NSW, particularly among people living in aged care facilities. Ongoing monitoring of rates and the characteristics of people who fall are needed to determine the long-term impact of fall prevention interventions.

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**Understanding older adult's technology adoption and withdrawal for elderly care and education: mixed method analysis from national survey**

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**Abstract**

**BACKGROUND:** Elderly adults have comprised the fastest growing population adopting the Internet and computer technology over the past decade. However, how their experiences can shed light on elderly learning theory has not been examined much in the literature.

**OBJECTIVE:** This study investigated the factors and reasons associated with Internet adoption and withdrawal among older adults in Taiwan, and if any gender differences exist in this context.

**METHODS:** Data on participants aged 50 years and older from the nationally representative "Digital Opportunity Survey on Individuals and Households in Taiwan," who did not use the Internet in 2005 but adopted it in 2007 (n=1548), and those who reported using Internet in 2011 but then withdrew (n=1575), were analyzed. Factors and reasons associated with Internet adoption and withdrawal were examined using both quantitative and qualitative data.

**RESULTS:** Education level independently predicted Internet adoption behavior. With regard to the reasons for adoption, 66% (62/94) of participants indicated they started using the Internet to meet certain "needs"; for example, "keeping up with the world" (40.4%, 38/94) was listed as the most critical reason, followed by "job needs" (25.5%, 24/94). Older adults with a positive attitude toward the Internet with regard to increasing employment opportunities (OR 2.0, 95% CI 1.0-3.9, P=.04) and the amount of information obtained (OR 0.5, 95% CI 0.3-0.9, P=.01), as well as enriching recreation and entertainment (OR 0.6, 95% CI 0.4-0.9, P=.02), were less likely to withdraw from the Internet. The most common reason for Internet withdrawal was "psychological barriers" (eg, no available time, no meaningful use, or nothing worth reading/watching; 66.3%, 193/291), followed by "health barriers" (eg, eyes or body deteriorate with Internet use; 21.0%, 61/291). Although psychological barriers were the most important factor for Internet withdrawal for both men (72.5%, 100/138) and women (62%, 93/150), women were more likely than men to be affected by health barriers (26.0%, 39/150 vs 15.9%, 22/138; P=.004) and anthropic factors or accidental barriers (7.3%, 11/150 vs 2.9%, 4/138; P=.02).

**CONCLUSIONS:** Our findings that the need to keep up with the world associated with Internet adoption, and gender differences in reasons behind Internet withdrawal, such that women reported more health and anthropic factors or accidental barriers than man, may provide a new perspective that help health educators understand strategies that encourage older adults to keep learning, an important component of active aging.

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#### Use of antiepileptic drugs and risk of falls in old age: a systematic review

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#### Abstract

**OBJECTIVE:** The aim of this study is to systematically review the scientific literature to investigate if use of antiepileptic drugs (AEDs) is associated with falls and/or recurrent falls in old age.

**METHOD:** We searched the literature for relevant articles in PubMed and Embase published up until 3rd December 2015. Studies on people aged 60 years and over with an observational design assessing the risk of fall in people exposed to AEDs compared to people not exposed to AED were included.

**RESULTS:** We found 744 studies by searching Medline and Embase and an additional 9 studies by reviewing relevant reference lists. Of these studies, 13 fulfilled our predefined criteria. The articles were of various study design, sizes and follow-up times, and presented the results in different ways. Also, confounder adjustment varied considerably between the studies. Ten studies presented results for the association between use of any AED and any fall/injurious fall. Of these studies, 6 presented

adjusted estimates, of which all but one showed statistically significant associations between use of any AED and any fall/injurious fall. Six studies investigated the association between use of any AED and recurrent falls. Of these, only 3 studies presented adjusted effect estimates of which 2 reached statistical significance for the association between use of AEDs and recurrent falls in elderly people.

**CONCLUSION:** Our results indicate an association between use of AEDs and risk of falls and recurrent falls in older people. This finding may be clinically important given that a substantial amount of older people use these drugs. However, further research is needed to increase the knowledge about the actual risk of falls when using these drugs in old age.

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