

SafetyLit March 12, 2017**A systematic review of gait perturbation paradigms for improving reactive stepping responses and falls risk among healthy older adults**

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Eur. Rev. Aging Phys. Activ. 2017; 14: e3.

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DOI 10.1186/s11556-017-0173-7 **PMID** 28270866

Abstract

BACKGROUND: Falls are a leading cause of injury among older adults and most often occur during walking. While strength and balance training moderately improve falls risk, training reactive recovery responses following sudden perturbations during walking may be more task-specific for falls prevention. The aim of this review was to determine the variety, characteristics and effectiveness of gait perturbation paradigms that have been used for improving reactive recovery responses during walking and reducing falls among healthy older adults.

METHODS: A systematic search was conducted in PubMed, Web of Science, MEDLINE and CINAHL databases in December 2015, repeated in May 2016, using sets of terms relating to gait, perturbations, adaptation and training, and ageing. Inclusion criteria: studies were conducted with healthy participants of 60 years or older; repeated, unpredictable, mechanical perturbations were applied during walking; and reactive recovery responses to gait perturbations or the incidence of laboratory or daily life falls were recorded. Results were narratively synthesised. The risk of bias for each study (PEDro Scale) and the levels of evidence for each perturbation type were determined.

RESULTS: In the nine studies that met the inclusion criteria, moveable floor platforms, ground surface compliance changes, or treadmill belt accelerations or decelerations were used to perturb the gait of older adults. Eight studies used a single session of perturbations, with two studies using multiple sessions. Eight of the studies reported improvement in the reactive recovery response to the perturbations. Four studies reported a reduction in the percentage of laboratory falls from the pre- to post-perturbation experience measurement and two studies reported a reduction in daily life falls. As well as the range of perturbation types, the magnitude and frequency of the perturbations varied between the studies.

CONCLUSIONS: To date, a range of perturbation paradigms have been used successfully to perturb older adults' gait and stimulate reactive response adaptations. Variation also exists in the number and magnitudes of applied perturbations. Future research should examine the effects of perturbation type, magnitude and number on the extent and retention of the reactive recovery response adaptations, as well as on falls, over longer time periods among older adults.

PDF Y Endnote Y**Activity monitoring and heart rate variability as indicators of fall risk: proof-of-concept for application of wearable sensors in the acute care setting**

Razjouyan J, Grewal GS, Rishel C, Parthasarathy S, Mohler J, Najafi B.

J. Gerontol. Nurs. 2017; ePub(ePub): 1-10.

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DOI 10.3928/00989134-20170223-01 PMID 28253410

Abstract

Growing concern for falls in acute care settings could be addressed with objective evaluation of fall risk. The current proof-of-concept study evaluated the feasibility of using a chest-worn sensor during hospitalization to determine fall risk. Physical activity and heart rate variability (HRV) of 31 volunteers admitted to a 29-bed adult inpatient unit were recorded using a single chest-worn sensor. Sensor data during the first 24-hour recording were analyzed. Participants were stratified using the Hendrich II fall risk assessment into high and low fall risk groups. Univariate analysis revealed age, daytime activity, nighttime side lying posture, and HRV were significantly different between groups.

RESULTS suggest feasibility of wearable technology to consciously monitor physical activity, sleep postures, and HRV as potential markers of fall risk in the acute care setting. Further study is warranted to confirm the results and examine the efficacy of the proposed wearable technology to manage falls in hospitals. [Journal of Gerontological Nursing, xx(x), xx-xx.].

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PDF N Endnote Y

Balance training with a dynamometric platform following total knee replacement: a randomized controlled trial

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

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(Copyright © 2017, American Physical Therapy Association)

DOI 10.1519/JPT.000000000000121 PMID 28252471

Abstract

BACKGROUND AND PURPOSE: Sensorimotor training has proven to be an efficient approach for recovering balance control following total knee replacement (TKR). The purpose of this trial was to evaluate the influence of specific balance-targeted training using a dynamometric platform on the overall state of balance in older adults undergoing TKR.

METHODS: This was a randomized controlled clinical trial conducted at a university hospital rehabilitation unit. Patients meeting the inclusion criteria were randomly assigned to a control group or an experimental group. Both groups participated in the same 4-week postoperative rehabilitation training protocol. Participants in the experimental group performed additional balance training with a dynamometric platform consisting of tests related to stability challenges, weight-shifting, and moving to the limits of stability. The primary outcome measure was the overall state of balance rated according to the Berg Balance Scale. Secondary outcomes in terms of balance were the Timed Up and Go Test, Functional Reach Test, and Romberg open and closed-eyes tests. Data processing included between-group analysis of covariance, minimal detectable change assessment for the primary outcome measure, and effect size estimation. Confidence intervals (CIs) were set at 95%.

RESULTS: Forty-three participants meeting the inclusion criteria and having signed the informed consent were randomly assigned to 2 groups. Thirty-seven completed the training (86.1%). Significant between-group differences in balance performance were found as measured with the Berg Balance Scale ($P = .03$) and Functional Reach Test ($P = .04$) with a CI = 95%. Significant differences were not recorded for the Timed Up and Go Test or Romberg open and closed-eyes tests ($P > .05$).

Furthermore, Cohen's effect size resulted in a value of $d = 0.97$, suggesting a high practical significance of the trial.

DISCUSSION AND CONCLUSIONS: According to the Berg Balance Scale and Functional Reach Test, participants with TKR who have followed a 4-week training program using a dynamometric platform improved balance performance to a higher extent than a control group training without such a device. The inclusion of this instrument in the functional training protocol may be beneficial for recovering balance following TKR.

PDF N Endnote Y

Biology of falls: preliminary cohort study suggesting a possible role for oxidative stress

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J. Am. Geriatr. Soc. 2017; ePub(ePub): ePub.

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(Copyright © 2017, John Wiley and Sons)

DOI 10.1111/jgs.14822 **PMID** 28248417

Abstract

BACKGROUND: Biological underpinnings of falls in older adults are not well established.

OBJECTIVES: To examine the validity of selected oxidative stress and inflammatory biomarkers for predicting incident falls in community-dwelling older adults.

DESIGN: Prospective cohort study.

SETTING AND PARTICIPANTS: 266 non-demented and ambulatory community-dwelling older adults (mean age 78 years, 55% women).

MEASUREMENTS: Oxidative stress (malondialdehyde) and inflammatory (interleukin-6 [IL-6]) biomarkers were selected based on associations with fall risk factors, and values were log-transformed to account for non-normal distributions.

