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A cross-sectional evaluation of the prevalence and detection of predictors of polypharmacy amongst adult in Spain

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DOI 10.1111/ijpp.12386 **PMID** 28795462

Abstract

OBJECTIVE: To investigate the association between polypharmacy and sociodemographic factors as well as health status, determinants of health and healthcare use, illness and use of prescribed medicines amongst adults in Spain.

METHODS: Data from the 2009 European Health Interview Survey in Spain which included 22 188 subjects were used. Polypharmacy was defined as the use of five or more prescribed medicines. The association between polypharmacy and several variables was assessed by means of bivariate analysis and logistic regression analysis (adjusted by age and gender). **KEY FINDINGS:** Amongst study participants, 15.8% were on prescribed polypharmacy (19.3%, women; 10.3%, men ($P < 0.001$)). A number of sociodemographic factors (e.g. age, gender, educational level), health status factors (e.g. limitation in daily activities, self-perception of health, presence of chronic disease) and other health-related factors (e.g. smoking, alcohol drinking, physical activity) have been studied and have been found to play a role in polypharmacy. Logistic regression analysis provided three variables which together with age could be used to predict polypharmacy.

CONCLUSION: In Spain, approximately 16% of people who take medicines are on polypharmacy and this is more frequent in women and amongst older adults. From our study, we can conclude that the variables which can predict a higher likelihood of polypharmacy are, together with age, prescribed antidepressants, and prescribed medicines for back/neck pain and joint pain. This may provide a tool for health professionals to readily assess polypharmacy appropriateness in polymedicated patients.

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PDF Y Endnote Y

A falls prevention programme to improve quality of life, physical function and falls efficacy in older people receiving home help services: study protocol for a randomised controlled trial

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Abstract

BACKGROUND: Falls and fall-related injuries in older adults are associated with great burdens, both for the individuals, the health care system and the society. Previous research has shown evidence for the efficiency of exercise as falls prevention. An understudied group are older adults receiving home help services, and the effect of a falls prevention programme on health-related quality of life is unclear. The primary aim of this randomised controlled trial is to examine the effect of a falls

prevention programme on quality of life, physical function and falls efficacy in older adults receiving home help services. A secondary aim is to explore the mediating factors between falls prevention and health-related quality of life.

METHODS: The study is a single-blinded randomised controlled trial. Participants are older adults, aged 67 or older, receiving home help services, who are able to walk with or without walking aids, who have experienced at least one fall during the last 12 months and who have a Mini Mental State Examination of 23 or above. The intervention group receives a programme, based on the Otago Exercise Programme, lasting 12 weeks including home visits and motivational telephone calls. The control group receives usual care. The primary outcome is health-related quality of life (SF-36). Secondary outcomes are leg strength, balance, walking speed, walking habits, activities of daily living, nutritional status and falls efficacy. All measurements are performed at baseline, following intervention at 3 months and at 6 months' follow-up. Sample size, based on the primary outcome, is set to 150 participants randomised into the two arms, including an estimated 15-20% drop out. Participants are recruited from six municipalities in Norway.

DISCUSSION: This trial will generate new knowledge on the effects of an exercise falls prevention programme among older fallers receiving home help services. This knowledge will be useful for clinicians, for health managers in the primary health care service and for policy makers. **TRIAL REGISTRATION:** ClinicalTrials.gov. NCT02374307. First registration, 16/02/2015.

PDF Y Endnote Y

Association of psychotropic drug use with falls among older adults in Germany. Results of the German Health Interview and Examination Survey for Adults 2008-2011 (DEGS1)

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Abstract

PURPOSE: To investigate the association of psychotropic drug use with falls among older adults in Germany based on data from the National Health Interview and Examination Survey for Adults 2008-2011 (DEGS1).

METHODS: DEGS1 collected data on drug use in the past 7 days and on falls occurred in the last 12 months. Study participants were older adults aged 65-79 years with complete data on drug use and falls (N = 1,833). Odds ratio (OR) and 95% confidence intervals (95% CI) were derived from logistic regression models adjusting for potential confounders including socio-demographic characteristics, health-related behaviors (alcohol drinking), body mass index and health conditions (frailty, vision impairment, disability, polypharmacy, blood pressure) as well as use of potential falls-risk-increasing drugs. SPSS complex sample methods were used for statistical analysis.

