Welcome

This issue features:

• Comment on Falls Interventions in Nursing Homes Review
• April Falls Day®/Month 2015 Resources
• Websites, Meetings and Conferences
• Recent Abstracts from the research literature

Falls Prevention® is everyone's business

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FOR YOUR DIARY:

• HNELHD Falls Forum - 26th March 2015
• April Falls Day® and Month 2015 - access resources now
• NSW Falls Network Forum - 22nd May 2015 (flyer on page 6).
Characteristics and Effectiveness of Fall Prevention Programs in Nursing Homes: A Systematic Review and Meta-Analysis of Randomized Controlled Trials

Ellen Vlaeyen, Joke Coussément, Greet Leysens, Elisa Van der Elst, Kim Delbaere, Dirk Cambier, Kris Denhaerynck, Stefan Goemaere, Arlette Wertelaers, Fabienne Dobbels, Eddy Dejaeger, Koen Milisen and on behalf of the Center of Expertise for Fall and Fracture Prevention Flanders


SUMMARY

Dr Kim Delbaere, Senior Research Fellow, Neuroscience Research Australia

Nursing home residents have a high risk of falling. About half of the residents fall more than once a year, often resulting in serious injuries. While many fall prevention programs have been developed for nursing homes, there is no conclusive evidence on the effectiveness of these programs. This systematic review is the first to show that it is possible to reduce the number of recurrent fallers in older persons who permanently reside in a nursing home. It uses a meta-analytic approach to investigate the characteristics and effectiveness of single, multiple, and multifactorial fall prevention programs on fall related outcomes.

Fourteen articles, describing 13 studies were analysed including six single, one multiple, and six multifactorial fall prevention programs. The overall meta-analysis across all studies showed that the number of recurrent fallers could be reduced by 21% in nursing home residents. In studies who applied multifactorial interventions, the number of falls could also be reduced by 33%. Out of the six multifactorial interventions, one study used a fully tailored intervention program and five studies used a partially tailored intervention program, including various components: exercise program, medication, orthostatic hypotension, environment, hip protectors, vision, feet and footwear, goal setting, reminders and feedback. Single interventions focusing on staff training and education, on the other hand, showed a significant harmful effect in the intervention groups on the number of falls.

To conclude, multifactorial fall prevention programs can reduce the number of falls and recurrent fallers in nursing home residents. Considering that single intervention such as staff training and education may be harmful, it is advised that nursing homes assess the type of fall prevention interventions they currently use. Nursing homes should try to implement individually-tailored multidisciplinary interventions, where possible.
April Falls Day®/Month 2015

Theme: Confusion and Falls - Don’t let confusion cloud the risk of falls

A day /month for your Health Service to promote Falls Prevention messages to:

• Staff and Patients,
• Families and Carers,
• Community Services and
• General Community

A suite of resources have been developed by the CEC Falls Prevention Program April Falls Working Group including:

• presentations for staff working in hospital, community and residential aged care settings,
• posters (see next page for an example),
• information flyers (on confusion and falls for patients, families and carers for hospital and community settings),

A special April Falls Links newsletter will be produced and we welcome reports with photos (please ensure you have permission from those being photographed) on April Falls activities in your health service. Please send these to e.vance@neura.edu.au by May 4th.
Preventing Falls
Tips for Seniors

1st April 2015
APRIL FALLS DAY

Secure scatter rugs in place or remove them.

Ensure rooms, halls and doorways are well lit.

Keep high traffic areas free of obstacles.

Keep the path from the bed to the bathroom clear.

Consider installing grip bars in the shower or bath.

Avoid rushing!

Only use ladders on dry, hard, flat surfaces, and keep your body weight centred.

Do not store items on the stairs, even temporarily.

Store heavy items in lower cupboards and lighter ones above.

Have emergency numbers handy near your bed and by all phones.

Wear shoes with good rubber soles. Avoid loosely fitting slippers.

Ensure pathways, decks and stairs are in good repair with railings and good traction.

To Do

☑ Check your home for tripping/slipping hazards. Most falls happen at home.

☐ Bone up on calcium & vitamin D: most of us are not getting enough in our diets.

☐ Check medications. Consult your doctor, especially if you are on more than three medications a day.

☐ Make an appointment to get your eyes checked at least once a year after the age of 65.

☐ Try tai chi, a strength-building, balance exercise that has been shown to reduce the risk of falling.

Sources: Public Health Agency of Canada & Health Canada. Reproduced with permission.
Patient Story videos
The 10 Year CEC Anniversary Falls Prevention Video is now live on YouTube:
https://www.youtube.com/watch?v=MPZSiDU3-cY.

Colin’s story shows how building strength, balance and confidence in older people can prevent falls from occurring. It features the Clinical Excellence Commission’s (CEC) Falls Prevention Program and Fairfield Hospital’s Able & Stable program. In marking the CEC’s 10 year anniversary, we feature just a few of the many programs getting real results to improve patient safety and clinical quality in the NSW public health system. We appreciate the support and input of clinicians, managers, staff, consumers and partner organisations who work alongside the CEC to achieve better and safer health care for NSW patients.

These next videos are from the UK and reflect their Health System however they highlight some key issues.

Mrs Andrews Story, Health Service Journal UK
https://www.youtube.com/watch?v=Fj_9HG_TWEM

This follows Mrs Andrews’ story, an 84-year-old woman who, after falling over in the bathroom, spent seven weeks in hospital which subsequently meant she never went home. Her failed care pathway illustrates why we should have more care and support for people like her in the community and that those services need to respond much earlier to people’s needs.

To read more about this case study and an alternative care pathway that shows how her care could have turned out very differently visit http://www.hsj.co.uk/5071057.article

Barbara’s story, Guy and St Thomas, NHS UK

Barbara’s story is a short film about Barbara and her experiences during a hospital visit and is part of an innovative training programme about dementia. This film uses actors to portray the scenario.

3 Ladder falls stories
Northern Sydney LHD has updated the Take Steps to Prevent a Fall section of our website has now been updated with the video clips of the ’3 falls stories’ we did for the seminar series. They may be of use during talks, presentations etc.

