Safety Literature 24th April 2022

Association between dynapenic abdominal obesity and fall risk in older adults

Abstract

BACKGROUND: In recent years, dynapenic abdominal obesity has received more and more attention. This article aimed to explore the relationship between dynapenic abdominal obesity and fall risk in older adults.

METHODS: In this cross-sectional study, according to waist circumference (≥90 cm for men and ≥85 cm for women) and handgrip strength (<28 kg for men and <18 kg for women), 551 older adults were divided into four groups: dynapenic abdominal obese (D/AO), dynapenic nonabdominal obese (D/NAO), nondynapenic abdominal obese (ND/AO) and nondynapenic nonabdominal obese (ND/NAO). Fall risk was measured by the Tinetti performance-oriented mobility assessment (POMA). Binary logistic regression was used to explore the relationship between D/AO and fall risk.

RESULTS: D/AO was related to POMA score (odds ratio [OR]=3.39; 95% confidence interval [CI]: 1.47-7.81; P=0.004) after adjusting the confounding variables. However, D/NAO (OR=1.51; 95% CI:0.69-3.32; P=0.302) and ND/AO (OR=1.48; 95% CI:0.74-2.99; P=0.272) were not associated with POMA score.

CONCLUSION: This study suggests that older adults with D/AO have a higher risk of falls. Therefore, it is necessary to strengthen the attention to D/AO and relevant interventions should be implemented.

Language: en

Brain activation during active balancing and its behavioral relevance in younger and older adults: a functional near-infrared spectroscopy (fNIRS) study

Lehmann N, Kuhn YA, Keller M, Aye N, Herold F, Draganski B, Taube W, Taubert M.
Front. Aging Neurosci. 2022; 14: e828474.

Abstract

Age-related deterioration of balance control is widely regarded as an important phenomenon influencing quality of life and longevity, such that a more comprehensive understanding of the neural mechanisms underlying this process is warranted. Specifically, previous studies have reported that older adults typically show higher neural activity during balancing as compared to younger counterparts, but the implications of this finding on balance performance remain largely unclear. Using functional near-infrared spectroscopy (fNIRS), differences in the cortical control of balance between healthy younger (n = 27) and older (n = 35) adults were explored. More specifically, the association between cortical functional activity and balance performance across and within age groups was investigated. To this end, we measured hemodynamic responses (i.e., changes in oxygenated and deoxygenated hemoglobin) while participants balanced on an unstable device. As criterion variables for brain-behavior-correlations, we also assessed postural sway while standing on a free-swinging platform and while balancing on wobble boards with different levels of difficulty. We found that older compared to younger participants had higher activity in prefrontal and lower activity in postcentral regions. Subsequent robust regression analyses revealed that lower prefrontal brain activity was related to improved balance performance across age groups, indicating that higher activity of the prefrontal cortex during balancing reflects neural inefficiency. We also present evidence supporting that age serves as a moderator in the relationship between brain activity and balance, i.e., cortical hemodynamics generally appears to be a more important predictor of balance performance in the older than in the younger. Strikingly, we found that age differences in balance performance are mediated by balancing-induced activation of the superior frontal gyrus, thus suggesting that differential activation of this region reflects a mechanism involved in the aging process of the neural control of balance. Our study suggests that differences in functional brain activity between age groups are not a mere by-product of aging, but instead of direct behavioral relevance for balance performance. Potential implications of these findings in terms of early detection of fall-prone individuals and intervention strategies targeting balance and healthy aging are discussed.
Language: en

Keywords

Comparing the cost-effectiveness of the Otago Exercise Programme among older women and men: a secondary analysis of a randomized controlled trial

Davis JC, Hsu CL, Barha C, Jehu DA, Chan P, Ghag C, Jacova P, Adjetey C, Dian L, Parmar N, Madden K, Liu-Ambrose T. PLoS One 2022; 17(4): e0267247.