RESULTS: Over a mean follow-up of 20.5 ± 10.1 months, 119 participants fell. In Cox proportional hazards models, each one standard deviation increase in baseline log-malondialdehyde levels predicted incident falls (Hazard ratio (HR) adjusted for age, gender, education, comorbidity count, medications, log-IL-6 levels, prior falls, depressive symptoms, cognitive status, gait velocity, and balance 1.53, 95% CI 1.11-2.16). Log-IL-6 levels were not associated with falls. Participants in the highest log-malondialdehyde quartile at baseline had increased risk for incident falls than those in the lowest quartile (HR 2.47, 95% CI 1.41-4.34).

CONCLUSION: Oxidative stress predicted falls in a community-based cohort, and should be further examined as a fall risk biomarker as well as a potential target to prevent falls.

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PDF Y Endnote Y

Cognitive ability in late life and onset of physical frailty: the Lothian Birth Cohort 1936

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J. Am. Geriatr. Soc. 2017; ePub(ePub): ePub.

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(Copyright © 2017, John Wiley and Sons)

DOI 10.1111/jgs.14787 **PMID** 28248416

Abstract

OBJECTIVES: To investigate whether poorer cognitive ability is a risk factor for development of physical frailty and whether this risk varies according to cognitive domain.

DESIGN: Prospective longitudinal study with 6-year follow-up.

SETTING: Edinburgh, Scotland.

PARTICIPANTS: Members of the Lothian Birth Cohort 1936 (N = 594).

MEASUREMENTS: Frailty was assessed at ages 70 and 76 using the Fried criteria. Cognitive function was assessed at age 70, 73, and 76. Factor score estimates were derived for baseline level of and change in four cognitive domains: visuospatial ability, memory, processing speed, and crystallized cognitive ability.

RESULTS: Higher baseline levels of processing speed, memory, visuospatial ability and crystallized ability at age 70, and less decline in speed, memory, and crystallized ability were associated with less risk of becoming physically frail by age 76. When all cognitive domains were modelled together, processing speed was the only domain associated with frailty risk, for a standard deviation (SD) increment in initial level of processing speed, the risk of frailty was 47% less (0.53 95% confidence interval (CI) = 0.33-0.85) after adjustment for age, sex, baseline frailty status, social class, depressive symptoms, number of chronic physical diseases, levels of inflammatory biomarkers, and other cognitive factor score estimates; for a SD increment in processing speed change (less decline) risk of frailty was 74% less (RR = 0.26, 95% CI = 0.16-0.42). When additional analyses were conducted using a single test of processing speed that did not require fast motor responses (inspection time), results were similar.

CONCLUSIONS: The speed with which older adults process information and the rate at which this declines over time may be an important indicator of the risk of physical frailty.

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Comparison of gait symmetry between poststroke fallers and nonfallers during level walking using triaxial accelerometry: a STROBE-compliant cross-sectional study

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Medicine (Baltimore) 2017; 96(9): e5990.

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DOI 10.1097/MD.0000000000005990 **PMID** 28248856

Abstract

To compare the degree of gait symmetry of chronic poststroke fallers with that of nonfallers during level walking using triaxial accelerometry. In this cross-sectional study, a total of 14 patients with chronic stroke were recruited from a community hospital from February 2015 to July 2016. Patient characteristics, including the number of falls in the previous 12 months, were obtained from medical records. The Berg Balance Scale (BBS) and timed up and go (TUG) test were used at the onset of the

study. Triaxial accelerometers were attached to the back and bilateral lower extremities of each subject with sampling rates of 120 Hz. The cross-correlation between the acceleration signals of the affected and unaffected feet was measured to assess the degree of gait symmetry. The triaxial acceleration signals of the 5 consecutive and bilateral strides from the middle of each trial were processed to measure the cross-correlation and time delay (T_s) between the magnitude of the acceleration vector of the affected and unaffected foot. After controlling for possible confounding factors, the mixed-effect models showed that cross-correlation was significantly higher among nonfallers than fallers ($\beta = -0.093$; standard error [SE] = 0.029; P-value = 0.002), and that the T_s was significantly longer among fallers than nonfallers ($\beta = -1.900$; SE = 0.719; P-value = 0.011). Cross-correlation and T_s between the affected and unaffected lower extremities may be useful indicators to distinguish poststroke fallers from nonfallers.

PDF Y Endnote Y

Effectiveness of falls prevention interventions for older adults newly discharged from hospital: a systematic review protocol

Naseri C, McPhail S, Francis-Coad J, Haines T, Etherton-Ber C, Morris ME, Flicker L, Shorr R, Bulsara M, Netto J, Lee DC, Waldron N, Boudville A, Hill AM.

JBI Database Syst. Rev Implement. Rep. 2017; 15(3): 686-693.

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DOI 10.11124/JBISRIR-2016-002952 **PMID** 28267030

Abstract

REVIEW OBJECTIVE: The objective of this review is to synthesize the best available evidence on the effectiveness of falls prevention interventions provided just prior or immediately after discharge from hospital on falls rates and falls injuries among older adults living in the community in the first 6 months after discharge from hospital.

PDF Endnote Y

Effects of a community care station program with structured exercise intervention on physical performance and balance in community-dwelling older adults: a prospective 2-year observational study

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J. Aging Phys. Act. 2017; ePub(ePub): ePub.

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(Copyright © 2017, Human Kinetics Publishers)

DOI 10.1123/japa.2015-0326 **PMID** 28253047

Abstract

The Taiwanese government has developed community care stations (CCSs) for community-based elderly care. We investigated the effects of a structured exercise intervention, applied at CCS for 6 months, on physical performance and balance in community-dwelling older adults, including a 2-

year reassessment. Fifty-eight participants (aged 76.9 ± 6.3 years) participated in the study. The Elderly Mobility Scale, Short Physical Performance Battery (SPPB), Timed Up and Go (TUG), gait speed, functional reach, one-leg-stance (OLS) and flexibility were evaluated at baseline, 6 months and 2 years. Compared with baseline, the participants improved significantly in the SPPB (0.93 points), TUG (1.94 s), gait speed (0.13 m/s) and right and left OLS (2.56 and 3.12 s) at 6 months. Furthermore, these significant effects except for OLS were maintained at the 2-year reassessment according to repeated measures ANOVA ($p < .01$). Our preliminary data suggests that adding a structured exercise program can benefit older adults participating in Taiwanese CCSs.

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Effects of gait self-efficacy and lower-extremity physical function on dual-task performance in older adults

Ehlers DK, Banducci SE, Daugherty AM, Fanning J, Awick EA, Porter GC, Burzynska A, Shen S, Kramer AF, McAuley E.

Biomed. Res. Int. 2017; 2017: e8570960.

