A development study and randomised feasibility trial of a tailored intervention to improve activity and reduce falls in older adults with mild cognitive impairment and mild dementia

Harwood RH, van der Wardt V, Goldberg SE, Kearney F, Logan P, Hood-Moore V, Booth V, Hancox JE, Masud T, Hoare Z, Brand A, Edwards RT, Jones C, das Nair R, Pollock K, Godfrey M, Gladman JRF, Vedhara K, Smith H, Orrell M.

Pilot Feasibility Stud. 2018; 4: e49.

Affiliation: Institute of Mental Health, University of Nottingham, Nottingham, NG8 1BB UK.

DOI 10.1186/s40814-018-0239-y **PMID** 29468084 **PMCID** PMC5816352

Abstract

BACKGROUND: People with dementia progressively lose abilities and are prone to falling. Exercise- and activity-based interventions hold the prospect of increasing abilities, reducing falls, and slowing decline in cognition. Current falls prevention approaches are poorly suited to people with dementia, however, and are of uncertain effectiveness. We used multiple sources, and a co-production approach, to develop a new intervention, which we will evaluate in a feasibility randomised controlled trial (RCT), with embedded adherence, process and economic analyses.

METHODS: We will recruit people with mild cognitive impairment or mild dementia from memory assessment clinics, and a family member or carer. We will randomise participants between a therapy programme with high intensity supervision over 12 months, a therapy programme with moderate intensity supervision over 3 months, and brief falls assessment and advice as a control intervention. The therapy programmes will be delivered at home by mental health specialist therapists and therapy assistants. We will measure activities of daily living, falls and a battery of intermediate and distal health status outcomes, including activity, balance, cognition, mood and quality of life. The main aim is to test recruitment and retention, intervention delivery, data collection and other trial processes in advance of a planned definitive RCT. We will also study motivation and adherence, and conduct a process evaluation to help understand why results occurred using mixed methods, including a qualitative interview study and scales measuring psychological, motivation and communication variables. We will undertake an economic study, including modelling of future impact and cost to end-of-life, and a social return on investment analysis.

DISCUSSION: In this study, we aim to better understand the practicalities of both intervention and research delivery, and to generate substantial new knowledge on motivation, adherence and the approach to economic analysis. This will enable us to refine a novel intervention to promote activity and safety after a diagnosis of dementia, which will be evaluated in a definitive randomised controlled trial. TRIAL REGISTRATION: ClinicalTrials.gov: NCT02874300; ISRCTN 10550694.

PDF Y Endnote Y

A manual physical therapy intervention for symptoms of knee osteoarthritis and associated fall risk: a case series of four patients

Allen C, Sheehan R, Deyle G, Wilken J, Gill N.

Physiother. Theory Pract. 2018; ePub(ePub): ePub.

Affiliation: a Army-Baylor University Doctoral Fellowship in Orthopaedic Manual Physical Therapy , Brooke Army Medical Center , Fort Sam Houston , TX , USA.

DOI 10.1080/09593985.2018.1443360 **PMID** 29482395

Abstract
BACKGROUND AND PURPOSE: Patients with knee osteoarthritis (OA) are at an increased risk of falling. Further, the symptoms associated with knee OA are correlated with fall risk. A manual physical therapy (MPT) approach consisting of mobilizing techniques and reinforcing exercise improves the symptoms and functional limitations associated with knee OA. The purpose of this case series is to evaluate an MPT intervention of mobilization techniques and exercise for knee OA on improving symptoms and quantify the secondary benefit of improving stumble recovery. CASE DESCRIPTION: Four patients with symptomatic knee OA and four matched controls completed a fall risk assessment. Following 4 weeks of intervention, patients were reevaluated. OUTCOMES: Initial Western Ontario and McMaster Universities Arthritis Index (WOMAC) scores indicated notable symptoms and functional limitations in all patients. In addition, all patients displayed elevated fall risk and/or impaired stumble responses. Following 4 weeks of intervention, all patients reported meaningful reductions in all three WOMAC subscales and demonstrated improvements in at least two of the three fall risk measures.
DISCUSSION: We identified potential connections between symptom relief in patients with knee OA, stumble response, and ultimately fall risk. The results suggest that MPT intervention designed to improve the signs and symptoms of knee OA may lead to a secondary benefit of improved gait stability and stumble response.
PDF Y Endnote Y

Balance training reduces brain activity during motor simulation of a challenging balance task in older adults: an fMRI study
Ruffieux J, Mouthon A, Keller M, Mouthon M, Annoni JM, Taube W.
Front. Behav. Neurosci. 2018; 12: e10.
Affiliation: Movement and Sport Sciences, Department of Medicine, University of Fribourg, Fribourg, Switzerland.

DOI 10.3389/fnbeh.2018.00010 **PMID** 29472847 **PMCID** PMC5810285
Abstract
Aging is associated with a shift from an automatic to a more cortical postural control strategy, which goes along with deteriorations in postural stability. Although balance training has been shown to effectively counteract these behavioral deteriorations, little is known about the effect of balance training on brain activity during postural tasks in older adults. We, therefore, assessed postural stability and brain activity using fMRI during motor imagery alone (MI) and in combination with action observation (AO; i.e., AO+MI) of a challenging balance task in older adults before and after 5 weeks of balance training.
RESULTS showed a nonsignificant trend toward improvements in postural stability after balance training, accompanied by reductions in brain activity during AO+MI of the balance task in areas relevant for postural control, which have been shown to be over-activated in older adults during (simulation of) motor performance, including motor, premotor, and multisensory vestibular areas. This suggests that balance training may reverse the age-related cortical over-activations and lead to changes in the control of upright posture toward the one observed in young adults.
PDF Y Endnote Y

Characteristics, consequences and prevention of falls in institutionalised older adults in the province of Malaga (Spain): a prospective, cohort, multicentre study

Aranda-Gallardo M, Morales-Asencio JM, Enriquez de Luna-Rodriguez M, Vazquez-Blanco MJ, Morilla-Herrera JC, Rivas-Ruiz F, Toribio-Montero JC, Canca-Sanchez JC.