RESULTS: Compared to people without falls, people with falls (n = 370) had a higher psychotropic drug use (33.1% vs. 20.7%, p < .001). After adjusting for potential confounders, use of psychotropic drugs overall was associated with a higher risk of falls (OR 1.64, 95% CI 1.14-2.37). This was particularly true for the use of synthetic psychotropic drugs (1.57, 1.08-2.28), antidepressants overall (2.88, 1.63-5.09) or synthetic antidepressants (2.66, 1.50-4.73), specifically, selective serotonin reuptake inhibitors (SSRIs) (6.22, 2.28-17.0). Similar results were found for recurrent falls.

CONCLUSIONS: Use of psychotropic drugs overall, especially synthetic antidepressants like SSRIs, is associated with higher risks of falls and recurrent falls among community dwelling older adults aged 65-79 years in Germany.

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Baseline predictors of antipsychotic treatment continuation and response at week 8 in patients with Alzheimer's disease with psychosis or aggressive symptoms: an analysis of the CATIE-AD Study

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(Copyright © 2017, IOS Press)

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Abstract

BACKGROUND/OBJECTIVE: The aim of the present study was to investigate predictors of atypical antipsychotic (AAP) treatment continuation and response by week 8 in patients with Alzheimer's disease (AD) who have psychotic/aggressive symptoms using the Clinical Antipsychotic Trials of Intervention Effectiveness-Alzheimer's Disease (CATIE-AD) dataset.

METHODS: Clinical data was utilized from 421 AD outpatients with psychotic/aggressive symptoms who needed interventional treatment. Logistic regression analyses were performed to examine which baseline sociodemographic and clinical characteristics contributed to treatment 'continuation' and 'response', the latter of which was evaluated by the Clinical Global Impression of Change (CGI-C), Neuropsychiatric Inventory (NPI), and Brief Psychiatric Scale (BPRS).

RESULTS: The treatment continuation rate was 48.7%, and CGI-C, NPI, and BPRS response rate by the last observation carried forward method were 42.7%, 48.6%, and 37.5%, respectively. No significant predictor was identified for treatment continuation in the Caucasian patients (n = 331), while better treatment response was predicted by a lower Mini-Mental State Examination score, treatment with risperidone (versus olanzapine and quetiapine), history of diabetes mellitus, healthier physical status, and more severe initial psychotic symptoms.

CONCLUSIONS: Comparatively high intolerability from AAPs in the short term was confirmed. We found that baseline clinical predictors to treatment response in Caucasian AD patients with psychotic/aggressive symptoms include treatment with risperidone (versus quetiapine and olanzapine), diabetes mellitus, global physical status, cognitive impairment, and psychotic symptoms. Going forward, these findings may help to determine treatment strategies or care plans.

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Community-dwelling older adults' adherence to environmental fall prevention recommendations

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Abstract

This study examined the impact of personalized versus generalized education about environmental fall prevention recommendations on older adults' adherence with recommendations. Secondary aims focused on the impact of recent falls and perceived susceptibility of future falls on adherence with recommendations. Twenty-four community-dwelling older adults aged 65 to 89 years were randomized into two groups to receive either personalized or generalized education intervention on environmental fall prevention recommendations. A significant difference was found in the mean total percentage of adherence with recommendations of those receiving personalized education (69%) compared with those receiving generalized education (37%). No statistically significant relationship was found between sustaining recent falls, nor perceived susceptibility to future falls, and their extent of adherence with environmental fall prevention recommendations. Providing personalized education for environmental fall prevention recommendations may improve older adults' adherence with the recommendations given.

PDF Y Endnote Y

Determinants of functional outcome in hip fracture: the role of comorbidity

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Abstract

BACKGROUND AND AIMS: Executed studies did not clearly identify which index of comorbidity was an independent outcome determinant. The aim of this prospective observational cohort study was to address this issue.

METHODS: We analyzed 200 consecutive patients with hip fracture. All patients underwent rehabilitation. At admission comorbidity was assessed through the cumulative severity, severity index, and comorbidity index of the Cumulative Illness Rating Scale. Discharge scores and effectiveness in the Functional Independence Measure motor subscale, and discharge destination were the outcome measures. Multivariate regression analyses were performed to identify determinants of outcome.