The clips can be found on www.nshealthpromotion.com.au

Robert’s Story: http://youtu.be/rlatXniHa6k
Chris’ Story: http://youtu.be/7DxRG6xcTeo
Les’ Story: http://youtu.be/dYACrbrNvmw

Please Note: Viewing the ladder falls stories on Internet Explorer 8 is not ideal.
Focus: Person-centred care

Plenary Speakers

Pam Albany Guest Lecture: Ms Lorraine Lovitt: 10 years on - NSW Falls Prevention Program
Professor Stephen Lord: Falls prevention research update
Professor Rebecca Ivers: The Iron Bark Project: Falls Prevention in Older Aboriginal People in NSW
Dr Anne-Marie Hill: Falls prevention patient education
Mr Nathan Hall: Engaging community dwelling older adults in ongoing exercise programs
Ms Lucy Thompson: Patients as active partners in their health care

Afternoon Concurrent Sessions

Showcasing best practice falls prevention initiatives from Acute/Subacute, Community and Residential Aged Care Settings

Cost: $70 per person (includes arrival tea/coffee, morning tea and light lunch).

For further details and registrations: https://fallsnetwork.neura.edu.au and click on Register Now
Registrations close: 15th May or when fully booked.

Enquiries to Esther Vance e.vance@neura.edu.au (02) 9399 1063
Reviews

Characteristics and effectiveness of fall prevention programs in nursing homes: a systematic review and meta-analysis of randomized controlled trials


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Abstract

OBJECTIVES: To determine characteristics and effectiveness of prevention programs on fall-related outcomes in a defined setting.

DESIGN: Systematic review and meta-analysis.

SETTING: A clearly described subgroup of nursing homes defined as residential facilities that provide 24-hour-a-day surveillance, personal care, and limited clinical care for persons who are typically elderly and infirm.

PARTICIPANTS: Nursing home residents (N = 22,915).

MEASUREMENTS: The primary outcomes were number of falls, fallers, and recurrent fallers.

RESULTS: Thirteen studies met the inclusion criteria. Six fall prevention programs were single (one intervention component provided to the residents), one was multiple (two or more intervention components not customized to individual fall risk), and six were multifactorial (two or more intervention components customized to each resident’s fall risk). Meta-analysis found significantly fewer recurrent fallers in the intervention groups (4 studies, relative risk (RR) = 0.79, 95% confidence interval (CI) = 0.65-0.97) but no significant effect of the intervention on fallers (6 studies, RR = 0.97, 95% CI = 0.84-1.11) or falls (10 studies, RR = 0.93, 95% CI = 0.76-1.13). Multifactorial interventions significantly reduced falls (4 studies, RR = 0.67, 95% CI = 0.55-0.82) and the number of recurrent fallers (4 studies, RR = 0.79, CI = 0.65-0.97), whereas single or multiple interventions did not. Training and education showed a significant harmful effect in the intervention groups on the number of falls (2 studies, RR = 1.29, 95% CI = 1.23-1.36).

CONCLUSION: This meta-analysis failed to reveal a significant effect of fall prevention interventions on falls or fallers but, for the first time, showed that fall prevention interventions significantly reduced the number of recurrent fallers by 21%.

Effect of Pilates exercise for improving balance in older adults: a systematic review with meta-analysis

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Abstract

OBJECTIVE: To investigate the effect of Pilates on balance and falls in older adults; and whether programs tested in prior studies met best-practice recommendations for exercise to prevent falls. DATA SOURCES: MEDLINE, SPORTDiscus, CINAHL, PubMed, The Physiotherapy Evidence Database and The Cochrane Library were searched from earliest record to July 2014.

STUDY SELECTION: Randomized and controlled clinical trials evaluating the effect of Pilates on balance and falls in older adults.

DATA EXTRACTION: Two reviewers independently extracted demographic, intervention and outcome data. Six studies were included in this review.

DATA SYNTHESIS: There is a lack of high-quality studies in this area. When compared to non-active control groups, Pilates was shown to improve balance (SMD 0.84, 95% CI 0.44 to 1.23; 6 studies) and reduce the number of falls...
Abstracts Continued
Recent abstracts from the research literature

(SMD -2.03, 95% CI -2.66 to -1.40; 1 study). Three studies provided sufficient detail to enable assessment of compliance with the recommendation of exercises providing a moderate or high challenge to balance. In these studies, 2-36% of exercises were assessed as providing a moderate or high challenge to balance. All studies provided ≥2 hours of exercise per week and one provided >50 hours of exercise during the study period.

CONCLUSION: The evidence suggests Pilates can improve balance, an important risk factor for falls in older adults. However, there is limited data on the impact on falls. Effects may have been over-estimated due to the low methodological quality of studies. Best-practice recommendations were rarely applied in prior studies indicating greater effects may have been achieved if recommendations were incorporated.

Effects of t'ai chi on balance: a population-based meta-analysis
Song R, Ahn S, So H, Lee EH, Chung Y, Park M.


Affiliation: 1 College of Nursing, Chungnam National University, Daejeon, Korea. (Copyright © 2015, Mary Ann Liebert Publishers)

Abstract

OBJECTIVE: To systematically review and analyze the effects of t’ai chi on balance in older adults.

METHODS: The literature was searched for randomized clinical trials on the effects of t’ai chi on balance, as evaluated by direct, static, dynamic, and mixed measures. The effect sizes (ESs) on balance were calculated by using the standardized mean difference (d) and 95% confidence intervals.

RESULTS: Thirty-four studies were included. The overall ES of t’ai chi on static balance was medium at 3 months (ES=0.73) and small at 6 months (ES=0.33) for participants with a low risk of falling. For those with a high risk of falling, the ES of t’ai chi on static balance was small (ES=0.47) at 3 months but not significant at 6 months. When compared with the no-exercise group, the ES of t’ai chi on static balance was medium (ES=0.66) at 3 months but smaller at 6 months (ES=0.37). The ES of t’ai chi (ES=0.31) was only significant at 6 months when compared with other exercise.

CONCLUSION: The findings of this meta-analysis suggest that persons with a low risk of falling should practice t’ai chi for 3 months to improve their balance. The effects of t’ai chi on balance in those with a high risk of falling were small but significant at 3 months, supporting the safety and effectiveness of t’ai chi. It is important to select reliable and sensitive measures for balance to examine the effects of t’ai chi.