BMJ Open 2018; 8(2): e020039.

Affiliation: Departmentof Nursing, Agencia Sanitaria Costa del Sol, Marbella, Malaga, Spain.

DOI 10.1136/bmjopen-2017-020039 **PMID** 29476031

Abstract

OBJECTIVES: Falls are an important adverse event among institutionalised persons. It is in this clinical setting where falls occur more frequently than in any other, despite the measures commonly taken to prevent them. This study aimed to determine the characteristics of a typical institutionalised elderly patient who suffers a fall and to describe the physical harms resulting from this event. We then examined the association between falls and the preventive measures used.

METHODS: This was a prospective cohort study in 37 nursing homes in Spain. The participants were all the nursing home residents institutionalised in these centres from May 2014 to July 2016. Participants were followed up for 9 months. During this period, two observations were made to evaluate the preventive measures taken and to record the occurrence of falls.

RESULTS: 896 residents were recruited, of whom 647 completed the study. During this period, 411 falls took place, affecting 213 residents. The injuries caused by the falls were mostly minor or moderate. They took place more frequently among women and provoked 22 fractures (5.35%). The most commonly used fall prevention measure was bed rails (53.53% of cases), followed by physical restraint (16.79%). The latter measure was associated with a higher incidence of injuries not requiring stitches (OR=2.06, 95% CI 1.01 to 4.22, P=0.054) and of injuries that did require stitches (OR=3.51, 95% CI 1.36 to 9.01, P=0.014) as a consequence of falls. Bed rails protected against night-time falls.

CONCLUSIONS: Falls are a very common adverse event in nursing homes. The prevention of falls is most commonly addressed by methods to restrain movement. The use of physical restraints is associated with a greater occurrence of injuries caused by a fall.

PDF Y Endnote Y

Cognitive behavioural therapy for fear of falling and balance among older people: a systematic review and meta-analysis

Liu TW, Ng GYF, Chung RCK, Ng SSM.

Age Ageing 2018; ePub(ePub): ePub.

Affiliation: Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Hung Hom, Hong Kong (SAR), China.

DOI 10.1093/ageing/afy010 **PMID** 29471428

Abstract

BACKGROUND: fear of falling is prevalent among older people and associated with various health outcomes. A growing number of studies have examined the effects of interventions designed to

reduce the fear of falling and improve balance among older people, yet our current understanding is restricted to physiological interventions. Psychological interventions such as cognitive behavioural therapy (CBT) have not been reviewed and meta-analysed.
OBJECTIVE: to perform a systematic review and meta-analysis evaluating the effects of CBT on reducing fear of falling and enhancing balance in community-dwelling older people.
METHOD: randomised controlled trials (RCTs) addressing fear of falling and balance were identified through searches of six electronic databases, concurrent registered clinical trials, forward citation and reference lists of three previous systematic reviews.
RESULTS: a total of six trials involving 1,626 participants were identified. Four studies used group-based interventions and two adopted individual intervention. Intervention period ranged from 4 to 20 weeks, and the number and duration of face-to-face contact varied. Core components of the CBT intervention included cognitive restructuring, personal goal setting and promotion of physical activities. The risk of bias was low across the included studies. Our analysis suggests that CBT interventions have significant immediate and retention effects up to 12 months on reducing fear of falling, and 6 months post-intervention effect on enhancing balance.
CONCLUSIONS: CBT appears to be effective in reducing fear of falling and improving balance among older people. Future researches to investigate the use of CBT on reducing fear of falling and improving balance are warranted.
PDF Y Endnote Y

Does focal mechanical stimulation of the lower limb muscles improve postural control and sit to stand movement in elderly?
Attanasio G, Camerota F, Ralli M, Galeoto G, La Torre G, Galli M, De Vincentiis M, Greco A, Celletti C. *Aging Clin. Exp. Res.* 2018; ePub(ePub): ePub.
Affiliation: Physical Medicine and Rehabilitation Division, Umberto I University Polyclinic of Rome, Rome, Italy. clacelletti@gmail.com.

DOI 10.1007/s40520-018-0909-x **PMID** 29468616
Abstract
BACKGROUNDS: Imbalance in elderly is a common problem strictly related to fall. AIMS: This study investigates the possibility that a new protocol based on the focal mechanical muscle vibration may improve balance and stability in elderly.
METHODS: Pre-post non-randomized clinical trial has been used. Patients referring postural disequilibrium with negative vestibular bed-side examinations have been treated with focal muscle vibration applied to quadriceps muscles and evaluated before and immediately after therapy and after 1 week and after 1 month with postural stabilometric examination and with an inertial measurement units during the time up and go test.
RESULTS: Stabilometric analysis showed statistically significant differences in both the area ($p = 0.01$) and sway ($p < 0.01$) of the center of pressure during the close eyes tests. Moreover, the global time of the time up and go test was reduced ($p < 0.05$) and the rotation velocity was increased ($p < 0.01$).
CONCLUSIONS: The findings confirm the beneficial role of focal muscle vibration in elderly patients improve postural stability and mobility.
PDF Y Endnote Y

Factors associated with occasional and recurrent falls in Mexican community-dwelling older people

Agudelo-Botero M, Giraldo-Rodríguez L, Murillo-González JC, Mino-León D, Cruz-Arenas E.

PLoS One 2018; 13(2): e0192926.

Affiliation: Unidad de Vigilancia Epidemiológica Hospitalaria, Investigación Sociomédica, Instituto Nacional de Rehabilitación, Mexico City, Mexico.

