Adipose tissue deposition region affects fall risk in people with obesity: a systematic review and meta-analysis

Abstract

This review sought to meta-analyze previous research observing the effects of fat mass distribution on the fall risk among people with obesity. The literature search yielded five qualified studies enrolling 1218 participants (650 with android vs. 568 with gynoid). The outcome variables included the annual fall prevalence (primary outcome) and the center of pressure (COP) movement measurements during a posturography test (secondary) among people with android or gynoid obesity. Meta-analyses were conducted using the inverse variance weighted random-effects model. The odds ratio (OR) and standardized mean difference (SMD) were used as the effect size for the primary and secondary variables, respectively. The results revealed that more people with android obesity fall annually than their gynoid obesity counterparts (OR = 1.78 [1.34, 2.37], p < 0.0001). People with android obesity also exhibited significantly faster overall COP velocity (SMD = 0.49 [0.11, 0.88], p = 0.01) during standing compared to individuals with gynoid obesity. Our results indicated that people with android obesity could have a greater fall risk than those with gynoid obesity. Given the limited number of studies included, more well-designed and quality work is desired to further clarify how fat mass distribution alters the fall risk among people with obesity. A standardized approach to quantify the fat mass distribution (android vs. gynoid) is imperatively needed for people with obesity.

Effect of forward moment on recovery motion against tripping

Abstract

Investigating the fall recovery motion mechanism is crucial to prevent fall injuries. Among the various parameters of motion and posture, the forward moment can be considered the representative parameter of the magnitude of tripping from a kinematic perspective. The effect of increasing the forward moment on the recovery motion after tripping was investigated in this study. A tripping experiment was performed on a treadmill, and the recovery motion was observed. The forward moment was artificially increased using several approaches, such as pulling the torso, increasing gait speed, and increasing body mass. Factor analysis was performed to establish the relationship between the recovery motion parameters and forward moment. The distribution of the factor scores implied the uniqueness of the recovery motion of the pull condition. Although the forward moment temporarily increased, it was compensated quickly. The other conditions and factors indicated qualitative similarity of the recovery motion among the different conditions. This study demonstrates that the recovery motion after tripping is robust against an increase in forward moment, regardless of the method used to increase the forward moment. The investigation of reaction motion pattern enables validation of the recovery motion and falling posture estimation. Such fall simulations will facilitate the development of a method of fall prevention and mitigation.

Language: en

Advances in balance training to prevent falls in stroke patients: a scoping review

Abstract

OBJECTIVE: To summarize the status and characteristics of the available evidence, research gaps, and future research priorities for preventing falls in stroke patients through balance training.

METHODS: We used a scoping review framework. A systematic search of PUBMED, Embase, and Cochrane databases for main articles was conducted. Our study only included articles that on balance training and fall-related indicators in stroke patients. Two researchers independently screened the literature according to the inclusion and exclusion criteria. The data of demographic, clinical characteristics, intervention, sample, and outcome indicators were extracted. The characteristics and limitations of the included literature were comprehensively analyzed.

RESULTS: Of the 1,058 studies, 31 were included. The methods of balance training include regular balance training, Tai Chi, Yoga, task balance training, visual balance training, multisensory training, aquatic balance training, perturbation-based balance training, cognitive balance training, system-based balance training, and robot-assisted balance training. The commonly used outcome measures include clinical balance test, such as Berg balance scale (BBS), Timed Up-and-Go Test (TUG), Fall Risk Index assessment (FRI), Fall Efficacy Scale score (FES), and instrumented balance tests.

CONCLUSION: This scoping review summarizes the existing primary research on preventing falls in stroke patients by balance training. Based on the summary of the existing evidence, the characteristics of balance training and their relation to falls in stroke patients were found. The future researches should explore how to develop personalized training program, the sound combination of various balance training, to more effectively prevent falls.

Differences of gait adaptability behavior between young and healthy older adults during a locomotor pointing task in virtual reality

Delbes L, Mascret N, Goulon C, Montagne G. Gait Posture 2024; 109: 233-239.