What works to prevent falls in community-dwelling older adults? An umbrella review of meta-analyses of randomized controlled trials
Stubbs B, Brefka S, Denkinger MD.


Affiliation: D. Denkinger, MD, Competence Centre of Geriatrics and Aging Research Ulm/Alb-Donau, Ulm, Germany. (Copyright © 2015, American Physical Therapy Association)

Abstract

BACKGROUND: Preventing falls is an International priority. There is a need to synthesise the highest quality falls prevention evidence in one place for clinicians.

PURPOSE: To conduct an umbrella review of meta-analyses (MA) of randomised controlled trials (RCTs) of falls prevention interventions in community dwelling older adults.

DATA SOURCES: MEDLINE, EMBASE, CINAHL, AMED, BNI, PsycINFO, Cochrane Library, PubMed and the PEDro database.

STUDY SELECTION: MA with one pooled analysis containing ≥ 3 RCTs investigating any intervention to prevent falls in community dwelling older adults aged ≥ 60 years of age were eligible. 16 MA representing 47 pooled analyses were included.

DATA EXTRACTION: Two authors independently extracted data.
DATA SYNTHESIS: Data was narratively synthesised. The methodological quality of the MA was moderate. 3 MA defined a fall and 3 reported adverse events (although minor). There is consistent evidence that exercise reduces falls (including the rate, risk and odds of falling) with 13/14 pooled analyses (93%) from 7 MA demonstrating a significant reduction. The methodological quality of meta-analyses investigating exercise were medium/ high and effect sizes ranged from 0.87 (relative risk (RR) 95% CI 0.81-0.94, N=18, n=3568) to 0.39 (rate ratio (RaR) 95% CI 0.23 - 0.66, N=6). There is consistent evidence that multifactorial interventions reduce falls (5/6, 83% reported significant reduction). There is conflicting evidence regarding the influence of vitamin d supplementation (7/12, 58.3% reported significant reduction).

LIMITATIONS: MA often used different analysis and reporting of key characteristics was often lacking (e.g. participants, heterogeneity, publication bias). There may be some overlap between included MA.

CONCLUSIONS: There is consistent evidence that exercise and individually tailored multifactorial interventions are effective in reducing falls in the community.

Older people's perspectives on participation in physical activity: a systematic review and thematic synthesis of qualitative literature
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Affiliation: The George Institute for Global Health, The University of Sydney, Sydney, New South Wales, Australia. (Copyright © 2015, BMJ Publishing Group)

Abstract
BACKGROUND: Physical inactivity accounts for 9% of all deaths worldwide and is among the top 10 risk factors for global disease burden. Nearly half of people aged over 60 years are inactive. Efforts to identify which factors influence physical activity behaviour are needed.

OBJECTIVE: To identify and synthesise the range of barriers and facilitators to physical activity participation.

METHODS: Systematic review of qualitative studies on the perspectives of physical activity among people aged 60 years and over. MEDLINE, EMBASE, CINAHL, PsychINFO and AMED were searched. Independent raters assessed comprehensiveness of reporting of included studies. Thematic synthesis was used to analyse the data.

RESULTS: From 132 studies involving 5987 participants, we identified six major themes: social influences (valuing interaction with peers, social awkwardness, encouragement from others, dependence on professional instruction); physical limitations (pain or discomfort, concerns about falling, comorbidities); competing priorities; access difficulties (environmental barriers, affordability); personal benefits of physical activity (strength, balance and flexibility, self-confidence, independence, improved health and mental well-being); and motivation and beliefs (apathy, irrelevance and inefficacy, maintaining habits).

CONCLUSIONS: Some older people still believe that physical activity is unnecessary or even potentially harmful. Others recognise the benefits of physical activity, but report a range of barriers to physical activity participation. Strategies to enhance physical activity participation among older people should include (1) raising awareness of the benefits and minimise the perceived risks of physical activity and (2) improving the environmental and financial access to physical activity opportunities.

Epidemiology of balance symptoms and disorders in the community: a systematic review
Murdin L, Schilder AG.

Abstract
INTRODUCTION: Balance disorders presenting with symptoms of dizziness or vertigo may have significant impact on quality of life and are a recognized risk factor for falls.
OBJECTIVE: The objective of this review was to systematically synthesize the published literature on the epidemiology of balance symptoms and disorders in the adult community population.

METHODS: A search was carried out across PubMed, Medline, and Cochrane databases to identify suitable studies. Studies were eligible for inclusion if they contained data on the epidemiology of symptoms of balance disorders (dizziness and vertigo) or balance disorders sampled from community-based adult populations. Data were collected on prevalence and incidence of balance symptoms and on specific balance disorders. A validated risk-of-bias assessment was carried out.

RESULTS: Twenty eligible studies were identified. The lifetime prevalence estimates of significant dizziness ranged between 17 and 30%, and for vertigo between 3 and 10%. Published point prevalence data exist for Ménière’s disease (0.12-0.5%) and for vestibular migraine (0.98%). For benign paroxysmal positional vertigo, 1-year incidence estimates range from 0.06 to 0.6%. There are no community-based studies on the prevalence or incidence of chronic uncompensated peripheral vestibular disorders or vestibular neuritis.

CONCLUSION: Symptoms of dizziness and vertigo are common in the adult population, and data give a coherent picture of community epidemiology. These data can inform rational service planning and much-needed clinical trials in this field. There are insufficient data on specific balance disorders, especially peripheral vestibular disorders such as vestibular neuritis and its long-term sequelae.

Falls and fallers in traumatic brain injury (TBI) rehabilitation settings: an integrative review

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(Copyright © 2015, Informa - Taylor and Francis Group)

Abstract
PURPOSE: To critically appraise the research literature on the nature of falls and fallers in traumatic brain injury (TBI) rehabilitation settings.

METHOD: An integrative review of the literature using thematic analysis was undertaken. Papers identified via a systematic search strategy were independently appraised by two reviewers. A data extraction instrument was developed to record results and to aid identification of themes in the literature. Critical Appraisal Skills Programme instruments were utilised to conduct a methodological critique of the papers included.