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(Copyright © 2017, Hindawi Publishing)

DOI 10.1155/2017/8570960 **PMID** 28255557

Abstract

OBJECTIVE: Despite evidence of self-efficacy and physical function's influences on functional limitations in older adults, few studies have examined relationships in the context of complex, real-world tasks. The present study tested the roles of self-efficacy and physical function in predicting older adults' street-crossing performance in single- and dual-task simulations.

METHODS: Lower-extremity physical function, gait self-efficacy, and street-crossing success ratio were assessed in 195 older adults (60-79 years old) at baseline of a randomized exercise trial. During the street-crossing task, participants walked on a self-propelled treadmill in a virtual reality environment. Participants crossed the street without distraction (single-task trials) and conversed on a cell phone (dual-task trials). Structural equation modeling was used to test hypothesized associations independent of demographic and clinical covariates.

RESULTS: Street-crossing performance was better on single-task trials when compared with dual-task trials. Direct effects of self-efficacy and physical function on success ratio were observed in dual-task trials only. The total effect of self-efficacy was significant in both conditions. The indirect path through physical function was evident in the dual-task condition only.

CONCLUSION: Physical function can predict older adults' performance on high fidelity simulations of complex, real-world tasks. Perceptions of function (i.e., self-efficacy) may play an even greater role.

The trial is registered with United States National Institutes of Health ClinicalTrials.gov (ID: NCT01472744; Fit & Active Seniors Trial).

PDF Y Endnote Y

Efficacy of Wii-Fit on static and dynamic balance in community dwelling older veterans: a randomized controlled pilot trial

Padala KP, Padala PR, Lensing SY, Dennis RA, Bopp MM, Parkes CM, Garrison MK, Dubbert PM, Roberson PK, Sullivan DH.

J. Aging Res. 2017; 2017: e4653635.



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DOI 10.1155/2017/4653635 **PMID** 28261500 **PMCID** PMC5316445

Abstract

BACKGROUND/OBJECTIVES: Balance problems are well-established modifiable risk factors for falls, which are common in older adults. The objective of this study was to establish the efficacy of a Wii-Fit interactive video-game-led physical exercise program to improve balance in older Veterans.

METHODS: A prospective randomized controlled parallel-group trial was conducted at Veterans Affairs Medical Center. Thirty community dwelling Veterans aged 68 (± 6.7) years were randomized to either the exercise or control groups. The exercise group performed Wii-Fit program while the control group performed a computer-based cognitive program for 45 minutes, three days per week for 8-weeks. The primary (Berg Balance Scale (BBS)) and secondary outcomes (fear of falling, physical activity enjoyment, and quality of life) were measured at baseline, 4 weeks, and 8 weeks.

RESULTS: Of 30 randomized subjects, 27 completed all aspects of the study protocol. There were no study-related adverse events. Intent-to-treat analysis showed a significantly greater improvement in BBS in the exercise group (6.0; 95% CI, 5.1-6.9) compared to the control group (0.5; 95% CI, -0.3-1.3) at 8 weeks (average intergroup difference (95% CI), 5.5 (4.3-6.7), $p < 0.001$) after adjusting for baseline.

CONCLUSION: This study establishes that the Wii-Fit exercise program is efficacious in improving balance in community dwelling older Veterans. This trial is registered with ClinicalTrials.gov Identifier NCT02190045.

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Emergency department visits for injury and illness among adults aged 65 and over: United States, 2012-2013

Albert M, Rui P, McCaig LF.

NCHS Data Brief 2017; (272): 1-8.

(Copyright © 2017, United States National Center for Health Statistics)

DOI unavailable **PMID** 28256995

Abstract

KEY FINDINGS: Data from the National Hospital Ambulatory Medical Care Survey

- During 2012-2013, adults aged 65 and over had an emergency department (ED) visit rate of 12 per 100 persons for injury and 36 per 100 persons for illness.
- Among adults aged 65 and over, women had a higher ED visit rate for injury (14 per 100 women) compared with men (10 per 100 men). There was no difference between women and men in the visit rate for illness.
- The percentage of injury visits resulting in hospital admission (17%) was lower than for illness visits (32%) among adults aged 65 and over. The same pattern held for critical care admissions (2% compared with 5%).
- Imaging was ordered at 75% of injury visits among adults aged 65 and over, which was higher than for illness visits (63%).

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Falls and frailty in prostate cancer survivors: current, past, and never users of androgen deprivation therapy

Winters-Stone KM, Moe E, Graff JN, Dieckmann NF, Stoyles S, Borsch C, Alumkal JJ, Amling CL, Beer TM.

J. Am. Geriatr. Soc. 2017; ePub(ePub): ePub.

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(Copyright © 2017, John Wiley and Sons)

DOI 10.1111/jgs.14795 **PMID** 28263373

Abstract

OBJECTIVES: To compare the prevalence of and association between falls and frailty of prostate cancer survivors (PCSs) who were current, past or never users of androgen deprivation therapy (ADT).

DESIGN: Cross-sectional.

SETTING: Mail and electronic survey.

PARTICIPANTS: PCSs (N = 280; mean age 72 ± 8).

MEASUREMENTS: Cancer history, falls, and frailty status (robust, prefrail, frail) using traditionally defined and obese phenotypes.

RESULTS: Current (37%) or past (34%) ADT users were more than twice as likely to have fallen in the previous year as never users (15%) (P = .002). ADT users had twice as many recurrent falls (P < .001) and more fall-related injuries than unexposed men (P = .01). Current (43%) or past (40%) ADT users were more likely to be classified as prefrail or frail than never users (15%) (P < .001), and the prevalence of combined obese frailty + prefrailty was even greater in current (59%) or past (62%) ADT users than never users (25%) (P < .001). Traditional and obese frailty significantly increased the likelihood of reporting falls in the previous year (odds ratio (OR) = 2.15, 95% CI = 1.18-3.94 and OR = 2.97, 95% CI = 1.62-5.58, respectively) and was also associated with greater risk of recurrent falls (OR = 3.10, 95% CI = 1.48-6.5 and OR = 3.99, 95% CI = 1.79-8.89, respectively).

CONCLUSIONS: Current and past exposure to ADT is linked to higher risk of falls and frailty than no treatment. PCSs should be appropriately counseled on fall prevention strategies, and approaches to reduce frailty should be considered.

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PDF Y Endnote Y

Identifying the number and location of body worn sensors to accurately classify walking, transferring and sedentary activities

Aziz O, Robinovitch SN, Park EJ.

Conf. Proc. IEEE Eng. Med. Biol. Soc. 2016; 2016: 5003-5006.