Abstract

BACKGROUND: Gait adaptability training programs to prevent falls in healthy older adults can be proposed in virtual reality. The development of training programs requires the characterization of the target population. RESEARCH QUESTION: Before proposing an innovative training program to develop gait adaptability behavior of healthy older adults in fully immersive virtual reality, we had to compare gait adaptability behavior between healthy older adults and young adults in virtual reality.

METHODS: Twenty healthy older adults (with no fall history) and twenty young adults performed a goal-directed locomotion task in a totally secure virtual reality set-up. Gait adaptability behavior was investigated via a set of measures taking into account gait speed, pointing accuracy, and the evolution of the relationship between the participant and the environment through both inter-trial and trial-by-trial analyses. Mann-Whitney tests and linear regressions were performed to determine potential age differences.

RESULTS: The results reveal some common and specific strategies in gait adaptability behavior between healthy older and young adults. In both populations, successive gait adjustments depend on the state of the agent-environment system. However, older adults walked more slowly than young adults ($p < .001$) with a greater coupling at the end of the target approach ($p = .003$). SIGNIFICANCE: In the context of fall prevention in healthy older adults, fully immersive VR appears as a relevant tool to propose relevant gait training programs to improve gait adjustments.

The effect of statins on falls and physical activity in people aged 65 and older: a systematic review

Abstract

PURPOSE: Statins are commonly prescribed medications with recognised side effects including muscle weakness. Despite this, little is known about their effect on the physical activity and falls risk in the older population. This paper aims to explore the relationship between statin use and the physical activity and falls risk in adults aged 65 and older.

METHODS: MEDLINE, Embase, CINAHL and PsycINFO were searched on 21/11/2022 to obtain relevant articles. Data considered appropriate included that relating to muscle strength, grip strength, gait speed, balance and falls incidence. Reference and citation searches were performed to identify further relevant papers, and all eligible articles were subject to a Critical Appraisal Skills Programme (CASP) to assess potential bias. With the data being highly heterogeneous, no attempt to measure effect size was made and a narrative synthesis approach was used. The review proposal was registered with PROSPERO: CRD42022366159.

RESULTS: Twenty articles were included. Data were inconsistent throughout, with the overall trend suggesting no significant negative effects of statins on the parameters of physical activity, or on falls risk. This was especially true in matched and adjusted cohorts, where potential confounders had been accounted for.

CONCLUSION: This review did not identify a relationship between statin use and physical activity and falls risk in people aged 65 years and older. Ultimately, the risks and benefits of every medication should be considered in the context of each individual.

Topic evolution before fall incidents in new fallers through natural language processing of general practitioners' clinical notes

Dormosh N, Abu-Hanna A, Calixto I, Schut MC, Heymans MW, van der Velde N. Age Ageing 2024; 53(2): afae016.

Abstract

BACKGROUND: Falls involve dynamic risk factors that change over time, but most studies on fall-risk factors are cross-sectional and do not capture this temporal aspect. The longitudinal clinical notes within electronic health records (EHR) provide an opportunity to analyse fall risk factor trajectories through Natural Language Processing techniques, specifically dynamic topic modelling (DTM). This study aims to uncover fall-related topics for new fallers and track their evolving trends leading up to falls.

METHODS: This case-cohort study utilised primary care EHR data covering information on older adults between 2016 and 2019. Cases were individuals who fell in 2019 but had no falls in the preceding three years (2016-18). The control group was randomly sampled individuals, with similar size to the cases group, who did not endure falls during the whole study follow-up period. We applied DTM on the clinical notes collected between 2016 and 2018. We compared the trend lines of the case and control groups using the slopes, which indicate direction and steepness of the change over time.

RESULTS: A total of 2,384 fallers (cases) and an equal number of controls were included. We identified 25 topics that showed significant differences in trends between the case and control groups. Topics such as medications, renal care, family caregivers, hospital admission/discharge and referral/streamlining diagnostic pathways exhibited a consistent increase in steepness over time within the cases group before the occurrence of falls.

CONCLUSIONS: Early recognition of health conditions demanding care is crucial for applying proactive and comprehensive multifactorial assessments that address underlying causes, ultimately reducing falls and fall-related injuries.