RESULTS: Mini Mental State Examination and comorbidity index of the Cumulative Illness Rating Scale were important independent determinants of final (respectively, $\beta = 0.46$ and -0.25) and effectiveness (respectively, $\beta = 0.47$ and -0.25) in motor Functional Independence Measure scores, while hip strength and Rankin score were determinants of final motor Functional Independence Measure score (respectively, $\beta = 0.21$ and -0.20). Comorbidity index of the Cumulative Illness Rating Scale (odds ratio 8.18 for ≥ 3 versus < 3 comorbidity score; 95% confidence interval, 1.03-64.7) and Geriatric Depression Scale (odds ratio 4.02 for ≥ 6 versus ≤ 5 depression scale score; 95% confidence interval, 1.52-10.63) were risk indicators for nursing home.

CONCLUSIONS: Among the indices of the Cumulative Illness Rating Scale, comorbidity index is the sole independent determinant of both motor Functional Independence Measure scores and discharge destination in hip fracture patients. This suggests to specifically evaluate this index to identify the patients who may be admitted to a rehabilitation program.

PDF Y Endnote Y

Effect of resistance training volume on walking speed performance in postmenopausal women: a randomized controlled trial

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Exp. Gerontol. 2017; ePub(ePub): ePub.

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Abstract

Low muscle strength and high abdominal fatness play an important role in fast and usual walking speeds decrement in postmenopausal women (PW). Low-volume resistance training (RT) improves muscle strength. However, high-volume RT has shown to improve muscle strength and abdominal fatness in PW. Thus, high-volume RT would elicit greater improvement in fast and usual walking speeds than low-volume RT.

OBJECTIVE: To confirm whether the high-volume RT is better than the low-volume RT, we performed a randomized controlled trial (clinical trial registration: RBR-8SBBVP) study to investigate the effects of two different RT volumes (three sets vs. six sets) on fast and usual walking speed performances (fast: one-mile walk test and usual: four-meter walk), muscle strength (1RM test), and abdominal fatness (WC - waist circumference; WC/W waist circumference-to-weight ratio; WHtR - waist-to-height ratio; ABSI - A body shape index; BRI - body roundness index; CI - conicity index) in PW.

METHODS: Thirty-three PW were randomized (simple randomization) in three groups: control group (CT - no exercise), low-volume RT (LV) and high-volume RT (HV). The RT consisted of eight total body exercises at 70% of one repetition maximum for 16 weeks performed three times a week.

RESULTS: The fast walking speed (6.1% [CI 95% 2.3-9.9]), WC (-4.1% [CI 95% -6.9 to -1.4]), WHtR (-4.2% [CI 95% -7.0 to -1.4]) and BRI (-10.3% [CI 95% -17.3 to -3.4]) improved in the HV when compared to the LV and CT. The WC/W (-3.7% [CI 95% -6.5 to -0.93]), ABSI (-3.8% [CI 95% -6.5 to -1.2]) and CI (-3.9% [CI 95% -6.6 to -1.3]) improved in the HV when compared to the CT. Muscle strength improved similarly in trained groups (LV: 49.1% [CI 95% 42.5-55.6] and HV: 43.7% [CI 95% 33.0-54.5]) when compared with the CT. No differences were observed in usual walking speed.

CONCLUSION: Our results suggest that high-volume RT (six sets) at 70% of 1RM is necessary to promote an improved fast walking speed performance and abdominal fatness in PW.

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Effectiveness of a timing and coordination group exercise program to improve mobility in community-dwelling older adults: a randomized clinical trial

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Abstract

IMPORTANCE: Timing and coordination exercises may be an important addition to community-based health promotion exercise programs to improve walking in older adults.

OBJECTIVE: To compare the effectiveness of the On the Move group exercise program, which focuses on the timing and coordination of movement, with a seated strength, endurance, and flexibility program (usual care) at improving function, disability, and walking ability of older adults.

DESIGN, SETTING, AND PARTICIPANTS: Cluster-randomized, single-blind intervention trial. Thirty-two independent living facilities, senior apartment buildings, and senior community centers were randomized to On the Move (16 sites; 152 participants) or usual care (16 sites; 146 participants). Participants were 65 years or older, able to ambulate independently with a gait speed of at least 0.60 m/s, able to follow 2-step commands, and were medically stable. **INTERVENTIONS:** Exercise classes were 50 minutes, twice a week for 12 weeks and had 10 or fewer participants per class. On the Move consisted of warm-up, timing and coordination (stepping and walking patterns), strengthening, and stretching exercises. The usual-care program consisted of warm-up, strength, endurance, and stretching exercises.