RESULTS: Thirteen studies were identified as having between 4% and 100% TBI patients in their study cohorts. From these papers, up to 71% of falls took place in a patient’s bedroom occurring in peaks and troughs over a 24-h period. With some divergent results, nine themes were identified describing faller characteristics including: (1) functional mobility impairments; (2) dizziness; (3) bladder and bowel dysfunction; (4) certain medications and number of medications prescribed; (5) executive functioning; (6) patient age; (7) fear of falling; (8) coma length following TBI; and (9) Functional Independence Measure (FIM™) total score, subscale scores and particular individual items.

CONCLUSIONS: Being a multifactorial phenomenon, falls are a complex clinical issue. Despite the heterogeneity of diagnosis related groups (DRGs) in the included studies, TBI patients were identified as a high falls risk patient population in several studies. Implications for Rehabilitation Due to multisystem impairments, falls in the traumatic brain injury (TBI) rehabilitation context are a multifactorial and significant clinical issue. When interpreting and generalising results from research into falls, clinicians need to be mindful that falls and faller characteristics may be dependent on study setting and patient population. There is need for context specific research into faller characteristics following a TBI; particularly in relation to post-traumatic amnesia.
**Epidemiology**

**Fall predictors in older cancer patients: a multicenter prospective study**


*BMC Geriatr.* 2014; 14: 135. (Copyright © 2014, BioMed Central)

**Abstract**

**BACKGROUND:** In the older population falls are a common problem and a major cause of morbidity, mortality and functional decline. The etiology is often multifactorial making the identification of fall predictors essential for preventive measures. Despite this knowledge, data on falls within the older cancer population are limited. The objective of this study was to evaluate the occurrence of falls within 2 to 3 months after cancer treatment decision and to identify predictors of falls (≥1 fall) during follow-up.

**METHODS:** Older patients (70 years or more) with a cancer treatment decision were included. At baseline, all patients underwent geriatric screening (G8 and Flemish Triage Risk Screening Tool), followed by a geriatric assessment including living situation, activities of daily living (ADL), instrumental activities of daily living (IADL), fall history in the past 12 months, fatigue, cognition, depression, nutrition, comorbidities and polypharmacy. Questionnaires were used to collect follow-up (2-3 months) data. Univariate and multivariate analyses were performed to identify predictors for falls (≥1 fall) during follow-up.

**RESULTS:** At baseline, 295 (31.5%) of 937 included patients reported at least one fall in the past 12 months with 88 patients (29.5%) sustaining a major injury. During follow-up (2-3 months), 142 (17.6%) patients fell, of whom 51.4% fell recurrently and 17.6% reported a major injury. Baseline fall history in the past 12 months (OR = 3.926), fatigue (OR = 0.380), ADL dependency (OR = 0.492), geriatric risk profile by G8 (OR = 0.471) and living alone (OR = 1.631) were independent predictors of falls (≥1 fall) within 2-3 months after cancer treatment decision.

**CONCLUSION:** Falls are a serious problem among older cancer patients. Geriatric screening and assessment data can identify patients at risk for a fall. A patient with risk factors associated with falls should undergo further evaluation and intervention to prevent potentially injurious fall incidents.

**Identifying clusters of falls-related hospital admissions to inform population targets for prioritising falls prevention programmes**


Affiliation: Monash Injury Research Institute (MIRI), Monash University, Clayton, Victoria, Australia. (Copyright © 2015, BMJ Publishing Group)

**Abstract**

**BACKGROUND:** There has been limited research investigating the relationship between injurious falls and hospital resource use. The aims of this study were to identify clusters of community-dwelling older people in the general population who are at increased risk of being admitted to hospital following a fall and how those clusters differed in their use of hospital resources.

**METHODS:** Analysis of routinely collected hospital admissions data relating to 45 374 fall-related admissions in Victorian community-dwelling older adults aged ≥65 years that occurred during 2008/2009 to 2010/2011. Fall-related admission episodes were identified based on being admitted from a private residence to hospital with a principal diagnosis of injury (International Classification of Diseases (ICD)-10-AM codes S00 to T75) and having a first external cause of a fall (ICD-10-AM codes W00 to W19). A cluster analysis was performed to identify homogeneous groups using demographic details of patients and information on the presence of comorbidities. Hospital length of stay (LOS) was compared across clusters using competing risks regression.

**RESULTS:** Clusters based on area of residence, demographic factors (age, gender, marital status, country of birth) and the presence of comorbidities were identified. Clusters representing hospitalised fallers with comorbidities were associated with longer LOS compared with other cluster groups. Clusters delineated by demographic factors were also associated with increased LOS.

**CONCLUSIONS:** All patients with comorbidity, and older women without comorbidities, stay in hospital longer following a fall and hence consume a disproportionate share of hospital resources. These findings have important implications for the targeting of falls prevention interventions for community-dwelling older people.
Risk Assessment

Ambulatory fall-risk assessment: amount and quality of daily-life gait predict falls in older adults


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**Abstract**

**BACKGROUND:** Ambulatory measurements of trunk accelerations can provide valuable information on the amount and quality of daily-life activities and contribute to the identification of individuals at risk of falls. We compared associations between retrospective and prospective falls with potential risk factors as measured by daily-life accelerometry. In addition, we investigated predictive value of these parameters for 6-month prospective falls.

**METHODS:** One week of trunk accelerometry (DynaPort MoveMonitor) was obtained in 169 older adults (mean age 75). The amount of daily activity and quality of gait were determined and validated questionnaires on fall-risk factors, grip strength, and trail making test were obtained. Six-month fall incidence was obtained retrospectively by recall and prospectively by fall diaries and monthly telephone contact.

**RESULTS:** Among all participants, 35.5% had a history of ≥1 falls and 34.9% experienced ≥1 falls during 6-month follow-up. Logistic regressions showed that questionnaires, grip strength, and trail making test, as well as the amount and quality of gait, were significantly associated with falls. Significant associations differed between retrospective and prospective analyses although odds ratios indicated similar patterns. Predictive ability based on questionnaires, grip strength, and trail making test (area under the curve.68) improved substantially by accelerometry-derived parameters of the amount of gait (number of strides), gait quality (complexity, intensity, and smoothness), and their interactions (area under the curve.82).