Effect of dual-task training on balance in older adults: a systematic review and meta-analysis

Abstract

PURPOSE: Our review aims to analyze the effect of dual-task training (DTT) on balance in healthy older adults.

METHODS: PubMed, EbscoHost, Web of Science (WOS), Scopus, Cochrane Library, MEDLINE, EBSCO Open Dissertations, ULAKBIM (TR Index) and YOK (Council of Higher Education Thesis Center) databases and the gray literature were searched. The quality of the studies was assessed with the Cochrane Risk of Bias tool and statistical analysis of the data was performed with Comprehensive Meta-Analysis (CMA) software. A funnel plot and Egger's test were used to detect publication bias. Fourteen studies with 691 participants were included.

RESULTS: According to the results of our study, DTT was found to have a significant benefit on balance in older adults than the non-intervention group (standardized mean difference (SMD): -0.691: -1.153, -0.229, 95 % confidence interval (CI)). Furthermore, DTT was superior to different intervention groups in improving balance in older adults (SMD: -0.229: -0.441, -0.016, 95 % CI).

CONCLUSION: The findings of this review suggest that DTT may be an effective intervention to improve balance in healthy older adults.

A custom-built step exergame training programme to prevent falls in people with multiple sclerosis: a multicentre randomised controlled trial

Hoang P, Sturnieks DL, Butler A, Chaplin C, Hicks C, Lo J, Ratanapongleka M, Robinson S, Smith N, Turner J, Krishnan AV, Barnett M, Gandevia S, Lord SR, Menant JC. Mult. Scler. 2024; ePub(ePub): ePub.

Abstract

BACKGROUND: Cognitive-motor step training can improve stepping, balance and mobility in people with multiple sclerosis (MS), but effectiveness in preventing falls has not been demonstrated.

OBJECTIVES: This multisite randomised controlled trial aimed to determine whether 6 months of home-based step exergame training could reduce falls and improve associated risk factors compared with usual care in people with MS.

METHODS: In total, 461 people with MS aged 22-81 years were randomly allocated to usual care (control) or unsupervised home-based step exergame training (120 minutes/week) for 6 months. The primary outcome was rate of falls over 6 months from randomisation. Secondary outcomes included physical, cognitive and psychosocial function at 6 months and falls over 12 months.

RESULTS: Mean (standard deviation (SD)) weekly training duration was 70 (51) minutes over 6 months. Fall rates did not differ between intervention and control groups (incidence rates (95% confidence interval (CI)): 2.13 (1.57-2.69) versus 2.24 (1.35-3.13), respectively, incidence rate ratio: 0.96 (95% CI: 0.69-1.34, p = 0.816)). Intervention participants performed faster in tests of choice-stepping reaction time at 6 months. No serious training-related adverse events were reported.

CONCLUSION: The step exergame training programme did not reduce falls among people with MS. However, it significantly improved choice-stepping reaction time which is critical to ambulate safely in daily life environment.

Age-related risk of serious fall events and opioid analgesic use

Hopkins RE, Bharat C, Buizen L, Close J, Ivers R, Draper B, Pearson SA, Degenhardt L, Gisev N. JAMA Intern. Med. 2024; ePub(ePub): ePub.

Abstract

IMPORTANCE: Opioid analgesics may be associated with increased risk of falls, particularly among older adults.

OBJECTIVE: To quantify the age-related risk of serious fall events among adults prescribed opioids by opioid exposure, time from initiation, and daily dose.

DESIGN, SETTING, AND PARTICIPANTS: This population-based cohort study conducted in New South Wales, Australia, used data linking national pharmaceutical claims to national and state datasets, including information on sociodemographic characteristics, clinical characteristics, medicines use, health services utilization, and mortality (POPPY II study). It included adults (18 years or older) who initiated prescription opioid treatment, which was defined as no prior dispensing during the preceding 365 days, between January 1, 2005, and December 31, 2018. Data were analyzed from February to June 2023.

EXPOSURE: Time-dependent periods of opioid exposure were evaluated from dispensing records.