(Copyright © 2016, IEEE (Institute of Electrical and Electronics Engineers))

DOI 10.1109/EMBC.2016.7591851 **PMID** 28269392

Abstract

In order to perform fall risk assessments using wearable inertial sensors in older adults in their natural settings where falls are likely to occur, a first step is to automatically segment and classify

sensor signals of human movements into the known 'activities of interest'. Sensor data from such activities can later be used through quantitative and qualitative analysis for differentiating fallers from non-fallers. In this study, ten young adults participated in experimental trials involving several variations of walking, transferring and sedentary activities. Data from tri-axial accelerometers and gyroscopes were used to classify the aforementioned three categories using a multiclass support vector machine algorithm. Our results showed 100% accuracy in distinguishing walking, transferring and sedentary activities using data from a three-sensor combination of sternum and both ankles.

PDF Y Endnote Y

Impact of cognitive fatigue on gait and sway among older adults: a literature review

Grobe S, Kakar RS, Smith ML, Mehta R, Baghurst T, Boolani A.

Prev. Med. Rep. 2017; 6: 88-93.

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(Copyright © 2017, Elsevier Publishers)

DOI 10.1016/j.pmedr.2017.02.016 **PMID** 28271026

Abstract

Cognitive fatigue is an alteration in central nervous system (CNS) processing due to prolonged performance of mentally demanding tasks. Decreased gait speed and increased stride length variability have been noted in cognitively fatigued older adults (≥ 65 years). Further, cognitive fatigue may weaken the visual, vestibular, and proprioceptive systems of the CNS, contributing to increased postural sway. Detriments in gait and sway caused by cognitive fatigue could increase fall risk. The objective of this literature review was to evaluate the impact of cognitive fatigue on changes in gait and postural sway and its role in fall risk.

PDF Y Endnote Y

Predicting mortality and independence at discharge in the aging traumatic brain injury population using data available at admission

Miller PR, Chang MC, Hoth JJ, Hildreth AN, Wolfe SQ, Gross JL, Martin RS, Carter JE, Meredith JW, D'Agostino R.

J. Am. Coll. Surg. 2017; ePub(ePub): ePub.

Affiliation: Wake Forest Health Science Department of Biostatistical Sciences, Wake Forest University, Winston-Salem, North Carolina.

(Copyright © 2017, American College of Surgeons, Publisher Elsevier Publishing)

DOI 10.1016/j.jamcollsurg.2016.12.053 **PMID** 28263858

Abstract

INTRODUCTION: Aging worsens outcome in traumatic brain injury (TBI), but available studies may not provide accurate outcome predictions due to confounding associated injuries. Our goal was to develop a predictive tool using variables available at admission to predict outcome related to severity of brain injury in aging patients.

METHODS: Characteristics and outcomes of blunt trauma patients with isolated TBI of ages ≥ 50 in National Trauma Data Bank (NTDB) were evaluated. Equations predicting survival and independence at DC (IDC) were developed and validated using patients from our trauma registry, comparing predicted to actual outcomes.

RESULTS: Logistic regression for survival and IDC was performed in 57,588 patients using age, gender, Glasgow Coma Scale score (GCS), and revised trauma score (RTS). All variables were

independent predictors of outcome. Two models were developed using these data. The first included age, gender, and GCS. The second substituted RTS for GCS. C statistics from the models for survival and IDC were 0.90 and 0.82 in the GCS model. In the RTS model, C statistics were 0.80 and 0.67. The use of GCS provided better discrimination, and was chosen for further examination. Using the predictive equation derived from the logistic regression model, outcome probabilities were calculated for 894 similar patients from our trauma registry (1/12-3/16). The survival and IDC models both showed excellent discrimination ($p < 0.0001$). IDC and survival generally decreased by decade: Age 50-59 (80% IDC, 6.5% mortality), 60-69 (82%, 7.0%), 70-79 (76%, 8.9%), and 80-89 (67%, 13.4%). CONCLUSION: These models can assist in predicting the probability of survival and IDC for aging patients with TBI. This provides important data for loved ones of these patients when addressing goals of care.

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PDF Y Endnote Y

Prevalence, risk factors and health outcomes associated with polypharmacy among urban community-dwelling older adults in multi-ethnic Malaysia

Lim LM, McStea M, Chung WW, Nor Azmi N, Abdul Aziz SA, Alwi S, Kamarulzaman A, Kamaruzzaman SB, Chua SS, Rajasuriar R.

PLoS One 2017; 12(3): e0173466.

Affiliation: Peter Doherty Institute for Infection and Immunity, Melbourne University, Melbourne, Australia.

(Copyright © 2017, Public Library of Science)

DOI 10.1371/journal.pone.0173466 **PMID** 28273128

Abstract

BACKGROUND: Polypharmacy has been associated with increased morbidity and mortality in the older population.

OBJECTIVES: The aim of this study was to determine the prevalence, risk factors and health outcomes associated with polypharmacy in a cohort of urban community-dwelling older adults receiving chronic medications in Malaysia.

METHODS: This was a baseline study in the Malaysian Elders Longitudinal Research cohort. The inclusion criteria were individuals aged ≥ 55 years and taking at least one medication chronically (≥ 3 months). Participants were interviewed using a structured questionnaire during home visits where medications taken were reviewed. Health outcomes assessed were frequency of falls, functional disability, potential inappropriate medication use (PIMs), potential drug-drug interactions (PDDIs), healthcare utilisation and quality of life (QoL). Risk factors and health outcomes associated with polypharmacy (≥ 5 medications including dietary supplements) were determined using multivariate regression models.

RESULTS: A total of 1256 participants were included with a median (interquartile range) age of 69(63-74) years. The prevalence of polypharmacy was 45.9% while supplement users made up 56.9% of the cohort. The risk factors associated with increasing medication use were increasing age, Indian ethnicity, male, having a higher number of comorbidities specifically those diagnosed with cardiovascular, endocrine and gastrointestinal disorders, as well as supplement use. Health outcomes significantly associated with polypharmacy were PIMS, PDDIs and increased healthcare utilisation.

CONCLUSION: A significant proportion of older adults on chronic medications were exposed to

polypharmacy and use of dietary supplements contributed significantly to this. Medication reviews are warranted to reduce significant polypharmacy related issues in the older population.

PDF Y Endnote Y

Responses to gait perturbations in stroke survivors who prospectively experienced falls or no falls

Punt M, Bruijn SM, Roeles S, van de Port IG, Wittink H, van Dieen JH.

J. Biomech. 2017; ePub(ePub): ePub.

Affiliation: Move Research Institute Amsterdam, Department of Human Movement Sciences, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands.