DOI 10.1371/journal.pone.0192926 **PMID** 29462159

Abstract

Falls are a frequent event among older adults that can cause wounds, disability, psychological disorders, and premature death. Although the large number of existing studies on the issue, few have been conducted in middle- and low-income countries. The objective of the present study is to identify the sociodemographic, medical, and functional performance factors associated with occasional and recurrent falls in Mexican older adults dwelling in community. Cross-sectional analysis of 9 598 adults ≥60 years old who participated in the fourth round (2015) of the Mexican Health and Aging Study. Bivariate tests were performed to evaluate the differences between covariates by distinct fall groups (no falls, occasional falls, and recurrent falls). Multiple logistic regressions with unadjusted and adjusted models were estimated. Approximately 46% of older adults had had at least one fall during the previous two years (one fall 16% and recurrent falls 30%). Occasional falls were only associated with being a woman; in addition to the sex, recurrent falls were strongly associated with advanced age, rural residence, bad and very bad self-perception of health status, activity-limiting pain, urinary incontinence, depression, arthritis, limitations in basic activities of daily living, and limitations in advanced activities of daily living. Falls, primarily recurrent falls, deserve to be addressed through multifactorial strategies that include different areas of intervention.

PDF Y Endnote Y

Falls prevention in community care: 10 years on

Burton E, Lewin G, O'Connell H, Hill KD.

Clin. Interv. Aging 2018; 13: 261-269.

Affiliation: School of Physiotherapy and Exercise Science, Curtin University.

DOI 10.2147/CIA.S153687 **PMID** 29483772 **PMCID** PMC5813950

Abstract

BACKGROUND: A million older people living in Australia receive community care services each year due to experiencing functional or mental health difficulties. This group may be at greater risk of falling than similar-aged people not receiving services. However, there is limited falls prevention research for this population.

PURPOSE: The aim of this study was to identify the falls prevalence rates of older people from 10 Australian community care organizations and compare current falls prevention data to a study 10 years prior that utilized the same 10 organizations. This study also identified factors associated with falling for this population.

PATIENTS AND METHODS: This is a cross-sectional descriptive study, in which 5,338 questionnaires were mailed to a random sample of community care recipients aged ≥65 years.

RESULTS: A total of 1,991 questionnaires were returned (37.3%), with 47.7% of respondents having fallen in the previous year, and 32.7% in the month prior to completing the questionnaire, similar to 10 years prior. Community care clients had a 50% higher falls rate than that reported for similar-aged people not receiving services, and this remained unchanged over the last 10 years. Eighty-six per cent of fallers had fallen once or twice, and 60% reported being injured. Thirty-six per cent of respondents reported not being able to get up independently, and only 27.4% of fallers were referred to a falls prevention program (significantly fewer than 10 years ago; 95% CI: 0.821-6.366,*p*=0.01). Balance issues (odds ratio [OR]: 2.06, 95% CI: 1.288-3.290,*p*=0.003) and perceived risk of falling in the future being "definite" (OR: 6.42, 95% CI: 1.890-21.808,*p*=0.003) or "unsure" (OR: 3.31, 95% CI: 1.144-9.544,*p*=0.027) were risk factors associated with falling. In contrast, individuals referred to a falls prevention intervention had a 47% reduced likelihood of having fallen (95% CI: 0.281-0.988,*p*=0.046).
CONCLUSION: Community care clients should have their falls risk routinely assessed, and at-risk individuals be offered falls prevention advice and referral to fall prevention programs.
PDF Y Endnote Y

Increased physical activity in older adults is associated with decreased fear of falling
Kirkwood RN.
Evid. Based Nurs. 2018; ePub(ePub): ePub.
Affiliation: Graduate Program in Health Science, Faculdade de Ciências Médicas de Minas Gerais, Belo Horizonte, Minas Gerais, Brazil.

DOI 10.1136/eb-2018-102868 **PMID** 29459387
Abstract
Falls are a significant health problem in the elderly population around the world, and the increase in life expectancy, costs and injury consequences could be disastrous. In Korea, more than half of physical injuries in older adults are a result of falls. Risk factors for falls include age, sex, number of comorbidities, polypharmacy and type of drugs in use, history of recurrent falls, fear of falling and physical function. Some of these factors are modifiable; identifying those …
Implications for practice and research:
Physical activity for older adults improves confidence in performing everyday activities without falling.
Polypharmacy should be considered in older adults with fear of falling.
Fear of falling is related to adverse health outcomes and should be investigated.
PDF Y Endnote Y

Influence of working memory and executive function on stair ascent and descent in young and older adults
Gaillardin F, Baudry S.
Exp. Gerontol. 2018; ePub(ePub): ePub.
Affiliation: Laboratory of Applied Biology and Neurophysiology, ULB Neuroscience Institute (UNI), Université libre de Bruxelles (ULB), 808 route de Lennik, 1070 Brussels, Belgium. Electronic address: sbaudry@ulb.ac.be.

DOI 10.1016/j.exger.2018.02.022 **PMID** 29486227

Abstract

This study assessed the influence of attention division, working memory and executive function on stair ascent and descent in young and older adults. Twenty young (25.5 ± 2.1 yrs) and 20 older adults (68.4 ± 5.4 yrs) ascended and descended a 3-step staircase with no simultaneous cognitive task (single-motor task) or while performing a cognitive task (dual-task condition). The cognitive task involved either 1) recalling a word list of the subject's word-span minus 2 words (SPAN-2) to assess the attention division effect, 2) a word list of subject's word-span (SPAN-O) to assess the working memory effect, or 3) recalling in alphabetical order, a word list of the subject's word-span (SPAN-A) to assess the executive function effect. Word-span corresponds to the longest string of words that can be recalled correctly. The duration of ascent and descent of stairs was used to assess the cognitive-motor interaction. Stair ascent and descent duration did not differ between age groups for the single-motor task, and was similar between single-motor task and SPAN-2 in both groups ($p > 0.05$). In contrast, stair ascent and descent duration increased with SPAN-O compared with SPAN-2 for both groups ($p < 0.01$). Stair ascent ($p = 0.017$) and descent ($p = 0.008$) were longer in SPAN-A than SPAN-O only in older adults. Healthy aging was not associated with a decrease in the capacity to perform motor-cognitive dual tasks that involved ascending and descending of stairs when the cognitive task only required working memory. However, the decrease in dual-task performance involving executive functioning may reflect a subclinical cognitive decline in healthy older adults.