MAIN OUTCOME AND MEASURES: Serious fall events identified from emergency department, hospitalization, and mortality records. Negative binomial models were used to assess associations between time-dependent opioid exposure (overall, by time from initiation, and by dose), age, and risk of fall events. Models were adjusted for known fall risk factors, including other fall risk-increasing drugs, frailty risk, and prior serious fall events.

RESULTS: The cohort comprised 3 212 369 individuals who initiated prescription opioid treatment (1 702 332 women [53%]; median [IQR] age at initiation, 49 [32-65] years). Overall, 506 573 serious fall events were identified, including 5210 fatal falls. During exposure to opioids, the risk of serious fall events was elevated among all age groups; compared with the group aged 18 to 44 years, this risk was highest among those 85 years or older (adjusted incident rate ratio, 6.35; 95% CI, 6.20-6.51). Across all age groups, the first 28 days following opioid initiation was a time of increased serious fall risk; this risk increased with age. Among individuals aged 18 to 84 years, associations were identified between higher daily opioid doses and serious fall events.

CONCLUSIONS AND RELEVANCE: The results of this cohort study suggest that prescription opioids were associated with increased risk of serious fall events among adults of all ages, with individuals 85 years or older at greatest risk. These risks should be considered when prescribing opioids, particularly for individuals with preexisting risk factors or when opioids are prescribed at higher doses. Targeted falls prevention

efforts may be most effective within the first month following opioid initiation.

Language: en

Validating the accuracy of the Hendrich II Fall Risk Model for hospitalized patients using the ROC curve analysis

Hu CY, Sun LC, Lin MY, Chen MH, Hsu HT. Kaohsiung J. Med. Sci. 2024; ePub(ePub): ePub.

Abstract

This retrospective study was conducted at a medical center in southern Taiwan to assess the accuracy of the Hendrich II Fall Risk Model (HIIFRM) in predicting falls. Sensitivity, specificity, accuracy, and optimal cutoff points were analyzed using receiver operating characteristic (ROC) curves. Data analysis was conducted using information from the electronic medical record and patient safety reporting systems, capturing 303 fall events and 47,146 non-fall events.

RESULTS revealed that at the standard threshold of HIIFRM score ≥5, the median score in the fall group was significantly higher than in the non-fall group. The top three units with HIIFRM scores exceeding 5 were the internal medicine (50.6%), surgical (26.5%), and oncology wards (14.1%), indicating a higher risk of falls in these areas. ROC analysis showed an HIIFRM sensitivity of 29.5% and specificity of 86.3%. The area under the curve (AUC) was 0.57, indicating limited discriminative ability in predicting falls. At a lower cutoff score (≥2), the AUC was 0.75 (95% confidence interval: 0.666-0.706; $p < 0.0001$), suggesting acceptable discriminative ability in predicting falls, with an additional identification of 101 fall events. This study emphasizes the importance of selecting an appropriate cutoff score when using the HIIFRM as a fall risk assessment tool. The findings have implications for fall prevention strategies and patient care in clinical settings, potentially leading to improved outcomes and patient safety.

Prevalence of falls and comparison of health-related physical fitness factors between different faller categories among institutionalized older adults in Kandy District of Sri Lanka

Ihalage WISM, Wijebandara VRCS, Wickramakumari DGWS, Wickramasingha WMBD, Sampath RMRK, Manchanayake MMJP, Liyanage E. PLoS One 2024; 19(2): e0297946.

Abstract

Falls can be identified as one of the main issues in elderly population which can lead to serious consequences. Elderly population can be subdivided as community dwelling older adults and institutionalized older adults. The components of health-related physical fitness factors play an important role in the perspective of healthy ageing. The objective of the study was to determine the prevalence of falls and to compare health-related physical fitness factors between different fall categories among institutionalized older adults. This descriptive cross-sectional study comprised of one hundred and seventy-two elders above 60 years of age, living in registered elder's homes in Kandy District. The prevalence of falls was determined by the number of falls reported by the subjects. They were further categorized as non-fallers, fallers, and frequent fallers depending on the number of falls. Body Mass Index (BMI) for body composition, 2-minute walk test for cardiovascular endurance, 30 second sit to stand test for muscle strength and endurance, hand grip strength for upper body strength, chair sit and reach test for lower body flexibility and back scratch test for upper body flexibility were the measures used to assess health-related physical fitness factors. The prevalence of falls is presented as percentage and the health-related factors were compared between the three faller categories using one-way ANOVA and pairwise comparison was performed using Scheffe test. The prevalence of falls was 47.1%. There was a significant difference in BMI, cardiovascular endurance, and lower body flexibility between the three categories of fallers. Higher BMI, lower cardiovascular endurance and lower flexibility in the lower body were associated with increased prevalence of falls ($p<0.05$). There was no significant difference in body fat percentage, hand grip strength, lower body muscle strength and endurance and upper body flexibility ($p>0.05$). The findings suggest that, BMI, cardiovascular endurance, and lower body flexibility must be addressed and managed, while designing intervention programs for falls prevention among institutionalized older adults.