(Copyright © 2017, Elsevier Publishing)

DOI 10.1016/j.jbiomech.2017.02.010 **PMID** 28267989

Abstract

BACKGROUND: Steady-state gait characteristics appear promising as predictors of falls in stroke survivors. However, assessing how stroke survivors respond to actual gait perturbations may result in better fall predictions. We hypothesize that stroke survivors who fall have a diminished ability to adequately adjust gait characteristics after gait is perturbed. This study explored whether gait characteristics of perturbed gait differ between fallers and non fallers.

METHOD: Chronic stroke survivors were recruited by clinical therapy practices. Prospective falls were monitored over a six months follow up period. We used the Gait Real-time Analysis Interactive Lab (GRAIL, Motekforce Link B.V., Amsterdam) to assess gait. First we assessed gait characteristics during steady-state gait and second we examined gait responses after six types of gait perturbations. We assessed base of support gait characteristics and margins of stability in the forward and medio-lateral direction.

FINDINGS: Thirty eight stroke survivors complete our gait protocol. Fifteen stroke survivors experienced falls. All six gait perturbations resulted in a significant gait deviation. Forward stability was reduced in the fall group during the second step after a ipsilateral perturbation.

INTERPRETATION: Although stability was different between groups during a ipsilateral perturbation, it was caused by a secondary strategy to keep up with the belt speed, therefore, contrary to our hypothesis fallers group of stroke survivors have a preserved ability to cope with external gait perturbations as compared to non fallers. Yet, our sample size was limited and thereby, perhaps minor group differences were not revealed in the present study.

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PDF Y Endnote Y

Risk for falls among community-dwelling older people: systematic literature review

Sousa LM, Marques-Vieira CM, Caldevilla MN, Henriques CM, Severino SS, Caldeira SM.

Rev. Gaucha Enferm. 2017; 37(4): e55030.

Affiliation: Universidade Católica Portuguesa, Instituto de Ciências da Saúde. Lisboa, Portugal.

(Copyright © 2017, Escola de Enfermagem da Universidade Federal do Rio Grande e do Sul)

DOI 10.1590/1983-1447.2016.04.55030 **PMID** 28273251

Abstract

OBJECTIVE: To identify the risk factors for falls of the community-dwelling elderly in order to update the Taxonomy II of NANDA International.

METHOD: A systematic literature review based on research using the following platforms:

EBSCOHost **METHOD:** ®, CINAHL and MEDLINE, from December 2010 to December 2014. The

descriptors used were (Fall* OR Accidental Fall) AND (Community Dwelling OR Community Health Services OR Primary health care) AND (Risk OR Risk Assessment OR Fall Risk Factors) AND (Fall* OR Accidental Fall) AND (Community Dwelling OR METHOD: older) AND Nurs* AND Fall Risk Factors. RESULTS: The sample comprised 62 studies and 50 risk factors have been identified. Of these risk factors, only 38 are already listed in the classification.

CONCLUSIONS: Two new categories of risk factors are proposed: psychological and socio-economical. New fall risk factors for the community-dwelling elderly have been identified, which can contribute to the updating of this nursing diagnosis of the Taxonomy II of NANDA International.

PDF Y Endnote Y

Subjective and objective cognitive function among older adults with a history of traumatic brain injury: A population-based cohort study

Gardner RC, Langa KM, Yaffe K.

PLoS Med. 2017; 14(3): e1002246.

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(Copyright © 2017, Public Library of Science)

DOI 10.1371/journal.pmed.1002246 **PMID** 28267747

Abstract

BACKGROUND: Traumatic brain injury (TBI) is extremely common across the lifespan and is an established risk factor for dementia. The cognitive profile of the large and growing population of older adults with prior TBI who do not have a diagnosis of dementia, however, has not been well described. Our aim was to describe the cognitive profile associated with prior TBI exposure among community-dwelling older adults without dementia—an understudied but potentially vulnerable population.

METHODS AND FINDINGS: In this population-based cohort study, we studied 984 community-dwelling older adults (age 51 y and older and their spouses) without dementia who had been randomly selected from respondents to the 2014 wave of the Health and Retirement Study to participate in a comprehensive TBI survey and who either reported no prior TBI ($n = 737$) or prior symptomatic TBI resulting in treatment in a hospital ($n = 247$). Mean time since first TBI was 38 ± 19 y. Outcomes assessed included measures of global cognitive function, verbal episodic memory, semantic fluency, and calculation as well as a measure of subjective memory ("How would you rate your memory at the present time?"). We compared outcomes between the two TBI groups using regression models adjusting for demographics, medical comorbidities, and depression. Sensitivity analyses were performed stratified by TBI severity (no TBI, TBI without loss of consciousness [LOC], and TBI with LOC). Respondents with TBI were younger (mean age 64 ± 10 y versus 68 ± 11 y), were less likely to be female, and had higher prevalence of medical comorbidities and depression than respondents without TBI. Respondents with TBI did not perform significantly differently from respondents without TBI on any measure of objective cognitive function in either raw or adjusted models (fully adjusted: global cognitive function score 15.4 versus 15.2, $p = 0.68$; verbal episodic memory score 4.4 versus 4.3, $p = 0.79$; semantic fluency score 15.7 versus 14.0, $p = 0.21$; calculation impairment 22% versus 26%, risk ratio [RR] [95% CI] = 0.86 [0.67-1.11], $p = 0.24$). Sensitivity analyses stratified by TBI severity produced similar results. TBI was associated with significantly increased risk for subjective memory impairment in models adjusted for demographics and medical comorbidities (29% versus 24%; RR [95% CI]: 1.26 [1.02-1.57], $p = 0.036$). After further adjustment for active

depression, however, risk for subjective memory impairment was no longer significant (RR [95% CI]: 1.18 [0.95-1.47], $p = 0.13$). Sensitivity analyses revealed that risk of subjective memory impairment was increased only among respondents with TBI with LOC and not among those with TBI without LOC. Furthermore, the risk of subjective memory impairment was significantly greater among those with TBI with LOC versus those without TBI even after adjustment for depression (RR [95% CI]: partially adjusted, 1.38 [1.09-1.74], $p = 0.008$; fully adjusted, 1.28 [1.01-1.61], $p = 0.039$).

CONCLUSIONS: In this population-based study of community-dwelling older adults without dementia, those with prior TBI with LOC were more likely to report subjective memory impairment compared to those without TBI even after adjustment for demographics, medical comorbidities, and active depression. Lack of greater objective cognitive impairment among those with versus without TBI may be due to poor sensitivity of the cognitive battery or survival bias, or may suggest that post-TBI cognitive impairment primarily affects executive function and processing speed, which were not rigorously assessed in this study. Our findings show that among community-dwelling non-demented older adults, history of TBI is common but may not preferentially impact cognitive domains of episodic memory, attention, working memory, verbal semantic fluency, or calculation.