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Locomotive function and quality of life among older people in Liaoning, China: falls efficacy as mediator or moderator?

Huang LJ, Wen YF, Liu YC, Guo LN, Du WT, Qin MM, Zhang JJ, Liu K.

Arch. Gerontol. Geriatr. 2018; 76: 73-79.

Affiliation: College of Nursing, Jinzhou Medical University, Jinzhou, Liaoning, PR China. Electronic address: 3172986552@qq.com.

DOI 10.1016/j.archger.2018.01.014 **PMID** 29471207

Abstract

OBJECTIVES: This study aimed to examine the role of falls efficacy in the relationship between the locomotive function and quality of life.

METHODS: From March to May in 2016, we conducted a cross-sectional survey among 830 community residents aged ≥60 years from Jinzhou,China.GLFS-25 (25-question Geriatric Locomotive Function Scale), FES-I(International edition of Falls Efficacy Scale),and SF-12 (12-item Short Form Health Survey) were used to estimate locomotive function, falls efficacy and quality of life, respectively. The higher score of GLFS-25, the worse the locomotive function.

RESULTS: Median age was 68.69 years (ranges 60-88). Locomotive function, falls efficacy and quality of life all presented a linear relationship within each other, locomotive function score was negatively correlated with falls efficacy score (-0.461, $P < 0.01$). locomotive function score was negatively correlated with quality of life score (-0.523, $P < 0.01$).Falls efficacy score was positively correlated with quality of life score (0.415, $P < 0.01$).Falls efficacy exerted both a mediating and moderating

role between locomotive function and quality of life, and the mediation effect accounted for 45.5% of the total effect.
CONCLUSIONS: Poorer locomotive function was associated with poorer quality of life, and greater falls efficacy was associated with better quality of life. In addition, falls efficacy was demonstrated to be both a mediator and moderator variable in the linkage between locomotive function and quality of life. Aged care professional practitioners and our policy makers should strengthen the awareness of the psychological role of the elderly falls efficacy.

PDF Y Endnote Y

Physical function in U.S. older adults compared with other populations: a multinational study
Glei DA, Goldman N, Ryff CD, Weinstein M.
J. Aging Health 2018; ePub(ePub): ePub.
Affiliation: Georgetown University, Santa Rosa, CA, USA.

DOI 10.1177/0898264318759378 **PMID**29466893
Abstract
OBJECTIVE: We compare physical performance from three U.S. national surveys and nationally representative surveys in England, Taiwan, and Costa Rica.
METHOD: For each performance test, we use local mean smoothing to plot the age profiles by sex and survey wave and then fit a linear regression model to the pooled data, separately by sex, to test for significant differences across surveys controlling for age and height.
RESULTS: Age profiles of performance vary across U.S. surveys, but levels of lung function (peak expiratory flow) and handgrip strength in the United States are as high as they are in the other three countries. Americans also perform as well on the chair stand test as the English and Costa Ricans, if not better, but exhibit slower gait speed than the English at most ages.
DISCUSSION: With the exception of walking speed, we find little evidence that older Americans have worse physical performance than their peers.
PDF Y Endnote Y

Preventing falls in older people with cataract - it is not just about surgery
Keay L, Palagyi A.
Ophthalmic. Physiol. Opt. 2018; 38(2): 117-118.
Affiliation: The George Institute for Global Health, UNSW Sydney, Australia.

DOI 10.1111/opo.12445 **PMID** 29485206
Abstract [Abstract unavailable]
PDF Y Endnote Y

Risk factors for falls among older community dwellers in Shenzhen, China
Zhou H, Peng K, Tiedemann A, Peng J, Sherrington C.
Inj. Prev. 2018; ePub(ePub): ePub.
Affiliation: School of Public Health, The University of Sydney, Sydney, New South Wales, Australia.

DOI 10.1136/injuryprev-2017-042597 **PMID** 29475977

Abstract

OBJECTIVE: To determine the rate of falls reported by older community dwellers in Shenzhen, China and to identify fall-related risk factors.

METHOD: Participants were community dwellers residing in Shenzhen, China, who were aged 60 years and over and were recruited using multistage random sampling. All participants were surveyed about demographic and health-related information, mood, vision and hearing impairment, self-rated health and retrospective falls, and a test of balance was administered. Univariate and multivariate negative binomial regression was used to identify factors associated with a greater number of falls.

RESULT: Study participants were 1290 people aged 60-98 years (mean 68.2 years, SD ±6.5). One hundred and seventy-seven falls were reported. One hundred and eleven (8.6%) participants reported one fall in the past year, 17 (1.3%) participants reported two falls and 10 (0.8%) participants reported three or more falls. Univariate analysis showed that age, living alone, presence of a medical condition, medication usage, visual impairment, poor subjective body sense perception, low mood, poor self-rated health and poor balance were associated with a greater number of falls in the past year. Multivariate analysis identified presence of a medical condition (incidence rate ratio (IRR)=1.40, 95% CI 1.19 to 1.67), living alone (IRR=2.46, 95% CI 1.12 to 5.41), visual impairment (IRR=1.46, 95% CI 1.03 to 2.08), walking aid use (IRR=2.29, 95% CI 1.12 to 4.69) and impaired balance (IRR=1.05, 95% CI 1.00 to 1.10) to be significantly associated with a greater number of falls in the past year.