**CONCLUSIONS:** Daily-life accelerometry contributes substantially to the identification of individuals at risk of falls, and can predict falls in 6 months with good accuracy.

Choice stepping reaction time test using exergame technology for fall risk assessment in older people
Ejupi A, Brodie M, Gschwind YJ, Schoene D, Lord S, Delbaere K.


**Abstract**

Accidental falls remain an important problem in older people. Stepping is a common task to avoid a fall and requires good interplay between sensory functions, central processing and motor execution. Increased choice stepping reaction time has been associated with recurrent falls in older people. The aim of this study was to examine if a sensor-based Exergame Choice Stepping Reaction Time test can successfully discriminate older fallers from non-fallers. The stepping test was conducted in a cohort of 104 community-dwelling older people (mean age: 80.7 ± 7.0 years). Participants were asked to step laterally as quickly as possible after a light stimulus appeared on a TV screen. Spatial and temporal measurements of the lower and upper body were derived from a low-cost and portable 3D-depth sensor (i.e. Microsoft Kinect) and 3D-accelerometer. Fallers had a slower stepping reaction time (970 ± 228 ms vs. 858 ± 123 ms, P = 0.001) and a slower reaction of their upper body (719 ± 289 ms vs. 631 ± 166 ms, P = 0.052) compared to non-fallers. It took fallers significantly longer than non-fallers to recover their balance after initiating the step (2147 ± 800 ms vs. 1841 ± 591 ms, P = 0.029). This study demonstrated that a sensor-based, low-cost and easy to administer stepping test, with the potential to be used in clinical practice or regular unsupervised home assessments, was able to identify significant differences between performances by fallers and non-fallers.

A multifactorial falls risk prediction model for hospitalized older adults
Gholam Hosseini H, Baig MM, Connolly MJ, Linden M.

Abstract
Ageing population worldwide has grown fast with more cases of chronic illnesses and co-morbidity, involving higher healthcare costs. Falls are one of the leading causes of unintentional injury-related deaths in older adults. The aim of this study was to develop a robust multifactorial model toward the falls risk prediction. The proposed model employs real-time vital signs, motion data, falls history and muscle strength. Moreover, it identifies high-risk individuals for the development falls in their activity of daily living (ADL). The falls risk prediction model has been tested at a controlled-environment in hospital with 30 patients and compared with the results from the Morse fall scale. The simulated results show the proposed algorithm achieved an accuracy of 98%, sensitivity of 96% and specificity of 100% among a total of 80 intentional falls and 40 ADLs. The ultimate aim of this study is to extend the application to elderly home care and monitoring.

Agreement between video footage and fall incident reports on the circumstances of falls in long-term care
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Abstract
OBJECTIVE: Incident reports guide fall prevention efforts in long-term care (LTC) facilities, often based on descriptions of how falls occurred. The validity of these reports is poorly understood. We examined agreement on fall characteristics between fall incident reports and analysis of video footage of real-life falls in LTC.

DESIGN/SETTING/PARTICIPANTS: Video capture of 863 falls (by 309 individuals) over 6 years in common areas of 2 LTC facilities in British Columbia.

MEASUREMENTS: We reviewed each fall video with a previously validated questionnaire to determine the cause of imbalance leading to the fall, activity at the time of falling, and use of mobility aids. These data were compared with corresponding information recorded by staff on fall incident reports.

RESULTS: There was agreement between video analysis and incident reports on the cause of imbalance in 45.5% of falls (kappa = 0.25), on activity at time of falling in 45.1% of falls (kappa = 0.22), and on use of mobility aids in 79.5% of falls (kappa = 0.59). When compared with video analysis, incident reports over reported falls due to slips, and falling while rising and while using a wheelchair or walker. Incident reports also underreported falls due to hit/bump and loss-of-support, and falling while standing and sitting down.

CONCLUSION: In more than 50% of falls, we found discrepancies between fall incident reports and analysis of video footage on the cause of imbalance and activity while falling. Emerging technologies incorporating video capture or wearable sensors should improve our ability to understand the mechanisms and improve the prevention of falls in LTC.

Risk Factors
Influence of admission to a tertiary care hospital after a fall on use of potentially inappropriate medications among older patients
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Abstract
BACKGROUND: Each year, about one-third of individuals over the age of 65 years will experience a fall, and half of
these will experience a subsequent fall in the following year. The use of potentially inappropriate medications (PIMs) is an important factor contributing to increased fall risk in geriatric patients.

OBJECTIVE: To determine the proportion of patients over the age of 65 admitted to orthopedics and general medicine services with diagnosis of a fall who experienced a change in the total number or dosage of PIMs, as defined by the Beers criteria, upon discharge from hospital.

METHODS: This retrospective observational study involved patients admitted to a tertiary care hospital with diagnosis of a fall between January 1 and December 31, 2011. Those aged 65 years or older with at least one PIM on admission were eligible for inclusion. Data analysis included $\chi^2$ and Fisher testing, as well as multivariate analysis.

RESULTS: A total of 148 patients were included, of whom 63 (43%) had an overall change in the dosage or number of PIMs during their hospital stay. Forty patients (27%) had an overall reduction in the dosage or number of PIMs upon discharge from hospital, whereas 23 (16%) experienced an overall increase in the dosage or total number of PIMs. The mean number ($\pm$ standard deviation) of PIMs decreased during the hospital stay, from $1.6 \pm 0.8$ on admission to $1.4 \pm 0.9$ on discharge ($p = 0.03$). Benzodiazepines were the class of PIMs most frequently discontinued or reduced in dosage.

CONCLUSION: One-quarter of patients admitted with falls had de-escalation of PIMs upon hospital discharge. Although dosage reduction or drug discontinuation may not be appropriate for all patients, a standardized approach to medication review during the hospital stay and improved prescriber education and awareness of PIM use among elderly individuals are warranted.

Understanding the relationship between walking aids and falls in older adults: a prospective cohort study

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Abstract

BACKGROUND: A substantial proportion of older adults living in residential aged care facilities are using wheelchairs or walk with aids. The relationship between using walking aids and falling is somewhat inconsistent and poorly understood.