PDF Y Endnote Y

The influence of a cognitive dual task on the gait parameters of healthy older adults: a systematic review and meta-analysis

Smith E, Cusack T, Cunningham C, Blake C.

J. Aging Phys. Act. 2017; ePub(ePub): 1-35.

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(Copyright © 2017, Human Kinetics Publishers)

DOI 10.1123/japa.2016-0265 **PMID** 28253049

Abstract

This review examines the effect of a dual-task on the gait parameters of older adults with a mean gait speed of 1.0m/s or greater, and the effect of type and complexity of task. A systematic review of Web of Science, PubMed, SCOPUS, Embase and psychINFO was performed in July 2016. Twenty-three studies (twenty-eight data sets) were reviewed and pooled for meta-analysis. The effect size on seven gait parameters was measured as the raw mean difference between single and dual-task performance. Gait speed significantly reduced with the addition of a dual-task, with increasing complexity showing greater decrements. Cadence, stride time and measures of gait variability were all negatively affected under the dual-task condition. In older adults, the addition of a dual-task significantly reduces gait speed and cadence, with possible implications for the assessment of older people, as the addition of a dual-task may expose deficits not observed under single-task assessment.

PDF Y Endnote Y

The most common factors hindering the independent functioning of the elderly at home by age and sex

Talarska D, Kropińska S, Strugała M, Szewczyk M, Tobis S, Wieczorowska-Tobis K.

Eur. Rev. Med. Pharmacol. Sci. 2017; 21(4): 775-785.

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(Copyright © 2017, Verduci)

DOI unavailable PMID 28272705

Abstract

OBJECTIVE: Changes occurring with increased age as well progressive illnesses can negatively affect the independent functioning of older people. The goal of this study was to identify the most common problems that make independent life at home more difficult for the elderly and to try and present their relation with age and gender.

PATIENTS AND METHODS: A total of 506 persons over 60 years of age took part in the study. They were residents of Poznań, Poland and surrounding areas. The research instruments were the Abbreviated Mental Test Score and EASY-Care Standard 2010 questionnaire which makes it possible to analyze patient's functioning in seven areas and includes three risk scales: Independence score, Risk of breakdown in care, Risk of falls.

RESULTS: In the group studied the greatest difficulties included performing complex activities of everyday life connected with moving around (III area), difficulties with performing household tasks (50.8%), shopping (39.7%) and falls (35.0%). The most frequently reported symptom that was a cause of worry was pain (68.2%). Other health problems reported included sleep disorders (58.9%), incorrect body weight (52.6%), low tolerance of physical effort (48.4%), urethral sphincter functioning disorder (42.7%) and forgetfulness (40.5%). The feeling of being lonely was found in 45.8% of older people.

CONCLUSIONS: Significant differences in functioning between the genders were found in the areas of meal preparation, falls, mobility outside the home, not feeling safe, lack of physical activity, low tolerance of physical effort and almost all of area VII - Mental health and well-being. The main determinants of risk scores with the Independence Score, Risk of breakdown in care and Risk of fall domains were age and subjective feelings of pain.

PDF Y Endnote Y

Use of ACE-inhibitors and falls in patients with Parkinson's disease

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Gait Posture 2017; 54: 39-44.

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(Copyright © 2017, Elsevier Publishing)

DOI 10.1016/j.gaitpost.2017.02.007 PMID 28258036

Abstract

Falls represent a major concern in patients with Parkinson's disease (PD); however, currently acknowledged treatments for PD are not effective in reducing the risk of falling. The aim was to assess the association of use of ACE-inhibitors (ACEIs) and angiotensin receptor blockers (ARBs) with falls among patients with PD. We analysed data of 194 elderly with PD attending a geriatric Day Hospital. Self-reported history of falls that occurred over the last year, as well as use of drugs, including ACEIs and angiotensin II receptor blockers (ARBs) were recorded. The association of the occurrence of any falls with use of ACEIs, and ARBs was assessed by logistic regression analysis. The association between the number of falls and use of ACEIs, and ARBs was assessed according to Poisson regression. In logistic regression, after adjusting for potential confounders, use of ACEIs was associated with a reduced probability of falling over the last year (OR=0.15, 95% CI=0.03-0.81;

$P=0.028$). This association did not vary with blood pressure levels (P for the interaction term= 0.528). Also, using Poisson regression, use of ACEIs predicted a reduced number of falls among participants who fell ($PR=0.31$; $95\% CI=0.10-0.94$; $P=0.039$). No association was found between use of ARBs and falls. Our results indicate that use of ACEIs might be independently associated with reduced probability, and a reduced number of falls among patients with PD. Dedicated studies are needed to define the single agents and dosages that might most effectively reduce the risk of falling in clinical practice.

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Effects of diaphragmatic breathing patterns on balance: a preliminary clinical trial

Stephens RJ, Haas M, Moore WL, Emmil JR, Sipress JA, Williams A.

J. Manipulative Physiol. Ther. 2017; ePub(ePub): ePub.

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(Copyright © 2017, Elsevier Publishing)

DOI 10.1016/j.jmpt.2017.01.005 **PMID** 28259495

Abstract

OBJECTIVE: The purpose of this study was to determine the feasibility of performing a larger study to determine if training in diaphragmatic breathing influences static and dynamic balance.

METHODS: A group of 13 healthy persons (8 men, 5 women), who were staff, faculty, or students at the University of Western States participated in an 8-week breathing and balance study using an uncontrolled clinical trial design. Participants were given a series of breathing exercises to perform weekly in the clinic and at home. Balance and breathing were assessed at the weekly clinic sessions. Breathing was evaluated with Liebensohn's breathing assessment, static balance with the Modified Balance Error Scoring System, and dynamic balance with OptoGait's March in Place protocol.

RESULTS: Improvement was noted in mean diaphragmatic breathing scores (1.3 to 2.6, $P < .001$), number of single-leg stance balance errors (7.1 to 3.8, $P = .001$), and tandem stance balance errors (3.2 to 0.9, $P = .039$). A decreasing error rate in single-leg stance was associated with improvement in breathing score within participants over the 8 weeks of the study (-1.4 errors/unit breathing score change, $P < .001$). Tandem stance performance did not reach statistical significance (-0.5 error/unit change, $P = .118$). Dynamic balance was insensitive to balance change, being error free for all participants throughout the study.

CONCLUSION: This proof-of-concept study indicated that promotion of a costal-diaphragmatic breathing pattern may be associated with improvement in balance and suggests that a study of this phenomenon using an experimental design is feasible.

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Effects of stair task training on walking ability in stroke patients

Choi YK, Kim K, Choi JU.