CONCLUSION: More falls occurred in older Chinese people with presence of a medical condition, living alone, visual impairment, used a walking aid and impaired balance.

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Telegerontology as a novel approach to address health and safety by supporting community-based rural dementia care triads: randomized controlled trial protocol

Wallack EM, Harris C, Ploughman M, Butler R.

JMIR Res. Protoc. 2018; 7(2): e56.

Affiliation: Discipline of Family Medicine, Faculty of Medicine, Memorial University of Newfoundland, St John's, NL, Canada.

DOI 10.2196/resprot.8744 **PMID** 29472178

Abstract

BACKGROUND: Telegerontology is an approach using videoconferencing to connect an interdisciplinary team in a regional specialty center to patients in rural communities, which is becoming increasingly practical for addressing current limitations in rural community-based dementia care.

OBJECTIVE: Using the remotely-delivered expertise of the Telegerontology dementia care team, we aim to enhance the caregiver/patient/physician triad and thereby provide the necessary support for the person with dementia to "age in place." METHODS: This is a cluster randomized feasibility trial with four rural regions in the province of Newfoundland and Labrador, Canada (2 regions randomly assigned to "intervention" and 2 to "control"). The study population includes 22 "dementia triads"

that consist of a community-dwelling older Canadian with moderate to late dementia, their family caregivers, and their Primary Care Physician (PCP). Over the 6-month active study period, all participants will be provided an iPad. The intervention is intended as an adjunct to existing PCP care, consisting of weekly Skype-based videoconferencing calls with the Telegerontology physician, and other team members as needed (occupational therapist, physical therapist etc). Control participants receive usual community-based dementia care with their PCP. A baseline (pre-) assessment will be performed during a home visit with the study team. Post intervention, 6- and 12-month follow-up assessments will be collected remotely using specialized dementia monitoring applications and Skype calls. Primary outcomes include admission to long-term care, falls, emergency room visits, hospital stays, and caregiver burden.
RESULTS: Results will be available in March of 2018.
CONCLUSIONS: Results from this study will demonstrate a novel approach to dementia care that has the potential to impact both rural PCPs, family caregivers, and people with dementia, as well as provide evidence for the utility of Telegerontology in models of eHealth-based care.
PDF Y Endnote Y

The theoretical and empirical basis of a BioPsychoSocial (BPS) risk screener for detection of older people's health related needs, planning of community programs, and targeted care interventions
Hildon ZJ, Tan CS, Shiraz F, Ng WC, Deng X, Koh GCH, Tan KB, Philp I, Wiggins D, Aw S, Wu T, Vrijhoef *HJM. BMC Geriatr.* 2018; 18(1): e49.
Affiliation: Panaxea, Matrix II, unit 1.08/9, Science Park 400, 1098, XH Amsterdam, The Netherlands.

DOI 10.1186/s12877-018-0739-x **PMID** 29454316
Abstract
BACKGROUND: This study introduces the conceptual basis and operational measure, of BioPyschoSocial (BPS) health and related risk to better understand how well older people are managing and to screen for risk status. The BPS Risk Screener is constructed to detect vulnerability at older ages, and seeks to measure dynamic processes that place equal emphasis on Psycho-emotional and Socio-interpersonal risks, as Bio-functional ones. We validate the proposed measure and describe its application to programming.
METHODS: We undertook a quantitative cross-sectional, psychometric study with n = 1325 older Singaporeans, aged 60 and over. We adapted the EASYCare 2010 and Lubben Social Network Scale questionnaires to help determine the BPS domains using factor analysis from which we derive the BPS Risk Screener items. We then confirm its structure, and test the scoring system. The score is initially validated against self-reported general health then modelled against: number of falls; cognitive impairment; longstanding diseases; and further tested against service utilization (linked administrative data).
RESULTS: Three B, P and S clusters are defined and identified and a BPS managing score ('doing' well, or 'some', 'many', and 'overwhelming problems') calculated such that the risk of problematic additive BPS effects, what we term health 'loads', are accounted for. Thirty-five items (factor loadings over 0.5) clustered into three distinct B, P, S domains and were found to be independently associated with self-reported health: B: 1.99 (1.64 to 2.41), P: 1.59 (1.28 to 1.98), S: 1.33 (1.10 to 1.60). The fit improved when combined into the managing score 2.33 (1.92 to 2.83, < 0.01). The score was associated with mounting risk for all outcomes.

CONCLUSIONS: BPS domain structures, and the novel scoring system capturing dynamic BPS additive effects, which can combine to engender vulnerability, are validated through this analysis. The resulting tool helps render clients' risk status and related intervention needs transparent. Given its explicit and empirically supported attention to P and S risks, which have the potential to be more malleable than B ones, especially in the older old, this tool is designed to be change sensitive.
PDF Y Endnote Y

What you don't notice can harm you: age-related differences in detecting concurrent visual, auditory, and tactile cues
Pitts BJ, Sarter N.
Hum. Factors 2018; ePub(ePub): ePub.
Affiliation: University of Michigan, Ann Arbor.