Language: en

Examining the impact of a health report card on follow through with fall risk recommendations: an observational study

Kehrer-Dunlap AL, Bollinger RM, Holden B, Ances BM, Stark S. BMC Geriatr. 2024; 24(1): e166.

Abstract

BACKGROUND: Increasing older adults' awareness of their personal fall risk factors may increase their engagement in fall prevention. The purpose of this study was to explore the impact of and participant satisfaction with a comprehensive occupational therapy fall risk screening and recommendations for evidence-based fall prevention strategies based on personalized fall risk results for community-dwelling older adults.

METHODS: Cognitively normal participants (Clinical Dementia Rating = 0) were recruited from an ongoing longitudinal study of memory and aging. Participants completed 2 annual in-home visits, fall risk questionnaires, and 12 months of fall monitoring between visits. Participants received a health report card with their fall risks and tailored recommendations in 6 domains. Participants completed follow-up questions at their next annual in-home visit about the fall risk recommendations and their satisfaction with receiving their fall risk results.

RESULTS: Two hundred five participants completed 2 annual visits and 12 months of fall monitoring. Of the 6 domains of recommendations provided, participants were most likely to follow through with getting an annual eye exam and reviewing their medications with their doctor or pharmacist. Older adults who fell were significantly more likely to receive recommendations for finding fall prevention classes ($p = 0.01$) and having a doctor or pharmacist review their medications ($p = 0.004$). The majority of participants were satisfied receiving their fall risk results (92%) and believed it to be beneficial (90%), though few participants shared their results with their doctor (20%).

CONCLUSIONS: An occupational therapy fall risk screening and tailored recommendations were not sufficient to encourage follow through with fall risk recommendations. Older adults may benefit from additional support and encouragement to reduce their fall risk. Additional research is needed to examine awareness of fall risks and follow through with fall risk recommendations among community-dwelling older adults.

Injury patterns and demographics in older adult abuse and falls: a comparative study in emergency department settings

Abstract

BACKGROUND: Falls and interpersonal violence pose significant threats to older adults, leading to injuries, hospitalizations, and emergency department (ED) visits. This study investigates the demographics and injury patterns in older adults (aged 60 and above) who sought ED care due to assaults, comparing them with those who experienced falls to gain a deeper understanding of older adult abuse patterns.

METHOD: This study utilizes data from the National Electronic Injury Surveillance System (NEISS) All Injury Program (2005-2019) to examine injuries among older adults aged 60 years and above. Participants were categorized into two groups: older adult abuse and injuries due to falls. The differences between the groups by demographics, injury locations, patterns, and temporal trends were analyzed using statistical methods accounting for the weighted stratified nature of the data. Cosinor analysis and Joinpoint regression were used for temporal analysis.

RESULTS: Over 15 years, there were an estimated 307,237 ED visits for older adult abuse and 39,477,217 for falls. Older adults experiencing abuse were younger and had lower hospital admission rates compared to fall patients. Injuries associated with abuse included contusions/abrasions, penetrating injuries, and fractures to the head/neck, fingers, toes, ribs, and lower extremities. In contrast, fall patients had higher admission rates, with more fractures, including cervical spine and hip fractures. Temporal patterns showed a higher rate of assaults during the summer, whereas abuse demonstrated bimodal peaks in the summer and fall.