MAIN OUTCOMES AND MEASURES: The primary outcomes were self-report of function and disability (Late Life Function and Disability Instrument) and mobility (6-minute walk distance and gait speed) assessed by blinded individuals.

RESULTS: Participants (mean [SD] age, 80.0 [8.1] years) were mostly female (251 [84.2%]) and white (249 [83.6%]) and had a mean (SD) of 2.8 (1.4) chronic conditions. Intervention groups were similar on baseline characteristics. Postintervention, 142 (93.4%) participants in On the Move and 139 (95.2%) participants in usual care completed testing. On the Move had greater mean (SD) improvements than the usual-care group in gait speed (0.05 [0.13] vs -0.01 [0.11] m/s; adjusted difference = 0.05 [0.02] m/s; $P = .002$) and 6-minute walk distance (20.6 [57.1] vs 4.1 [55.6] m; adjusted difference = 16.7 [7.4] m; $P = .03$). Attendance was greater in the usual-care program compared with On the Move (95 [65.1%] vs 76 [50.0%] attended ≥ 20 classes; $P = .03$). There were no significant differences in any of the other primary or secondary outcomes.

CONCLUSIONS AND RELEVANCE: The On the Move group exercise program was more effective at improving mobility than a usual-care exercise program, despite lower attendance. Additional research examining the impact of the intervention on long-term disability outcomes is needed before recommending routine implementation into clinical practice. **TRIAL REGISTRATION:** clinicaltrials.gov Identifier: NCT01986647.

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Effectiveness of environment-based interventions that address behavior, perception, and falls in people with Alzheimer's disease and related major neurocognitive disorders: a systematic review

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Am. J. Occup. Ther. 2017; 71(5): e7105180030p1-7105180030p10.

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Abstract

OBJECTIVE: This systematic review evaluated the effectiveness of environment-based interventions that address behavior, perception, and falls in the home and other settings for people with Alzheimer's disease (AD) and related major neurocognitive disorders (NCDs).

METHOD: Database searches were limited to outcomes studies published in English in peer-reviewed journals between January 2006 and April 2014.

RESULTS: A total of 1,854 articles were initially identified, of which 42 met inclusion criteria.

CONCLUSION: Strong evidence indicates that person-centered approaches can improve behavior. Moderate evidence supports noise regulation, environmental design, unobtrusive visual barriers, and environmental relocation strategies to reduce problematic behaviors. Evidence is insufficient for the effectiveness of mealtime ambient music, bright light, proprioceptive input, wander gardens, optical strategies, and sensory devices in improving behavior or reducing wandering and falls. Although evidence supports many environment-based interventions used by occupational therapy practitioners to address behavior, perception, and falls in people with AD and related major NCDs, more studies are needed.

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Elderly users of fall-risk-increasing drug perceptions of fall risk and the relation to their drug use - a qualitative study

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Scand. J. Prim. Health Care 2017; ePub(ePub): ePub.

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Abstract

OBJECTIVE: The aim of the study was to explore how home-dwelling elderly who use fall-risk-increasing drugs (FRIDs) perceive their fall risk and how they relate this to their drug use.

DESIGN, SETTING AND SUBJECTS: A qualitative study with 14 home-dwelling elderly FRID users between 65 and 97 years in Central Norway participating in semi-structured individual interviews. The data were analyzed thematically by using systematic text condensation.

RESULTS: The main finding was that the informants did not necessarily perceive the use of FRIDs to be a prominent risk factor for falls. Some informants said they did not reflect upon drug use whatsoever and said they fully trusted their physician's choices. When either experiencing dizziness, fall episodes or by reading the patient information leaflet the informants said to either adjust their drug use or to contact their physician. Some felt rejected due to not getting their point across or their wish to alter the drug was not granted by the physician.

CONCLUSIONS: Elderly FRID users did not necessarily relate their drug use to fall risk or struggled to present their perceived drug-related problems. Physicians need to regularly inform, monitor and assess the drug treatment when treating elderly with FRIDs.