DOI 10.1177/0018720818759102 **PMID**29470102
Abstract
OBJECTIVE This research sought to determine whether people can perceive and process three nonredundant (and unrelated) signals in vision, hearing, and touch at the same time and how aging and concurrent task demands affect this ability. Background Multimodal displays have been shown to improve multitasking and attention management; however, their potential limitations are not well understood. The majority of studies on multimodal information presentation have focused on the processing of only two concurrent and, most often, redundant cues by younger participants.
METHOD Two experiments were conducted in which younger and older adults detected and responded to a series of singles, pairs, and triplets of visual, auditory, and tactile cues in the absence (Experiment 1) and presence (Experiment 2) of an ongoing simulated driving task. Detection rates, response times, and driving task performance were measured.
RESULTS Compared to younger participants, older adults showed longer response times and higher error rates in response to cues/cue combinations. Older participants often missed the tactile cue when three cues were combined. They sometimes falsely reported the presence of a visual cue when presented with a pair of auditory and tactile signals. Driving performance suffered most in the presence of cue triplets.
CONCLUSION People are more likely to miss information if more than two concurrent nonredundant signals are presented to different sensory channels. Application The findings from this work help inform the design of multimodal displays and ensure their usefulness across different age groups and in various application domains.
PDF Y Endnote Y

A critical appraisal of the reporting quality of published randomized controlled trials in the field of fall injuries
Asghari Jafarabadi M, Sadeghi-Bazrgani H, Dianat I.
Int. J. Inj. Control Safe. Promot. 2018; ePub(ePub): ePub.
Affiliation: Road Traffic Injury Research Center, Department of Occupational Health , Tabriz University of Medical Sciences , Tabriz , Iran.

DOI 10.1080/17457300.2017.1416479 **PMID** 29457920

Abstract
To evaluate the quality of reporting in published randomized controlled trials (RTCs) in the field of fall injuries. The 188 RTCs published between 2001 and 2011, indexed in EMBASE and Medline databases were extracted through searching by appropriate keywords and EMTree classification terms. The evaluation trustworthiness was assured through parallel evaluations of two experts in epidemiology and biostatistics. About 40%-75% of papers had problems in reporting random allocation method, allocation concealment, random allocation implementation, blinding and similarity among groups, intention to treat and balancing benefits and harms. Moreover, at least 10% of papers inappropriately/not reported the design, protocol violations, sample size justification, subgroup/adjusted analyses, presenting flow diagram, drop outs, recruitment time, baseline data, suitable effect size on outcome, ancillary analyses, limitations and generalizability. Considering the shortcomings found and due to the importance of the RCTs for fall injury prevention programmes, their reporting quality should be improved.
PDF Y Endnote Y

Clinical and non-clinical factors that predict discharge disposition after a fall
James MK, Robitsek RJ, Saghir SM, Gentile PA, Ramos M, Perez F.
Injury 2018; ePub(ePub): ePub.
Affiliation: Department of Case Management, Jamaica Hospital Medical Center, Jamaica, New York, USA. Electronic address: fperez@jhmc.org.

DOI 10.1016/j.injury.2018.02.014 **PMID**29463382
Abstract
BACKGROUND: Falls can result in injuries that require rehabilitation and long-term care after hospital discharge. Identifying factors that contribute to prediction of discharge disposition is crucial for efficient resource utilization and reducing cost. Several factors may influence discharge location after hospitalization for a fall. The aim of this study was to examine clinical and non-clinical factors that may predict discharge disposition after a fall. We hypothesized that age, injury type, insurance type, and functional status would affect discharge location.
METHODS: This two-year retrospective study was performed at an urban, adult level-1 trauma center. Fall patients who were discharged home or to a facility after hospital admission were included in the study. Data was obtained from the trauma registry and electronic medical records. Logistic regression modeling was used to assess independent predictors.
RESULTS: A total of 1,121 fallers were included in the study. 621 (55.4%) were discharged home and 500 (44.6%) to inpatient rehabilitation (IRF)/skilled nursing facility (SNF). The median age was 64 years (IQR: 49-79) and 48.4% (543) were male. The median length of hospital stay was 5 days (IQR: 2.5-8). Increasing age ($p < 0.001$), length of stay in the ICU ($p < 0.001$), injury severity ($p < 0.001$), number of comorbidities ($p = 0.038$), having Medicare insurance ($p = 0.025$), having a fracture at any body region ($p < 0.001$), and ambulation status ($p = 0.025$) significantly increased the odds of being discharged to IRF/SNF compared to home. The removal of injury severity score and ICU length of stay from the "late/regular discharge" model, to create an "early discharge" model, decreased the accuracy of the prediction rate from 78.5% to 74.9% ($p < 0.001$).
CONCLUSION: A combination of demographic, clinical, social, economic, and functional factors can together predict discharge disposition after a fall. The majority of these factors can be assessed early

in the hospital stay, which may facilitate a timely discharge plan and shorter stays in the hospital.

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Dynamic balance evaluation: reliability and validity of a computerized wobble board
Fusco A, Giancotti GF, Fuchs PX, Wagner H, Varalda C, Capranica L, Cortis C.
J. Strength Cond. Res. 2018; ePub(ePub): ePub.
Affiliation: Department of Human Sciences, Society and Health, University of Cassino e Lazio Meridionale, Italy.

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Abstract
Computerized Wobble Boards (WB) are inexpensive, transportable and user-friendly devices to objectively quantify the dynamic balance performances out of laboratory settings, although it has not been established if they are reliable and valid tools. Therefore, the purpose of this study was to determine the reliability and validity of a computerized WB. Thirty-nine (18 female, 21 male) young adults (age: 23.3±2.1years; body mass: 65.9±1.8kg; height: 168.2±8.8cm; leg length: 78.8±5.7cm; BMI: 23.2±2.1kg·m) participated in the study. Subjects were assessed during three separate sessions on different days with a 48h rest in between. A total number of two WB single limb tests and one Y Balance Test (YBT) were performed. The WB performance was registered using the proprietary software and represented by the time spent in the target zone, which represented the 0° tilt angle measured by the tri-axial accelerometer in the WB. YBT normalized reach distances were recorded for the anterior, posteromedial and posterolateral directions. Intraclass correlation coefficient, 95% confidence interval, standard error of measurement, minimal detectable change and Bland-Altman plots were used to evaluate intrasession and intersession reliability, while Pearson product moment correlation was used to determine concurrent validity. Reliability ranged from fair to excellent, showing acceptable levels of error and low minimal detectable change. However, all correlation coefficients between WB and YBT outcomes were poor. Despite the two methods addressing different aspects of balance performance, WB seems to validly serve its purpose and showed good reliability. Therefore, computerized WBs have the potential to become essential devices for dynamic balance assessment.
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Inpatient falls in older adults: a cohort study of antihypertensive prescribing pre- and post-fall
Omer HMRB, Hodson J, Pontefract SK, Martin U.
BMC Geriatr. 2018; 18(1): e58.
Affiliation: College of Medical and Dental Sciences, University of Birmingham, Birmingham, B15 2TT, UK. u.martin@bham.ac.uk.