Abstract

OBJECTIVE: Using stratified analyses, we examined the cost-effectiveness of the Otago Exercise Programme (OEP), from a health care system perspective, among older women and men who have previously fallen.

METHODS: This study was a secondary stratified analysis (by women and men), of a 12-month prospective economic evaluation of a randomized clinical trial (OEP compared with usual care). Three hundred and forty four community-dwelling older adults (≥70; 172 OEP (110 women; 62 men), 172 usual care (119 women; 53 men)) who sustained a fall in the past 12 months and received a baseline assessment at the Vancouver Falls Prevention Clinic, Canada were included. A gender by OEP/usual care interaction was examined for the falls incidence rate ratio (IRR). Outcome measures stratified by gender included: falls IRR, incremental cost-per fall prevented (ICER), incremental cost per quality adjusted life year (QALY, ICUR) gained, and mean total health care resource utilization costs.

RESULTS: Men were frailer than women at baseline. Men incurred higher mean total healthcare costs $6794 (SD: $11906)). There was no significant gender by OEP/usual care interaction on falls IRR. The efficacy of the OEP did not vary by gender. The adjusted IRR for the OEP group demonstrated a 39% (IRR: 0.61, CI: 0.40-0.93) significant reduction in falls among men but not women (32% reduction (IRR: 0.69, CI: 0.47-1.02)). The ICER showed the OEP was effective in preventing falls and less costly for men, while it was costlier for women by $42. The ICUR showed the OEP did not impact quality of life.

CONCLUSION: Future studies should explore gender factors (i.e., health seeking behaviours, gender related frailty) that may explain observed variation in the cost-effectiveness of the OEP as a secondary falls prevention strategy. TRIAL REGISTRATIONS: ClinicalTrials.gov Protocol Registration System Identifier: NCT01029171; URL: https://clinicaltrials.gov/ct2/show/NCT01029171 Identifier: NCT00323596; URL: https://clinicaltrials.gov/ct2/show/NCT00323596.

Language: en

Fall risk assessment for the elderly based on weak foot features of wearable plantar pressure

Song Z, Ou J, Shu L, Hu GH, Wu S, Xu X, Chen Z. IEEE Trans. Neural Syst. Rehabil. Eng. 2022; ePub(ePub): ePub.

Abstract

The high fall rate of the elderly brings enormous challenges to families and the medical system; therefore, early risk assessment and intervention are quite necessary. Compared to other sensor-based technologies, in-shoe plantar pressure sensors, effectiveness and low obtrusiveness are widely used for long-term fall risk assessments because of their portability. While frequently-used bipedal center-of-pressure (COP) features are derived from a pressure sensing platform, they are not suitable for the shoe system or pressure insole owing to the lack of relative position information. Therefore, in this study, a definition of "weak foot" was proposed to solve the sensitivity problem of single foot features and facilitate the extraction of temporal consistency related features. Forty-four multi-dimensional weak foot features based on single foot COP were correspondingly extracted; notably, the relationship between the fall risk and temporal inconsistency in the weak foot were discussed in this study, and probability distribution method was used to analyze the symmetry and temporal consistency of gait lines. Though experiments, foot pressure data were collected from 48 subjects with 24 high risk (HR) and 24 low risk (LR) ones obtained by the smart footwear system. The final models with 87.5% accuracy and 100% sensitivity on test data outperformed the base line models using bipedal COP. The results and feature space shown the novel features of wearable plantar pressure could comprehensively evaluate the difference between HR and LR groups. Our fall risk assessment models based on these features had good generalization performance, and showed practicability and reliability in real-life monitoring situations.