PDF Y Endnote Y

Epidemiology of fall injury in rural Bangladesh

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Int. J. Environ. Res. Public Health 2017; 14(8): ePub.

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Abstract

Globally, falls are the second leading cause of unintentional injury deaths, with 80% occurring in low- and middle-income countries. The overall objective of this study is to describe the burden and risk factors of falls in rural Bangladesh. In 2013, a large household survey covering a population of 1,169,593 was conducted in seven rural sub-districts of Bangladesh to assess the burden of all injuries, including falls. The recall periods for non-fatal and fatal injuries were six and 12 months, respectively. Descriptive, bivariate and multiple logistic regression analyses were conducted. The rates of non-fatal and fatal falls were 36.3 per 1000 and 5 per 100,000 population, respectively. The rates of both fatal and non-fatal falls were highest among the elderly. The risk of non-fatal falls was higher at extremes of age. Lower limb and waist injuries were frequent following a fall. Head injuries were frequent among infants (35%), while lower limb and waist injuries were frequent among the elderly (>65 years old). Injuries to all body parts (except the waist) were most frequent among men. More than half of all non-fatal falls occurred in a home environment. The injury patterns and risk factors of non-fatal falls differ by sociodemographic factors.

PDF Y Endnote Y

Frailty is strongly associated with increased risk of recurrent falls among older HIV-infected adults: a prospective cohort study

Tassiopoulos K, Abdo M, Wu K, Koletar SL, Palella FJ, Kalayjian R, Taiwo B, Erlandson KM. *AIDS* 2017; ePub(ePub): ePub.

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Abstract

OBJECTIVE: Both frailty and falls occur at earlier than expected ages among HIV-infected individuals, but the contribution of frailty to fall risk in this population is not well understood. We examined this association among participants enrolled in AIDS Clinical Trials Group (ACTG) A5322.

DESIGN: A prospective, multi-center cohort study of HIV-infected men and women ≥ 40 years.

METHODS: Frailty assessment included a 4-meter walk, grip strength, and self-reported weight loss, exhaustion, and low physical activity. Multinomial logistic regression assessed the association between baseline frailty, grip, and 4-meter walk and single and recurrent (2+) falls over the next 12 months; logistic regression assessed effect modification by several factors on association between frailty and any (1+) falls.

RESULTS: Of 967 individuals, 6% were frail, 39% pre-frail, and 55% non-frail. Eighteen percent had ≥ 1 fall, and 7% had recurrent falls. In multivariable models, recurrent falls were more likely among frail (OR = 17.3; 95% CI = 7.03-42.6) and pre-frail (OR = 3.80; 95% CI = 1.87-7.72) than non-frail individuals. Significant associations were also seen with recurrent falls and slow walk and weak grip. The association between frailty and any falls was substantially stronger among individuals with

peripheral neuropathy.

CONCLUSIONS: Aging HIV-infected pre-frail and frail individuals are at significantly increased risk of falls. Incorporation of frailty assessments or simple evaluations of walk speed or grip strength in clinical care may help identify individuals at greatest risk for falls. Peripheral neuropathy further increases fall risk among frail persons, defining a potential target population for closer fall surveillance, prevention, and treatment.

PDF N Endnote Y

Mobility as the purpose of postural control

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Front. Comput. Neurosci. 2017; 11: e67.

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DOI 10.3389/fncom.2017.00067 **PMID** 28798679 **PMCID** PMC5529402

Abstract

Counteracting the destabilizing force of gravity is usually considered to be the main purpose of postural control. However, from the consideration of the mechanical requirements for movement, we argue that posture is adjusted in view of providing impetus for movement. Thus, we show that the posture that is usually adopted in quiet standing in fact allows torque for potential movement. Moreover, when performing a movement-either voluntarily or in response to an external perturbation-we show that the postural adjustments are organized both spatially and temporally so as to provide the required torque for the movement. Thus, when movement is performed skillfully, the force of gravity is not counteracted but actually used to provide impetus to movement. This ability to move one's weight so as to exploit the torque of gravity seems to be dependent on development and skill learning, and is impaired in aging.

PDF Y Endnote Y

Quantitative trunk sway and prediction of incident falls in older adults

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Gait Posture 2017; 58: 183-187.