CONCLUSIONS: Injuries associated with abuse such as facial, upper trunk, and upper extremity fractures should raise suspicion even in the absence of severe symptoms. These findings emphasize the importance of early identification to connect older adults with support resources, as patients experiencing abuse often get discharged from the ED.

Home exergame prevents falls

Abstract

For exercise interventions delivery, uptake and adherence present a challenge that computer gaming-based programs (exergames) may address. The research team took inspiration from the 1998 video arcade game Dance Dance Revolution to develop smart±step, a system comprising eight games that can be played either seated using a touchpad or by stepping on target panels on a mat. ...

Language: en

Risk of fall in patients with chronic kidney disease: results from the China Health and Retirement Longitudinal Study (CHARLS)

Abstract

BACKGROUND: Chronic kidney disease (CKD), often coexisting with various systemic disorders, may increase the risk of falls. Our study aimed to assess the prevalence and risk of falls among patients with CKD in China.

METHODS: We included patients with/without CKD from China Health and Retirement Longitudinal Study (CHARLS). Our primary outcome was the occurrence of fall accidents within the past 2 years. To enhance the robustness of our findings, we employed a multivariable logistic regression model, conducted propensity score analysis, and applied an inverse probability-weighting model.

RESULTS: A total of 12,658 participants were included, the prevalence of fall accident rates were 17.1% (2,028/11,837) among participants without CKD and 24.7% (203/821) among those with CKD. In the inverse probability-weighting model, participants with CKD exhibited higher fall accident rates (OR = 1.28, 95% CI: 1.08-1.53, p = 0.005). Sensitivity and subgroup analysis showed the results still stable.

CONCLUSIONS: The population in China afflicted with CKD has a significantly heightened risk of experiencing falls, underscoring the crucial importance of intensifying efforts in assessing and preventing fall risks.

A meta-analysis of fall risk in older adults with Alzheimer's disease

Mahmoudzadeh Khalili S, Simpkins C, Yang F. J. Am. Med. Dir. Assoc. 2024; ePub(ePub): ePub.

Abstract

OBJECTIVES: Falls are the leading cause of injuries in older adults. Although it is well recognized that Alzheimer's disease (AD) increases the fall risk of older adults, the reported fall risk in people with AD varies drastically. The principal purpose of this study was to summarize and synthesize previous studies reporting fall risk-related metrics in people with AD.

DESIGN: This was a meta-analysis. SETTING AND PARTICIPANTS: Thirty-one studies reporting relevant fall data among 4654 older adults with AD were included.

METHODS: The fall prevalence, average number of falls, rate of recurrent fallers, and rate of injured fallers of included studies were meta-analyzed using random-effects models with inverse variance weights.

RESULTS: The pooled annual fall prevalence in older people with AD is 44.27% with an average annual number of falls of 1.30/person and a yearly rate of recurrent fallers of 42.08%. The reported rate of injured fallers was 45.0%.

CONCLUSIONS AND IMPLICATIONS: Our results reinforce that people with AD experience a higher fall risk than their cognitively healthy counterparts. The pooled fall metrics in this meta-analysis extend our understanding of the fall risk in people with AD. In addition, standardized approaches are needed to report fall-related data for people with AD.

Physical therapy and risk of falls among patients with dizziness-reply

Marmor S, Karaca-Mandic P, Adams ME. JAMA Otolaryngol. Head Neck Surg. 2024; ePub(ePub): ePub.

Abstract

In Reply We thank Wu and colleagues for their insightful comments about our study1 that assessed the use of physical therapy (PT) and subsequent falls among patients with dizziness in the US using a large administrative claims dataset. Our primary objective was to examine the association between receipt of any PT service and falls requiring medical care within 12 months of presentation for dizziness, and secondarily to identify factors associated with receipt of PT and falls. In their Letter, Wu and colleagues emphasize the potential influence of several unmeasured variables on the observed association. We concur with the authors regarding the potential significance of the patient-specific factors they mention, including frailty, general balance, and mobility, as well as the capacity and willingness to adhere to the recommended PT regimen during and after therapy sessions at home as important covariates.2 At the same time, we acknowledge constraints in assessing these variables in our analyses due to their unavailability in the administrative dataset we used. We agree with the authors on the necessity for further research to elucidate how these variables may affect PT use and the effects of PT for patients experiencing dizziness.