PURPOSE: To investigate the use of walking aids as a risk factor for future falls among older adults living in residential aged care facilities and to identify spatiotemporal gait parameters that mediate the potential relationship between walking aids and falling.

METHODS: Forty-three older adults (22 using walking aids and 21 not using walking aids) living in residential aged care facilities were enrolled in this study. Fall history, fear of falling, and the use of psychotropic agents were registered. Spatiotemporal gait (GAITRite®), grip strength (Jamar®), and cognitive status (Mini-Mental State Examination and Clock Drawing Test) were assessed. Falls were prospectively recorded during a 12-month follow-up period using monthly calendars.

RESULTS: Individuals using walking aids were older ($P = 0.012$), had a greater fear of falling ($P = 0.017$), and demonstrated a more conservative gait pattern compared with those not using walking aids. They walked slower ($P < 0.001$) and had a lower cadence ($P < 0.001$) and shorter step length ($P = 0.018$) and step time ($P = 0.003$). Twenty-two participants (15 using walking aids vs 7 not using walking aids) reported at least one fall (“fallers”). Univariate logistic regression identified using walking aids as a risk factor for future falls (odds ratio, 3.98; 95% confidence interval, 1.10-14.37; $P = 0.035$). A lower cadence, increased stance percentage, decreased swing percentage, increased age, and greater psychotropic drug intake were mediators that reduced the odds ratio of the relationship between using walking aids and faller status the most.

CONCLUSIONS: Using walking aids is a risk factor for future falls among the older population living in residential settings. A substantial proportion of the relationship between walking aids and future falls could be explained by an altered spatiotemporal gait pattern, increased age, and psychotropic drug intake. This finding supports the aim of extensive training periods and appropriate instructions on the proper use of walking aids in terms of adequate and safe gait patterns.
Abstracts Continued
Recent abstracts from the research literature

The use of a frailty index to predict adverse health outcomes (falls, fractures, hospitalization, medication use, comorbid conditions) in people with intellectual disabilities
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Abstract
Frailty in older people can be seen as the increased likelihood of future negative health outcomes. Lifelong disabilities in people with intellectual disabilities (ID) may not only influence their frailty status but also the consequences. Here, we report the relation between frailty and adverse health outcomes in older people with ID (50 years and over). In a prospective population based study, frailty was measured at baseline with a frailty index in 982 older adults with ID (≥50 yr). Information on negative health outcomes (falls, fractures, hospitalization, increased medication use, and comorbid conditions) was collected at baseline and after a three-year follow-up period. Odds ratios or regression coefficients for negative health outcomes were estimated with the frailty index, adjusted for gender, age, level of ID, Down syndrome and baseline adverse health condition. The frailty index was related to an increased risk of higher medication use and several comorbid conditions, but not to falls, fractures and hospitalization. Frailty at baseline was related to negative health outcomes three years later in older people with ID, but to a lesser extent than found in the general population.

Interventions
A cost-benefit analysis of three older adult fall prevention interventions
Carande-Kulis V, Stevens JA, Florence CS, Beattie BL, Arias I.
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Abstract
INTRODUCTION: One out of three persons aged 65 and older falls annually and 20% to 30% of falls result in injury. The purpose of this cost-benefit analysis was to identify community-based fall interventions that were feasible, effective, and provided a positive return on investment (ROI).

METHODS: A third-party payer perspective was used to determine the costs and benefits of three effective fall interventions. Intervention effectiveness was based on randomized controlled trial results. National data were used to estimate the average annual benefits from averting the direct medical costs of a fall. The net benefit and ROI were estimated for each of the interventions.

RESULTS: For the Otago Exercise Program delivered to persons aged 65 and older, the net benefit was $121.85 per participant and the ROI was 36% for each dollar invested. For Otago delivered to persons aged 80 and older, the net benefit was $429.18 and the ROI was 127%. Tai chi: Moving for Better Balance had a net benefit of $529.86 and an ROI of 509% and Stepping On had a net benefit of $134.37 and an ROI of 64%.

CONCLUSIONS: All three fall interventions provided positive net benefits. The ROIs showed that the benefits not only covered the implementation costs but also exceeded the expected direct program delivery costs. These results can help health care funders and other community organizations select appropriate and effective fall interventions that also can provide positive returns on investment.

Exercise for falls prevention in Parkinson disease: a randomized controlled trial
Abstract

OBJECTIVE: To determine whether falls can be prevented with minimally supervised exercise targeting potentially remediable fall risk factors, i.e., poor balance, reduced leg muscle strength, and freezing of gait, in people with Parkinson disease.

METHODS: Two hundred thirty-one people with Parkinson disease were randomized into exercise or usual-care control groups. Exercises were practiced for 40 to 60 minutes, 3 times weekly for 6 months. Primary outcomes were fall rates and proportion of fallers during the intervention period. Secondary outcomes were physical (balance, mobility, freezing of gait, habitual physical activity), psychological (fear of falling, affect), and quality-of-life measures.

RESULTS: There was no significant difference between groups in the rate of falls (incidence rate ratio [IRR] = 0.73, 95% confidence interval [CI] 0.45-1.17, p = 0.18) or proportion of fallers (p = 0.45). Preplanned subgroup analysis revealed a significant interaction for disease severity (p < 0.001). In the lower disease severity subgroup, there were fewer falls in the exercise group compared with controls (IRR = 0.31, 95% CI 0.15-0.62, p < 0.001), while in the higher disease severity subgroup, there was a trend toward more falls in the exercise group (IRR = 1.61, 95% CI 0.86-3.03, p = 0.13). Postintervention, the exercise group scored significantly (p < 0.05) better than controls on the Short Physical Performance Battery, sit-to-stand, fear of falling, affect, and quality of life, after adjusting for baseline performance.