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Abstract

Poor balance and balance impairments are major predictors of falls. The purpose of the current study was to determine the clinical validity of baseline quantitative static trunk sway measurements in predicting incident falls in a cohort of 287 community-dwelling non-demented older Americans (mean age 76.14±6.82years; 54% female). Trunk sway was measured using the SwayStar™ device, and quantified as angular displacement in degrees in anterior-posterior (pitch) and medio-lateral (roll) planes. Over a one-year follow-up period, 66 elders (23%) reported incident falls. Anterior-posterior angular displacement was a strong predictor of incident falls in older adults in Cox

proportional hazards models (hazard ratio adjusted for age, gender, education, RBANS total score, medical comorbidities, geriatric depression scale score, sensory impairments, gait speed, and history of fall in the past 1year ((aHR)=1.59; p=0.033) whereas, angular displacement in the medio-lateral plane was not predictive of falls (aHR=1.35; p=0.276). Our results reveal the significance of quantitative trunk sway, specifically anterior-posterior angular displacement, in predicting incident falls in older adults.

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PDF Y Endnote Y

Risk factors for falls in community stroke survivors: a systematic review and meta-analysis

Xu T, Clemson L, O'Loughlin K, Lannin NA, Dean C, Koh G.

Arch. Phys. Med. Rehabil. 2017; ePub(ePub): ePub.

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Abstract

OBJECTIVE: To identify the risk factors for falls in community stroke survivors. **DATA SOURCES:** A comprehensive search for articles indexed on MEDLINE, EMBASE, CINAHL, PsychINFO, Cochrane Library, and Web of Science databases was conducted.

STUDY SELECTION: Prospective studies investigating fall risk factors in community stroke survivors were included. Reviewers in pair independently screened the articles and determined inclusion through consensus. Studies meeting acceptable quality rating using the Q-Coh were included in the meta-analysis.

DATA EXTRACTION: Data extraction was done in duplicate by four reviewers using a standardized data extraction sheet, and confirmed by another independent reviewer for completeness and accuracy.

DATA SYNTHESIS: Twenty-one articles met the minimum criteria for inclusion; risk factors investigated by three or more studies (n=16) were included in a meta-analysis. The following risk factors had strong association with all fallers: impaired mobility (OR 4.36, CI 2.68-7.10); reduced balance (OR 3.87, CI 2.39-6.26); use of sedative / psychotropic medications (OR 3.19, CI 1.36-7.48); disability in self-care (OR 2.30, CI 1.51-3.49); depression (OR 2.11, CI 1.18-3.75); cognitive impairment (OR 1.75, CI 1.02-2.99); and history of fall (OR 1.67, CI 1.03-2.72). A history of falling (OR 4.19, CI 2.05-7.01) had a stronger association with recurrent fallers.

CONCLUSIONS: This study confirms that balance and mobility problems, assisted self-care, taking sedative or psychotropic medications, cognitive impairment, depression, and history of falling are associated with falls in community stroke survivors. We recommend that any future research into falls prevention programs should consider addressing these modifiable risk factors. As the risk factors for falls in community stroke survivors are multifactorial, interventions should be multi-dimensional.

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PDF Y Endnote Y

Self-reported vision impairment and incident prefrailty and frailty in English community-dwelling older adults: findings from a 4-year follow-up study

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Abstract

BACKGROUND: Little is known about vision impairment and frailty in older age. We investigated the relationship of poor vision and incident prefrailty and frailty.

METHODS: Cross-sectional and longitudinal analyses with 4-year follow-up of 2836 English community-dwellers aged ≥ 60 years. Vision impairment was defined as poor self-reported vision. A score of 0 out of the 5 Fried phenotype components was defined as non-frail, 1-2 prefrail and ≥ 3 as frail. Participants non-frail at baseline were followed-up for incident prefrailty and frailty. Participants prefrail at baseline were followed-up for incident frailty.