J. Phys. Ther. Sci. 2017; 29(2): 235-237.

Affiliation: Department of Physical Therapy, College of Rehabilitation Science, Daegu University, Republic of Korea.

(Copyright © 2017, Society of Physical Therapy Science)

DOI 10.1589/jpts.29.235 **PMID** 28265147 **PMCID** PMC5332978

Abstract

PURPOSE: The aim of this study was to determine the effect of stair task training on gait abilities by conducting stair task training. In this training, step training is applied in various directions with hemiplegia patients.

SUBJECTS AND METHODS: Thirty-six patients with stroke were selected on the basis of inclusion and exclusion criteria, and they were randomly divided into eighteen patients in the experimental group and eighteen patients in the control group via draw.

RESULTS: In this study, the Dartfish program was used to measure gait capabilities. Experiment group showed a statistically significant improvement in the swing phase time of the affected lower extremity compared to control group.

CONCLUSION: It was found that the stair task training group had effective results in the swing phase time of the affected lower extremity compared with the group that applied weight support on the affected lower extremity and balance training.

PDF Y Endnote Y

Fall prevention intervention and the Triple Aim Goals

Monaghan EG.

Am. J. Public Health 2017; 107(4): e22.

Affiliation: Elizabeth G. Monaghan is a graduate student at Holy Names University, Oakland, CA.

(Copyright © 2017, American Public Health Association)

DOI 10.2105/AJPH.2016.303632 **PMID** 28272953

Abstract [Abstract unavailable]

PDF Y Endnote Y

Fall reduction interventions for hospice patients

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Home Healthc. Now 2017; 35(3): 166-170.

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(Copyright © 2017, Lippincott Williams and Wilkins)

DOI 10.1097/NHH.0000000000000506 **PMID** 28248784

Abstract

Despite efforts to decrease inpatient falls at a Midwestern Veterans Administration Medical Center, patients on the hospice unit continued to have higher rates of falls than patients on other units. The purpose of this article is to review the literature to determine if evidence-based, population-specific, fall prevention measures could be implemented to reduce the risk of falls for hospice patients. As a result of this literature review, an end-of-life care plan was developed and will be utilized to increase the frequency of assessment and rounding, and to encourage family involvement during this critical time frame.

PDF N Endnote Y

In-hospital mortality risk of intertrochanteric hip fractures: a comprehensive review of the US Medicare database from 2005 to 2010

Kiriakopoulos E, McCormick F, Nwachukwu BU, Erickson BJ, Caravella J.

Musculoskelet. Surg. 2017; ePub(ePub): ePub.



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(Copyright © 2017, Springer Science+Business Media)

DOI 10.1007/s12306-017-0470-3 **PMID** 28255840

Abstract

PURPOSE: Intertrochanteric hip fracture is a common injury in the Medicare population. Very little is known about the in-hospital mortality risk of intertrochanteric hip fractures and associated demographics for the US Medicare population. The purpose of this study is to determine the in-hospital mortality rate of closed intertrochanteric hip fractures and to evaluate demographic factors influencing an increased mortality risk.

METHODS: The PearlDiver Medicare database from 2005 to 2010 was queried for closed intertrochanteric hip fractures. Stratified sampling was conducted by creating subset for individuals with a death discharge from inpatient facilities. Statistical analysis was performed where appropriate.

RESULTS: Throughout 2005-2010 there were a total of 1,138,142 intertrochanteric hip fractures. There were 19,385 deaths during the initial hospital stay, yielding a mortality rate of 1.70%. There was a 1.83% mortality rate for patients 75 and older and patients over the age of 84 comprised the majority of deaths at 58%. The mortality rate was lower for females (1.39%) than for males (2.56%) ($p < 0.0002$).

CONCLUSION: We found in the Medicare database that there is a relatively low rate of in-hospital mortality associated with intertrochanteric hip fractures; this rate is lower than previously reported. We report a 1.70% in-hospital mortality using a complete Medicare dataset. Based on previous reporting for short term and one-year mortality risk, the present study suggests that mortality risk is greatest after patients have been released from the hospital. More attention should be paid to understanding and attenuating the mortality associated with intertrochanteric hip fractures after the acute hospital phase.

PDF Y Endnote Y

Modified Delphi consensus to suggest key elements of Stepping On falls prevention program

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Front. Public Health 2017; 5: e21.

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(Copyright © 2017, Frontiers Editorial Office)

DOI 10.3389/fpubh.2017.00021 **PMID** 28265557 **PMCID** PMC5317011

Abstract

Falls among older adults result in substantial morbidity and mortality. Community-based programs have been shown to decrease the rate of falls. In 2007, the Centers for Disease Control and Prevention funded a research study to determine how to successfully disseminate the evidence-based fall prevention program (Stepping On) in the community setting. As the first step for this study, a panel of subject matter experts was convened to suggest which parts of the Stepping On fall prevention program were considered key elements, which could not be modified by implementers.

METHODS: Older adult fall prevention experts from the US, Canada, and Australia participated in a modified Delphi technique process to suggest key program elements of Stepping On. Forty-four experts were invited to ensure that the panel of experts would consist of equal numbers of physical therapists, occupational therapists, geriatricians, exercise scientists, and public health researchers. Consensus was determined by percent of agreement among panelists. A Rasch analysis of item fit was conducted to explore the degree of diversity and/or homogeneity of responses across our

panelists.

RESULTS: The Rasch analysis of the 19 panelists using fit statistics shows there was a reasonable and sufficient range of diverse perspectives (Infit MnSQ 1.01, Z score -0.1, Outfit MnSQ 0.96, Z score -0.2 with a separation of 4.89). Consensus was achieved that these elements were key: 17 of 18 adult learning elements, 11 of 22 programming, 12 of 15 exercise, 7 of 8 upgrading exercises, 2 of 4 peer co-leader's role, and all of the home visits, booster sessions, group leader's role, and background and training of group leader elements. The top five key elements were: (1) use plain language, (2) develop trust, (3) engage people in what is meaningful and contextual for them, (4) train participants for cues in self-monitoring quality of exercises, and (5) group leader learns about exercises and understands how to progress them.

DISCUSSION: The Delphi consensus process suggested key elements related to Stepping On program delivery. These elements were considered essential to program effectiveness. Findings from this study laid the foundation for translation of Stepping On for broad US dissemination.

PDF Y Endnote Y

The influence of cueing and an attentional strategy on freezing of gait in Parkinson disease during turning

Spildooren J, Vercruyssen S, Heremans E, Galna B, Verheyden G, Vervoort G, Nieuwboer A.