Language: en

Hourly Rounding and fall prevention among the elderly in long term care: a change process

Abstract

Long term care facilities have a rising rate of falls and fall related injuries with increasing cost and more hospitalization. Hourly rounding® is an evidenced based intervention that is proactive for nursing staff to be able to identify patient's needs. This helps with positive fall prevention outcome. This project focused on process improvement efforts for 10 weeks and examining the education and implementation of an evidenced-based hourly rounding program that assisted in reducing the number of falls in the pilot unit. The implementation of the intervention took place in a long-term care facility located in Dallas, Georgia. The hourly rounding tools used in this project were the Studer Group hourly rounding log and competency checklist with permission. Twenty staff members were included in the sample, age 18 years and 60 years. The unit has 41 residents who were included in the pilot case study design. Staff members were first educated regarding hourly rounding and documentation on the hourly rounding log was done two days before implementation and the pre and post fall rate was retrieved from the facilities fall database. Competency checklist was completed prior to implementation and post implementation to evaluate staff understanding of the main tenets of the 4 P's (potty, pain, possession, and position). For this project, descriptive statistics was used to help determine fall rates. Minitab was used to analyzed data and to determine if it was clinically significant. In the ten weeks following the hourly rounding implementation, participants performed hourly rounding by incorporating it to each resident's daily routine and documented their rounds on the log sheet. The results indicated that it is statistically significant and with a P-values = -<0.0001 and t-value = -5.81.

Language: en

Inhibitory control and fall prevention: why stopping matters

Abstract

The fact that weak leg muscles, impaired vision, numb feet, or insufficient blood pressure can predispose someone to a fall is unsurprising. Consequently, such factors are a standard part of clinical fall risk assessments. However, the relationship between cognitive ability and falls (1-3) is less readily appreciated. And even less intuitive are findings that executive function tests which emphasize inhibitory control, such as a go/no-go or Stroop task, are especially predictive of falls in community dwelling older adults (4-7). This begs the question: "How does an ability to say "green" when the word "red" is written in green ink on the Stroop evaluation prevent a fall?" Although not immediately clear, the fog lifts when we consider that inhibitory control is a prerequisite for behavioral flexibility (8). A capacity to inhibit implies that we are no longer at the mercy of a highly automatic response and can instead abort that response allowing adaptation to novel and complex scenarios on short notice. Stopping automatic behavioral tendencies in daily life is critical when such tendencies put us in harm's way and must be quickly modified (e.g., preventing a step that is destined to land on a slippery or unstable surface). Recent insights have shed light on how short latency inhibitory control plays a role in resisting a fall, and in this paper, we advocate for the inclusion of this important concept in clinical assessments and interventions, and intensification of research efforts into its underlying mechanisms...

Language: en

Keywords

aging; falls; balance; response inhibition; stopping

Injuries from falls by older adults in long-term care captured on video: prevalence of impacts and injuries to body parts

Komisar V, Dojnov A, Yang Y, Shishov N, Chong H, Yu Y, Bercovitz I, Cusimano MD, Becker C, Mackey DC, Robinovitch SN. BMC Geriatr. 2022; 22(1): e343.

Abstract

BACKGROUND: Falls are the leading cause of injuries in older adults. However, most falls in older adults do not cause serious injury, suggesting that older adults may fall in a manner that reduces the likelihood of impact to body sites that are most vulnerable to injury. In this observational study of falls in long-term care (LTC), we tested whether body parts differed in their probability of impact and injury.

METHODS: We recorded and analyzed videos of 2388 falls by 658 LTC residents (mean age 84.0 (SD = 8.1); 56.4% female). We used Linear Mixed Models to test for differences between body parts in the probability of impact and injury, and injury when impacts occurred.

RESULTS: Injuries were reported in 38.2% of falls, and 85.9% of injuries involved direct impact to the injured body part. Impact occurred most often to the hip/pelvis (probability (standard error) = 0.95 (0.01); p < .001 relative to other body parts), and least often to the head (0.35 (0.01)). Conversely, injury occurred most often to the head (p < .001 relative to other body parts). The probability of injury when impacts occurred was 0.40 (0.01) for the head, and 0.11 or less for all other body parts.