CONCLUSIONS: An exercise program targeting balance, leg strength, and freezing of gait did not reduce falls but improved physical and psychological health. Falls were reduced in people with milder disease but not in those with more severe Parkinson disease. CLASSIFICATION OF EVIDENCE: This study provides Class III evidence that for patients with Parkinson disease, a minimally supervised exercise program does not reduce fall risk. This study lacked the precision to exclude a moderate reduction or modest increase in fall risk from exercise. Trial registration: Australian New Zealand Clinical Trials Registry (ACTRN12608000303347).

The impact of a home-based walking programme on falls in older people: the Easy Steps randomised controlled trial


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Abstract

BACKGROUND: walking is the most popular form of exercise in older people but the impact of walking on falls is unclear. This study investigated the impact of a 48-week walking programme on falls in older people.

METHODS: three hundred and eighty-six physically inactive people aged 65+ years living in the community were randomised into an intervention or control group. The intervention group received a self-paced, 48-week walking programme that involved three mailed printed manuals and telephone coaching. Coinciding with the walking programme manual control group participants received health information unrelated to falls. Monthly falls calendars were used to monitor falls (primary outcome) over 48 weeks. Secondary outcomes were self-reported quality of life, falls efficacy, exercise and walking levels. Mobility, leg strength and choice stepping reaction time were measured in a sub-sample (n = 178) of participants.

RESULTS: there was no difference in fall rates between the intervention and control groups in the follow-up period (IRR = 0.88, 95% CI: 0.60-1.29). By the end of the study, intervention group participants spent significantly more time exercising in general, and specifically walking for exercise (median 1.69 versus 0.75 h/week, P < 0.001).

CONCLUSION: our finding that a walking programme is ineffective in preventing falls supports previous research and questions the suitability of recommending walking as a fall prevention strategy for older people. Walking, however, increases physical activity levels in previously inactive older people.
A randomized controlled trial to reduce falls in people with Parkinson's disease

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Abstract

BACKGROUND: Falls are common and disabling in people with Parkinson's disease (PD). There is a need to quantify the effects of movement rehabilitation on falls in PD.

OBJECTIVE: To evaluate 2 physical therapy interventions in reducing falls in PD.

METHODS: We randomized 210 people with PD to 3 groups: progressive resistance strength training coupled with falls prevention education, movement strategy training combined with falls prevention education, and life-skills information (control). All received 8 weeks of out-patient therapy once per week and a structured home program. The primary end point was the falls rate, recorded prospectively over a 12 month period, starting from the completion of the intervention. Secondary outcomes were walking speed, disability, and quality of life.

RESULTS: A total of 1547 falls were reported for the trial. The falls rate was higher in the control group compared with the groups that received strength training or strategy training. There were 193 falls for the progressive resistance strength training group, 441 for the movement strategy group and 913 for the control group. The strength training group had 84.9% fewer falls than controls (incidence rate ratio [IRR] = 0.151, 95% CI 0.071-0.327, P <.001). The movement strategy training group had 61.5% fewer falls than controls (IRR = 0.385, 95% CI 0.184-0.808, P =.012). Disability scores improved in the intervention groups following therapy while deteriorating in the control group.

CONCLUSIONS: Rehabilitation combining falls prevention education with strength training or movement strategy training reduces the rate of falls in people with mild to moderately severe PD and is feasible.

Effect of a falls quality improvement program on serious fall-related injuries

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Abstract

OBJECTIVES: To determine whether a program that improves the quality of care for falls reduces the number of episodes of care for serious fall-related injuries.

DESIGN: Nonrandomized controlled trial.

SETTING: Four community-based primary care practices.

PARTICIPANTS: Individuals aged 75 and older who screened positive for fall risk.

INTERVENTION: A multicomponent quality improvement program (Assessing Care of Vulnerable Elders Practice Redesign for Improved Medical Care for Elders) involving face-to-face clinician education about falls and decision support to prompt primary care providers to implement appropriate care, including referral to appropriate community resources, in response to individuals screening positive for fall risk.

MEASUREMENTS: Episodes of care for selected fall-related injuries, based on healthcare claims.

RESULTS: Of 1,791 individuals with data available for analysis, 1,187 were in the intervention group, and 604 were in the control group. Mean age was 83, and more than two-thirds of the sample were women. After adjusting for potential confounders, there were no statistically significant differences between intervention and control.
groups in episodes of care for fall-related injuries during the 12-month (incidence rate ratio (IRR) 1.27, 95% confidence interval (CI) = 0.93-1.73) or 24-month (IRR 1.18, 95% CI = 0.93-1.49) period after initiation of the intervention.

CONCLUSION: Despite improving the care of falls, this quality improvement initiative did not result in a change in the number of episodes of care for serious fall-related injuries. Future work in community-based settings should test higher-intensity interventions to reduce fall-related injuries.

Management of falls in community-dwelling older adults: a clinical guidance statement from the Academy of Geriatric Physical Therapy of the American Physical Therapy Association

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Abstract

BACKGROUND: Falls in older adults are a major public health concern due to high prevalence, impact on health outcomes and quality of life, and treatment costs. Physical therapists (PTs) can play a major role in reducing fall risk for older adults; however, existing clinical practice guidelines (CPGs) related to fall prevention and management are not targeted to PTs.

OBJECTIVE: The purpose of this clinical guidance statement (CGS) is to provide recommendations to PTs to help improve outcomes in the identification and management of fall risk in community-dwelling older adults.

DESIGN AND METHODS: The Subcommittee on Evidence-based Documents (EBDs) of the Practice Committee of the Academy of Geriatric Physical Therapy developed this CGS. Existing CPGs were identified by systematic search and critically appraised using the Appraisal of Guidelines, Research, and Evaluation in Europe II (AGREE II) tool. Through this process, 3 CPGs were recommended for inclusion in the CGS and were synthesized and summarized.

RESULTS: Screening recommendations include asking all older adults in contact with a health care provider whether they have fallen in the past year or have concerns about balance or walking. Follow-up should include screening for balance and mobility impairments. Older adults who screen positive should have a targeted multifactorial assessment and targeted intervention. The components of this assessment and intervention are reviewed in this CGS, and barriers and issues related to implementation are discussed. LIMITATIONS: A gap analysis supports the need for the development of a PT-specific CPG to provide more precise recommendations for screening and assessment measures, exercise parameters, and delivery models.