DOI 10.1186/s12877-018-0749-8 **PMID** 29471792
Abstract
BACKGROUND: Falls are common during hospital admissions and may occur more frequently in patients who are taking antihypertensive medications, particularly in the context of normal to low blood pressure. The review and adjustment of these medications is an essential aspect of the post-

fall assessment and should take place as soon as possible after the fall. Our aim was to investigate whether appropriate post-fall adjustments of antihypertensive medications are routinely made in a large National Health Service (NHS) Trust.
METHODS: Inpatient records over an eight-month period were captured from an electronic prescribing system to identify older adults (≥80 years old) with normal/low blood pressures (< 140 mmHg systolic) who had a documented inpatient fall as these patients were considered to be at high risk of further falls. Prescribed antihypertensive medication on admission was then compared with the post-fall (within 24 h after the fall) and discharge prescriptions.
RESULTS: A total of 146 patients were included in the analysis. Of those, 120 patients (82%) were taking the same number of antihypertensive medications in the 24 h after the fall as they were before; only 19 patients (13%) had a reduction in the number of medications and seven patients (5%) had an increase in medications during that period. Only 9% of the antihypertensive classes assessed were either stopped or reduced in dose immediately post-fall. In addition, 11 new antihypertensives were prescribed at this time. At discharge, half of the patients (n = 73) remained on the same number of antihypertensive medication as on admission, 51 patients (35%) were on fewer antihypertensives and 22 (15%) were on more. Additionally, no changes were made to individual antihypertensives in 49% of prescriptions; 34% were stopped or reduced in dose but 38 new agents were started by the time of discharge. Angiotensin converting enzyme inhibitors and angiotensin II receptor blockers (ACEi/ARB) were the class of medications most commonly stopped or reduced (51%).
CONCLUSIONS: Antihypertensive prescriptions are frequently unchanged after an inpatient fall. Routine medication review needs to be part of post-fall assessments in hospital to reduce the risk of further falls.
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Kinematics of lower limbs during walking are emulated by springy walking model with a compliantly connected, off-centered curvy foot
Lim H, Park S.
J. Biomech. 2018; ePub(ePub): ePub.
Affiliation: Department of Mechanical Engineering, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Republic of Korea. Electronic address: sukyungp@kaist.ac.kr.

DOI 10.1016/j.jbiomech.2018.01.031 **PMID** 29456169
Abstract
The dynamics of the center of mass (CoM) during walking and running at various gait conditions are well described by the mechanics of a simple passive spring loaded inverted pendulum (SLIP). Due to its simplicity, however, the current form of the SLIP model is limited at providing any further information about multi-segmental lower limbs that generate oscillatory CoM behaviors and their corresponding ground reaction forces. Considering that the dynamics of the CoM are simply achieved by mass-spring mechanics, we wondered whether any of the multi-joint motions could be demonstrated by simple mechanics. In this study, we expand a SLIP model of human locomotion with an off-centered curvy foot connected to the leg by a springy segment that emulates the asymmetric kinematics and kinetics of the ankle joint. The passive dynamics of the proposed expansion of the SLIP model demonstrated the empirical data of ground reaction forces, center of

mass trajectories, ankle joint kinematics and corresponding ankle joint torque at various gait speeds. From the mechanically simulated trajectories of the ankle joint and CoM, the motion of lower-limb segments, such as thigh and shank angles, could be estimated from inverse kinematics. The estimation of lower limb kinematics showed a qualitative match with empirical data of walking at various speeds. The representability of passive compliant mechanics for the kinetics of the CoM and ankle joint and lower limb joint kinematics implies that the coordination of multi-joint lower limbs during gait can be understood with a mechanical framework.

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Motor output complexity in Parkinson's disease during quiet standing and walking: analysis of short-term correlations using the entropic half-life
Pasluosta C, Hannink J, Gaßner H, Von Tscharner V, Winkler J, Klucken J, Eskofier BM.
Hum. Mov. Sci. 2018; 58: 185-194.
Affiliation: Digital Sports Group, Pattern Recognition Laboratory, Department of Computer Science, Friedrich Alexander University Erlangen-Nürnberg (FAU), Erlangen, Germany.

DOI 10.1016/j.humov.2018.02.005 **PMID** 29459326
Abstract
Parkinson's disease (PD) is associated with alterations in motor outputs such as center of pressure (CoP) adjustments during quiet standing and foot kinematics during walking. Previous research suggests that the complexity of motor outputs reflects the number of control processes stabilizing a specific movement, providing a measure that is linked to the neurological control of the movement. The Entropic Half Life (EnHL) represents a new method for assessing motor output complexity. We hypothesized that there will be a lack of neuromuscular control pathways for PD patients, resulting in a decrease in motor output complexity. We computed the EnHL of CoP adjustments during quiet standing and foot kinematics during walking of 70 PD patients and 33 age-matched controls. Patients with PD showed longer EnHL values compared to controls, suggesting a tighter motor control. Excluding vision led to a decrease of EnHL of CoP in both groups. EnHL was correlated with spatio-temporal gait parameters. We compared EnHL with the pull test and the timed up-and-go test. No significant differences were present in the pull test, yet motor output complexity was correlated with the timed up-and-go test. The results suggest a reduced complexity in motor outputs of PD patients affecting distinct motor functions.