CONCLUSION: Our results help to explain why most falls by older adults in LTC do not cause serious injury: residents land on body parts that are the most resilient to injury. The high susceptibility of the head to injury reinforces the need to enhance upper limb protective responses for fall arrest. The dominant role of direct impact as the mechanism of injury supports approaches to attenuate impact forces through strategies like protective clothing and compliant flooring.

Language: en

Keywords

NSW
Fall Prevention
& Healthy Ageing
Network

Living in a rural area: a potential risk factor for falls in people with Parkinson disease

Abstract

INTRODUCTION: Falls are prevalent in patients with Parkinson disease (PD). Previous work focused on the impact of motor and non-motor symptoms on falls and ignored the impact of environmental factors, such as residence, economic level, and nursing status. The aim of this study was to investigate the prevalence and risk factors of falls in patients with PD and explore the impact of residence on falls.

METHODS: A cross-sectional study of 100 patients with PD was carried out. Patients were recruited from Anhui Provincial Hospital (Hefei, Anhui province, China) between July 2017 and December 2020. Participants were grouped based on whether they had fallen in the previous 3 months, and demographic information was collected through detailed interviews. In addition, severity of motor symptoms, cognitive function, and self-care abilities were assessed with the Unified Parkinson's Disease Rating Scale part III (UPDRS-III), the Hoehn-Yahr (H&Y) scale, the Mini-Mental State Examination (MMSE), and the Barthel Index. The results were analyzed using student t-test, Mann-Whitney U-test, $\chi 2$ test and multivariate binary logistic regression analyses.

RESULTS: A total of 42% of the patients had fallen in the previous 3 months. The patients who had fallen were older and with a longer disease period, a higher UPDRS-III score, a higher H&Y stage, a lower MMSE score, and a lower Barthel Index score (all $p<0.05$). According to the logistic regression analysis, living in a rural area (odds ratio (OR)=3.34, 95% confidence interval (CI) 1.15-9.65), MMSE<24 (OR=4.79, 95%CI 1.17-19.65), having sleep disorders (OR=4.97, 95%CI 1.74-14.2), and having a high UPDRS-III score (OR=1.07, 95%CI 1.02-1.11) were independent risk factors for falls. The incidence of falls was higher in rural areas. Urban and rural patients showed different levels of disease severity; rural patients had higher H&Y stages, higher UPDRS-III scores and lower Barthel Index scores.

CONCLUSION: Falls are caused by a variety of factors in people with PD. Multidimensional factors should be considered comprehensively to develop a personalized plan to prevent falls in PD patients.

Language: en

Keywords

The effects of social isolation due to COVID-19 on the fear of movement, falling, and physical activity in older people

Abstract

OBJECTIVE: This study investigates the interaction between fear of movement, fall risk, and physical activity levels in ageing individuals who experienced social isolation during the COVID-19 pandemic.

METHODS: In this descriptive and cross-sectional study, 254 eligible participants used an online background survey. Individuals' fear of movement was evaluated by the kinesiophobia causes scale, fall risk by the falls efficacy scale, and physical activity levels by the physical activity scale for the ageing.

RESULTS: The fear of movement had a significant positive interaction on fall risk (β = 0.471, R^2 = 0.495, $p < 0.001$). The fall risk had a negative effect on physical activity (β = -1.686, R^2 = 0.161, $p < 0.001$). The fear of movement and fall risk explained 15.6% of the change in physical activity levels of ageing individuals ($p < 0.001$).

CONCLUSIONS: These results showed a significant interaction between physical activity levels and fear of movement, with a high fall risk in ageing individuals during the pandemic period.

Language: en

Vitamin D supplementation is associated with a reduction in self-reported falls among older adults with previous fall history - feasibility study

Anton SD, Mankowski RT, Qiu P, You L, Bensadon BA, Audino EJ, Custodero C, Lee JH, Hincapie J, McLaren C, Leeuwenburgh C, Ganesh SP. J. Frailty Aging 2022; 11(2): 224-230.