J. Neurol. Phys. Ther. 2017; ePub(ePub): ePub.

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(Copyright © 2017, Neurology Section, American Physical Therapy Association)

DOI 10.1097/NPT.000000000000178 **PMID** 28263251

Abstract

BACKGROUND AND PURPOSE: Individuals with Parkinson disease exhibit decreased axial head-pelvis rotation. Consequently, they turn more en bloc than healthy controls, which may contribute to freezing during turning. We wanted to understand the influence of auditory cueing and an attentional strategy on turning and how this related to freezing of gait (FOG).

METHODS: Fifteen participants with Parkinson disease and FOG were asked to turn 180° during baseline condition, unilateral cueing, and an attentional strategy prompting to start the turn with head rotation first. FOG occurrence, axial rotation, center of mass (COM) deviation, knee-flexion amplitude, and total turn velocity were measured using 3D motion analysis while off-medication. Normal reference values were obtained from 14 age-matched controls.

RESULTS: Thirty-nine FOG episodes occurred in 5 participants. FOG occurred in 52.8% of baseline trials compared with 34.6% of trials using the head-first strategy, and 3.8% of the auditory cueing trials. During the head first strategy, the initiation of head, trunk, and pelvic rotation as well as the head-pelvis separation resembled turning patterns of healthy controls, but the COM shift to the inside of the turn was exaggerated. By contrast, during cueing, turning became more en bloc, with decreased head-pelvis separation and knee-flexion amplitude.

DISCUSSION AND CONCLUSIONS: Cueing reduced FOG but did not correct axial movement deficits. The head-first strategy improved head-pelvis dissociation but had only limited effects on FOG. These results suggest that axial and COM deviation impairments are not directly related to FOG but may rather indicate a compensatory mechanism. Cueing reinforced the en-bloc movement and might as

such help prevent FOG by triggering an alternative neural mechanism for movement generation. Video Abstract available for more insights from the authors (see Video, Supplemental Digital Content 1, <http://links.lww.com/JNPT/A163>).

PDFN Endnote Y

Trauma injury in adult underweight patients: a cross-sectional study based on the trauma registry system of a level I trauma center

Hsieh CH, Lai WH, Wu SC, Chen YC, Kuo PJ, Hsu SY, Hsieh HY.

Medicine (Baltimore) 2017; 96(10): e6272.

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DOI 10.1097/MD.0000000000006272 PMID 28272241

Abstract

The aim of this study was to investigate and compare the injury characteristics, severity, and outcome between underweight and normal-weight patients hospitalized for the treatment of all kinds of trauma injury. This study was based on a level I trauma center Taiwan. The detailed data of 640 underweight adult trauma patients with a body mass index (BMI) of <18.5 kg/m and 6497 normal-weight adult patients ($25 > \text{BMI} \geq 18.5$ kg/m) were retrieved from the Trauma Registry System between January 1, 2009, and December 31, 2014. Pearson's chi-square test, Fisher's exact test, and independent Student's t-test were performed to compare the differences. Propensity score matching with logistic regression was used to evaluate the effect of underweight on mortality. Underweight patients presented a different bodily injury pattern and a significantly higher rate of admittance to the intensive care unit (ICU) than did normal-weight patients; however, no significant differences in the Glasgow Coma Scale (GCS) score, injury severity score (ISS), in-hospital mortality, and hospital length of stay were found between the two groups. However, further analysis of the patients stratified by two major injury mechanisms (motorcycle accident and fall injury) revealed that underweight patients had significantly lower GCS scores (13.8 ± 3.0 vs 14.5 ± 2.0 , $P=0.020$), but higher ISS (10.1 ± 6.9 vs 8.4 ± 5.9 , $P=0.005$), in-hospital mortality (odds ratio, 4.4; 95% confidence interval, 1.69-11.35; $P=0.006$), and ICU admittance rate (24.1% vs 14.3%, $P=0.007$) than normal-weight patients in the fall accident group, but not in the motorcycle accident group. However, after propensity score matching, logistic regression analysis of well-matched pairs of patients with either all trauma, motorcycle accident, or fall injury did not show a significant influence of underweight on mortality. Exploratory data analysis revealed that underweight patients presented a different bodily injury pattern from that of normal-weight patients, specifically a higher incidence of pneumothorax in those with penetrating injuries and of femoral fracture in those with struck on/against injuries; however, the injury severity and outcome of underweight patients varied depending on the injury mechanism.

PDF Y Endnote Y

Traumatic brain injury in the Netherlands, trends in emergency department visits, hospitalization and mortality between 1998 and 2012

van den Brand CL, Karger LB, Nijman ST, Hunink MG, Patka P, Jellema K.

Eur. J. Emerg. Med. 2017; ePub(ePub): ePub.

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DOI 10.1097/MEJ.0000000000000457 **PMID** 28266943

Abstract

BACKGROUND: Traumatic brain injury (TBI) is a major cause of morbidity and mortality worldwide. The effects of epidemiological changes such as ageing of the population and increased traffic safety on the incidence of TBI are unknown.

OBJECTIVE: The objective of this study was to evaluate trends in TBI-related emergency department (ED) visits, hospitalization and mortality in the Netherlands between 1998 and 2012.

DESIGN: This was a retrospective observational, longitudinal study. **MAIN OUTCOME MEASURES:** The main outcome measures were TBI-related ED visits, hospitalization and mortality.

RESULTS: Between 1998 and 2012, there were 500 000 TBI-related ED visits in the Netherlands. In the same period, there were 222 000 TBI-related admissions and 17 000 TBI-related deaths. During this period, there was a 75% increase in ED visits for TBI and a 95% increase for TBI-related hospitalization; overall mortality because of TBI did not change significantly. Despite the overall increase in TBI-related ED visits, this increase was not evenly distributed among age groups or trauma mechanisms. In patients younger than 65 years, a declining trend in ED visits for TBI caused by road traffic accidents was observed. Among patients 65 years or older, ED visits for TBI caused by a fall increased markedly. TBI-related mortality shifted from mainly young (67%) and middle-aged individuals (<65 years) to mainly elderly (63%) individuals (≥65 years) between 1998 and 2012. The conclusions of this study did not change when adjusting for changes in age, sex and overall population growth.

CONCLUSION: The incidence of TBI-related ED visits and hospitalization increased markedly between 1998 and 2012 in the Netherlands. TBI-related mortality occurred at an older age. These observations are probably the result of a change in aetiology of TBI, specifically a decrease in traffic accidents and an increase in falls in the ageing population. This hypothesis is supported by our data. However, ageing of the population is not the only cause of the changes observed; the observed changes remained significant when correcting for age and sex. The higher incidence of TBI with a relatively stable mortality rate highlights the importance of clinical decision rules to identify patients with a high risk of poor outcome after TBI.

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