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Persistence of depressive symptoms and gait speed recovery in older adults after hip fracture
Rathbun AM, Shardell MD, Stuart EA, Gruber-Baldini AL, Orwig D, Ostir GV, Hicks GE, Hochberg MC, Magaziner J.
Int. J. Geriatr. Psychiatry 2018; ePub(ePub): ePub.
Affiliation: Department of Epidemiology and Public Health, University of Maryland School of Medicine, Baltimore, MD, USA.

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Abstract
OBJECTIVE: Depression after hip fracture in older adults is associated with worse physical performance; however, depressive symptoms are dynamic, fluctuating during the recovery period. The study aim was to determine how the persistence of depressive symptoms over time cumulatively affects the recovery of physical performance.
METHODS: Marginal structural models estimated the cumulative effect of persistence of depressive symptoms on gait speed during hip fracture recovery among older adults (n = 284) enrolled in the Baltimore Hip Studies 7th cohort. Depressive symptoms at baseline and at 2-month and 6-month postadmission for hip fracture were evaluated by using the Center for Epidemiological Studies Depression Scale, and persistence of symptoms was assessed as a time-averaged severity lagged to standardized 3 m gait speed at 2, 6, and 12 months.
RESULTS: A 1-unit increase in time-averaged Center for Epidemiological Studies Depression score was associated with a mean difference in gait speed of -0.0076 standard deviations (95% confidence interval [CI]: -0.0184, 0.0032; P = .166). The association was largest in magnitude from baseline to 6 months: -0.0144 standard deviations (95% CI: -0.0303, 0.0015; P = 0.076). Associations for the other time intervals were smaller: -0.0028 standard deviations (95% CI: -0.0138, 0.0083; P = .621) at 2 months and -0.0121 standard deviations (95% CI: -0.0324, 0.0082; P = .238) at 12 months.
CONCLUSION: Although not statistically significant, the magnitude of the numerical estimates suggests that expressing more depressive symptoms during the first 6 months after hip fracture has a meaningful impact on functional recovery.

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Smaller radius width in women with distal radius fractures compared to women without fractures
Kiebzak G, Sassard WR.
Cureus 2017; 9(12): e1950.
Affiliation: Orthopaedic Surgery, Houston Methodist Hospital.

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Abstract
INTRODUCTION: Bone mineral density (BMD) measured using dual-energy x-ray absorptiometry (DXA) is typically used to assess fracture risk. However, other factors such as bone size and the forward momentum of a fall (a function of body size) can also potentially influence fracture risk, but are understudied. This report describes the characteristics of a cohort of Caucasian pre- and postmenopausal women with distal radius fractures (DRF) after falling onto an outstretched hand.
METHODS The fracture cohort comprised entries in an institutional review board-approved registry of study patients who had had DXA scans. For patients with DRF, the contralateral radius was scanned and BMD, T-scores (used to define bone status as normal, osteopenic, or osteoporotic), and radius width were recorded. Generally, side-to-side (left-right) differences in bone size and BMD are small and, hence, the contralateral radius was considered a surrogate for bone status of the fractured radius. Apparently healthy women without fractures were used as race-, age-, and BMI-matched controls. Results Premenopausal women < 49 years of age (mean age, 38 years) with DRF had significanty smaller radii width compared to matched controls. Mean radius BMD was in the normal range. As a group, the cohort was overweight based on mean BMI. Postmenopausal women

> 50 years (mean age, 64 years) with DRF also had low radius width, but in contrast to the first group, this group had low peripheral and central BMD.
CONCLUSIONS Women with DRF had contralateral and presumably fractured radii of bone width smaller than matched controls. As a group, these women were also overweight based on BMI. The smaller radius width may increase the risk for fracture irrespective of BMD, especially since larger body size would result in greater inertial force when falling while ambulating.
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The effect of visual stimuli on stability and complexity of postural control
Luo H, Wang X, Fan M, Deng L, Jian C, Wei M, Luo
J. Front. Neurol. 2018; 9: e48.
Affiliation: Key Laboratory of Sensing Technology and Biomedical Instrument of Guangdong Province, Guangdong Provincial Engineering and Technology Center of Advanced and Portable Medical Devices, School of Engineering, Sun Yat-sen University, Guangzhou, China.

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Abstract
Visual input could benefit balance control or increase postural sway, and it is far from fully understanding the effect of visual stimuli on postural stability and its underlying mechanism. In this study, the effect of different visual inputs on stability and complexity of postural control was examined by analyzing the mean velocity (MV), SD, and fuzzy approximate entropy (fApEn) of the center of pressure (COP) signal during quiet upright standing. We designed five visual exposure conditions: eyes-closed, eyes-open (EO), and three virtual reality (VR) scenes (VR1-VR3). The VR scenes were a limited field view of an optokinetic drum rotating around yaw (VR1), pitch (VR2), and roll (VR3) axes, respectively. Sixteen healthy subjects were involved in the experiment, and their COP trajectories were assessed from the force plate data. MV, SD, and fApEn of the COP in anterior-posterior (AP), medial-lateral (ML) directions were calculated. Two-way analysis of variance with repeated measures was conducted to test the statistical significance. We found that all the three parameters obtained the lowest values in the EO condition, and highest in the VR3 condition. We also found that the active neuromuscular intervention, indicated by fApEn, in response to changing the visual exposure conditions were more adaptive in AP direction, and the stability, indicated by SD, in ML direction reflected the changes of visual scenes.
MV was found to capture both instability and active neuromuscular control dynamics. It seemed that the three parameters provided compensatory information about the postural control in the immersive virtual environment.
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