RESULTS: 49% of participants (n=1396) were non-frail, 42% (n=1178) prefrail and 9% (n=262) frail. At follow-up, there were 367 new cases of prefrailty and frailty among those non-frail at baseline, and 133 new cases of frailty among those prefrail at baseline. In cross-sectional analysis, vision impairment was associated with frailty (age-adjusted and sex-adjusted OR 2.53, 95% CI 1.95 to 3.30). The association remained after further adjustment for wealth, education, cardiovascular disease, diabetes, falls, cognition and depression. In longitudinal analysis, compared with non-frail participants with no vision impairment, non-frail participants with vision impairment had twofold increased risks of prefrailty or frailty at follow-up (OR 2.07, 95% CI 1.32 to 3.24). The association remained after further adjustment. Prefrail participants with vision impairment did not have greater risks of becoming frail at follow-up.

CONCLUSION: Non-frail older adults who experience poor vision have increased risks of becoming prefrail and frail over 4 years. This is of public health importance as both vision impairment and frailty affect a large number of older adults.

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Activity recognition in individuals walking with assistive devices: the benefits of device-specific models

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Abstract

BACKGROUND: Wearable sensors gather data that machine-learning models can convert into an identification of physical activities, a clinically relevant outcome measure. However, when individuals with disabilities upgrade to a new walking assistive device, their gait patterns can change,

which could affect the accuracy of activity recognition.

OBJECTIVE: The objective of this study was to assess whether we need to train an activity recognition model with labeled data from activities performed with the new assistive device, rather than data from the original device or from healthy individuals.

METHODS: Data were collected from 11 healthy controls as well as from 11 age-matched individuals with disabilities who used a standard stance control knee-ankle-foot orthosis (KAFO), and then a computer-controlled adaptive KAFO (Ottobock C-Brace). All subjects performed a structured set of functional activities while wearing an accelerometer on their waist, and random forest classifiers were used as activity classification models. We examined both global models, which are trained on other subjects (healthy or disabled individuals), and personal models, which are trained and tested on the same subject.

RESULTS: Median accuracies of global and personal models trained with data from the new KAFO were significantly higher (61% and 76%, respectively) than those of models that use data from the original KAFO (55% and 66%, respectively) (Wilcoxon signed-rank test, $P=.006$ and $P=.01$). These models also massively outperformed a global model trained on healthy subjects, which only achieved a median accuracy of 53%. Device-specific models conferred a major advantage for activity recognition.

CONCLUSIONS: Our results suggest that when patients use a new assistive device, labeled data from activities performed with the specific device are needed for maximal precision activity recognition. Personal device-specific models yield the highest accuracy in such scenarios, whereas models trained on healthy individuals perform poorly and should not be used in patient populations.

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Development and delivery of an exercise programme for falls prevention: the Prevention of Falls Injury Trial (PreFIT)

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Abstract

OBJECTIVE: This paper describes the development and implementation of an exercise intervention to prevent falls within The Prevention of Fall Injury Trial (PreFIT), which is a large multi-centred randomised controlled trial based in the UK National Health Service (NHS).

DESIGN: Using the template for intervention description and replication (TIDieR) checklist, to describe the rationale and processes for treatment selection and delivery of the PreFIT exercise intervention.

PARTICIPANTS: Based on the results of a validated falls and balance survey, participants were eligible for the exercise intervention if they were at moderate or high risk of falling.

INTERVENTIONS: Intervention development was informed using the current evidence base, published guidelines, and pre-existing surveys of clinical practice, a pilot study and consensus work with therapists and practitioners. The exercise programme targets lower limb strength and balance,

which are known, modifiable risk factors for falling. Treatment was individually tailored and progressive, with seven recommended contacts over a six-month period. Clinical Trials Registry (ISCTRN 71002650).

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Establishing a classification system for high fall-risk among inpatients using support vector machines

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Abstract

We constructed a model using a support vector machine to determine whether an inpatient will suffer a fall on a given day, depending on patient status on the previous day. Using fall report data from our own facility and intensity-of-nursing-care-needs data accumulated through hospital information systems, a dataset comprising approximately 1.2 million patient-days was created. Approximately 50% of the dataset was used as training and testing data. A multistep grid search was conducted using the semicomprehensive combination of three parameters. A discriminant model for the testing data was created for each parameter to identify which parameter had the highest score by calculating the sensitivity and specificity. The score of the model with the highest score had a sensitivity of 64.9% and a specificity of 69.6%. By adopting a method that relies on daily data recorded in the electronic medical record system and accurately predicts unknown data, we were able to overcome issues described in previous studies while simultaneously constructing a discriminant model for patients' fall risk that does not burden nurses and patients with information gathering.

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