Abstract

BACKGROUND: Vitamin D insufficiency contributes to muscle weakness and a higher risk of falls in older adults.

OBJECTIVES: This study explored the impact of vitamin D supplementation on self-reported falls and physical function in older adults with low vitamin D levels and a recent fall history.

MATERIALS AND METHODS: Twenty-five older adults ≥ 70 years with two or more falls during the past year, low vitamin D blood levels (≥10 ng/ml and < 30 ng/mL), and slow gait speed (1.2 m/s) participated in a 6-month vitamin D supplementation (800 IU/day) study. A modified version of the Morse Fall Scale questionnaire was used to assess frequency of falls over one-year prior to study enrollment. Functional outcomes (short physical performance battery, handgrip strength, gait Timed Up and Go, and six-minute walk), and vitamin D levels were assessed at baseline and 6-month follow-up.

RESULTS: Based on diaries and pill counts, participants were generally adherent to the intervention (6 of 7 days per week). Supplementation with 800 IU/day of vitamin D for 6 months increased blood vitamin D levels from 23.25±4.8 ng/ml to 29.13±6.9 ng/ml (p<0.001). Self-reported number of falls decreased from an average of 3.76 ± 2.2 falls in one-year to 0.76 plusmn; 1.4 falls (p <0.0001) over the 6-month intervention. No changes in functional outcome measures were observed.

CONCLUSIONS: Vitamin D supplementation at the currently recommended dose of 800 IU/day increased blood vitamin D levels and reduced frequency of falls in older adults with low vitamin D levels and a recent fall history.

Language: en

Keywords

Yoga exercise intervention improves balance control and prevents falls in seniors aged 65

Abstract

INTRODUCTION: Body balance control represents a key factor preventing falls and subsequent injuries in seniors aged 65+. Intervention based on yoga exercises seem to be effective in improving balance.

OBJECTIVE: The objective is to analyse and compare changes in static, dynamic, and total balance scores, changes in body composition and social indices as effects of yoga-based intervention.

METHODS: A total of 500 participants (234 men aged 74.5 SD±7.74 and 266 women aged 76.9 SD±7.23) were assessed using the Tinetti Balance Assessment Tool, the InBody 230 bioimpedance body composition analyser, and the SF-36 Health Survey, applied to pre and post-testing. The experimental group (n=262; 122 males; 140 females) underwent a four-week yoga-based intervention, 30 minutes daily, while the control group (n=238; 112 males; 126 females) underwent its usual daily programme at senior homes or centres. The ANOVA model, consisting of the Group, Stage, Subject and Group × Stage interaction factors, was used for data evaluation.

RESULTS: Intervention led to improvements in the static, dynamic and total balance scores in the experimental group compared to the control group. The results of SF-36 showed positive changes in the psychosocial aspects of health, such as promoting of calmness and happiness in male seniors and reducing fatigue, nervousness and depression in female seniors. The post-intervention decrease in body fat percentage and increase in muscle mass in seniors is discussed.

CONCLUSIONS: The four-week yoga-based intervention had positive effects on the static, dynamic and total balance scores, body composition and social status.

Language: en

Keywords

Risk factors and impacts of slips, trips, and falls in janitorial populations: a literature review

Bitzas S, Ma S, Pesanelli K, Zaia AM. Appl. Ergon. 2022; 102: e103745.