CONCLUSION: This CGS provides recommendations to assist PTs in the identification and management of fall risk in older community-dwelling adults.

Translating a fall prevention intervention into practice: a randomized community trial

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Abstract

OBJECTIVE:. We examined whether community translation of an effective evidence-based fall prevention program via standard monetary support can produce a community-wide reduction in fall injuries in older adults and evaluated whether an enhanced version with added technical support and capacity building amplified the fall reduction effect.
METHODS: We completed a randomized controlled community trial among adults aged 65 and older in (1) 10 control communities receiving no special resources or guidance on fall prevention, (2) 5 standard support communities receiving modest funding to implement Stepping On, and (3) 5 enhanced support communities receiving funding and technical support. The primary outcome was hospital inpatient and emergency department discharges for falls, examined with Poisson regression.

RESULTS: Compared with control communities, standard and enhanced support communities showed significantly higher community-wide reductions (9% and 8%, respectively) in fall injuries from baseline (2007-2008) to follow-up (2010-2011). No significant difference was found between enhanced and standard support communities.

CONCLUSIONS: Population-based fall prevention interventions can be effective when implemented in community settings. More research is needed to identify the barriers and facilitators that influence the successful adoption and implementation of fall prevention interventions into broad community practice.

Group balance training specifically designed for individuals with Alzheimer disease: impact on Berg balance scale, timed up and go, gait speed, and mini-mental status examination

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Abstract

BACKGROUND AND PURPOSE: Individuals with Alzheimer disease (IwAD) experience more frequent and more injurious falls than their cognitively intact peers. Evidence of balance and gait dysfunction is observed earlier in the course of Alzheimer disease (AD) than once believed. Balance training has been demonstrated to be effective in improving balance and decreasing falls in cognitively intact older adults but is not well studied in IwAD. This study was designed to analyze the effects of a group balance training program on balance and falls in IwAD. The program was developed specifically for IwAD, with explicit guidelines for communication/interaction and deliberate structure of training sessions catered to the motor learning needs of IwAD.

DESIGN: This prospective, quasi-experimental, pretest-posttest design study describes the effects of a balance training program for a cohort of IwAD.

METHODS: Thirty IwAD were recruited from 3 adult day health centers; 22 completed at least 1 posttest session. Participants were tested with Berg Balance Scale (BBS), Timed Up and Go (TUG), Self-Selected Gait Speed (SSGS), Fast Gait Speed (FGS), and Mini-Mental Status Examination (MMSE) immediately before and after the 3-month intervention and again 3 months later. Group training was held at the adult day health centers for 45 minutes, twice per week. Sessions were characterized by massed, constant, and blocked practice of functional, relevant activities with considerable repetition. Ratio of participant to staff member never exceeded 3:1. Physical therapist staff members assured that participants were up on their feet the majority of each session and were individually challenged as much as possible.

RESULTS: Repeated-measures analysis of variance (ANOVA) for BBS was significant (F = 15.04; df = 1.67/28.40; P = .000) with post hoc tests, revealing improvement between pretest and immediate posttest (P = .000) and decline in performance between immediate and 3-month posttest (P = .012). Repeated-measures ANOVA posttest for MMSE was significant (F = 5.12; df = 1.73/22.53; P =.018) with post hoc tests, showing no change in MMSE between pretest and immediate posttest but decline in MMSE when comparing immediate posttest with 3-month posttest (P =.038) and pretest with 3-month posttest (P =.019). Repeated-measures ANOVA for TUG, FGS, and SSGS were not significant. Immediate effects of the intervention as assessed by the a priori paired t tests (comparing pre- and immediate posttest data) revealed significant improvement in BBS (t = -7.010; df = 20; P = .000), TUG (t = 3.103; df = 20; P =.006), and FGS (t = -2.115; df = 19; P =.048), but not in SSGS (t = -1.456; df = 20; P =.161).

DISCUSSION AND CONCLUSION: The 3-month group balance training intervention designed specifically for IwAD was effective in improving balance and mobility, as evidenced by improved BBS and TUG performances. Cognition did not decline during the course of the intervention but did decline following the intervention, suggesting a possible protective effect. Given the promising findings, a larger-scale controlled study is warranted.
Joining the Network
To join the NSW Falls Prevention Network listserv, send an email to:
majourdmo@lists.health.nsw.gov.au
In the body of the message type
subscribe nsw-falls-network
on the next line type end
Do not put anything in the subject line. You will receive an e-mail to confirm you have been added to the listserv.

To unsubscribe send an e-mail to:
majourdmo@lists.health.nsw.gov.au
and in the body of the message type
unsubscribe nsw-falls-network
on the next line type end
If you have any problems, contact Esther Vance at e.vance@neura.edu.au.

Share your news and information/ideas
Do you have any news on Falls Prevention you want to share with others on the network, or do you want to report on a project that is happening in your area.

Please email Esther with your information. We also welcome suggestions for articles and information you would like to see in this newsletter.

Send your information to:
e.vance@neura.edu.au

The Network Listserv
It is great to see the increased activity on the listserv and we want to continue to promote this. To send an item to the listserv where all members of the network can see it, send an email to:
nsf-walls-network@lists.health.nsw.gov.au
You need to be a subscriber to the listserv to send an email that will be distributed to all members of the listserv. Remember to put a short description in the subject line.

Recently some posts to the listserv have bounced due to email address changes, you need to re-subscribe with your new e-mail address and unsubscribe from your old address following the Join the Network instructions as shown on this page.

NSW Falls Prevention Network Background
The NSW Falls Prevention Network was established in 1993. The role of this network has grown since its inception and now includes:

• Meetings for discussion of falls related issues;
• Dissemination of research findings both local and international;
• Sharing resources developed and exploration of opportunities to combine resources in joint initiatives;
• Encouragement of collaborative projects and research;
• To act as a group to influence policy;
• To liaise with NSW Ministry of Health to provide information on current State/Commonwealth issues in relation to falls and
• Maintenance of resources pertinent to the field.

The main purpose of the network is to share knowledge, expertise and resources on falls prevention for older people.

The NSW Falls Prevention Network activities are part of the implementation of the NSW Falls Prevention Policy funded by the NSW Ministry of Health.

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