Abstract

The objective of this paper is to analyze the existing literature to determine the scope and risk factors of slips, trips, and falls (STFs) within the janitorial population in order to make evidence-based recommendations to prevent these incidents in the future. Selected for review were published peer-reviewed articles, conference proceedings, and gray literature relating to STFs among janitors and cleaners. Individuals employed as janitors and cleaners, specifically those that were older than 45-years of age and/or female, represented the highest risk populations for STFs. These STFs result in injuries, such as sprains, strains, dislocations, and tears. Among janitors and cleaners, 30% of nonfatal incidents are attributed to STFs, resulting in a median of 11 days away from work. Both non-observable/human factors and observable/organizational factors contribute to STFs within this population and must be addressed to protect public health. Preventive interventions focused on comprehensive approaches that target observable and non-observable factors are needed to reduce STFs within the custodial population. More research is needed on STFs in the janitorial population to identify successful preventive STF interventions. Addressing the issue of STFs within this job classification will improve the overall health and well-being of janitors as well as reduce the indirect and direct economic burden placed on the employer organization.

Language: en

Keywords

Social participation's association with falls and frailty in Malaysia: a cross-sectional study

Abstract

BACKGROUND: The global population is ageing rapidly, with the most dramatic increases in developing countries like Malaysia. Older people are at increased risk of multimorbidity, frailty and falls.

OBJECTIVES: In this study we aimed to determine the relationship between social participation, frailty and falls in Malaysia. DESIGN, SETTING, AND PARTICIPANTS: This was a cross-sectional study of individuals aged 55 years and above selected from the electoral rolls of three Klang Valley parliamentary constituencies through stratified random sampling. They were invited to take part in a questionnaire and physical assessment as part of the Malaysian Elders Longitudinal Research (MELoR) study. MEASUREMENTS: Fallers were individuals who had fallen in the previous year. Frailty was defined as meeting ≥3 of: low body mass index, reduced cognition, low physical activity, low hand-grip strength, and slow walking speed. Social participation was determined from employment status, social network, and community activity. Binomial logistic regression multivariant analysis was performed to identify links between the measures of social participation and falls and frailty.

RESULTS: The mean age of the 1383 participants was 68.5 years, with 57.1% female. Within the population, 22.9% were fallers and 9.3% were frail. Social isolation (OR= 2.119; 95% CI=1.351-3.324), and non-engagement in community activities (OR=2.548; 95% CI=1.107-5.865) were associated with increased frailty. Falls increased with social isolation (OR=1.327; 95% CI=1.004-1.754).

CONCLUSIONS: Previous studies have shown social participation to be linked to frailty and falls risk, and social isolation to be a predictor of falls. In this study frailty was associated with all three social participation measures and history of falls was associated with social isolation.

Language: en

Keywords

The application of the Omaha System in community rehabilitation nursing for patients with stroke and previous falls

Fang X, Jia S, Wang Q, Liu H, Zhou Y, Zhang L, Dai T, Luo H, Peng H, Yuan J, Zhou H.

Abstract

OBJECTIVE: This study aimed to explore the use of the Omaha System in rehabilitation and nursing methods and the effects on patients within the community who had experienced stroke and previous falls.

METHODS: This study enrolled 42 patients who had experienced stroke and previous falls and had returned to the community after being discharged from the Department of Neurology and Rehabilitation of the Affiliated Hospital of Nanchang University from January to July 2018. The patients were randomly divided into two groups: an experimental group (n = 21) and a control group (n = 21). Patients in the control group received routine community rehabilitation care, and patients in the experimental group received community rehabilitation care on the basis of the Omaha System. Intervention lasted for 1 year. The Omaha outcome score, the ability to perform activities of daily living (ADL) (measured via the Modified Barthel Index [MBI]), and the incidence of falls for each group were compared before and after the intervention.

RESULTS: After 1 year of intervention, the Omaha outcome score and MBI of both groups were higher than before; the Omaha outcome score and MBI of the experimental group were higher than those of the control group; the differences were statistically significant (P < 0.05). No fall occurred in either of the two groups.

CONCLUSION: The Omaha System can comprehensively evaluate the health problems of patients, guide nursing intervention, and quantitatively evaluate the effect of nursing intervention; it is therefore worthy of promotion.

Language: en

Keywords

community; falls; stroke; Omaha System; rehabilitation nursing