Language: en

Associations among frailty status, hypertension, and fall risk in community-dwelling older adults

Abstract

OBJECTIVES: Frailty and hypertension often coexist in older adults, which may lead to fall risks. This study aimed to examine the relationship between frailty status, hypertension, and fall risk.

METHODS: In this cross-sectional study, a total of 401 older adults were conveniently recruited from communities in Wuxi, China, between September 2022 and November 2022. The fall risk self-assessment checklist from the Stopping Elderly Accidents, Deaths & Injuries (STEADI) Toolkit was used to evaluate their fall risks. The FRAIL scale questionnaire was used to assess frailty status. Participants' demographic information and comorbidities were collected. Multivariate logistic regression, generalized additive model, and smooth curve fitting were used to analyze the association between frailty, hypertension, and fall risk.

RESULTS: Frailty had a strong association with increased prevalence of fall risk among the participants (OR 8.52, 95% CI 3.21-22.57; $P < 0.001$). Hypertension significantly increased the fall risk among older adults (OR 1.87, 95% CI 1.11-3.13; $P = 0.019$). The group with hypertension and frailty had the highest prevalence of fall risk (OR 12.24, 95% CI 3.51-42.65). Smooth curve fitting showed a nonlinear association between frailty and fall risk in hypertension status. In the progress of pre-frailty to frailty status, a higher tendency to fall was found among older adults with hypertension.

CONCLUSIONS: Frailty status and hypertension independently and jointly influenced the increased prevalence of fall risk. Enhanced frailty and hypertension management may help decrease fall risk among this population.

Effects of square dance exercise on cognitive function in elderly individuals with mild cognitive impairment: the mediating role of balance ability and executive function

Abstract

BACKGROUND: Square dancing is a kind of aerobic fitness exercise without environmental restrictions that yields many benefits for physical and mental health; this exercise is popular among middle-aged and elderly people in China and in these populations in other countries. This study aimed to evaluate the effects of square dance exercise on the overall cognitive function of elderly individuals with mild cognitive impairment (MCI) and to research its mechanisms.

METHODS: A total of 60 elderly people with MCI (60-69 years old) without square dance experience were selected and randomly divided into an experimental group (n = 30) and a control group (n = 30). The experimental group participated in square dance exercise for 12 weeks, while the control group maintained their original lifestyle habits. One week before and after the intervention period, the overall cognitive function, physical fitness, and executive function of both groups were measured.

RESULTS: According to the results, square dance exercise directly improved the overall cognitive function of elderly individuals with MCI and indirectly affected overall cognitive function through the mediating effects of balance ability and executive function.

CONCLUSIONS: Square dance exercise represents a nonpharmacological intervention for the prevention and treatment of MCI. Importantly, it is best to combine this exercise with other forms of physical exercise and comprehensive treatment programs such as cognitive training, social interaction, and psychological intervention to realize its maximum effect.

Turning speed as a more responsive metric of age-related decline in mobility: a comparative study with gait speed

Weston AR, Lohse KR, Kittelson A, King LA, Carlson-Kuhta P, Dibble LE, Mancini M. Clin. Biomech. 2024; 113: e106196.

Abstract

BACKGROUND: Navigating your environment requires both straight-line gait as well as turning. Gait speed normative values are well established and utilized in determining a person's functional status, however, it has limitations. This study sought to examine whether turning speed declines with age and how it compared to gait speed age-related decline.

METHODS: A secondary analysis was performed on 275 community dwelling adults between the ages of 18-88 that performed a timed walking test with an inertial measurement unit on their lumbar spine. Turning speed and walking speed were extracted for each participant. A series of mixed models were compared, and Akaike's Information Criterion was used to determine the best fit model between age and turning speed and age and gait speed.

FINDINGS: Turning speed and gait speed normative values were reported for each age decade. A linear model with a random intercept of "Condition" was used to assess the relationship between age and turning speed. The results indicated a significant negative relationship between age and turning speed (B = -0.66, p < 0.001). A spline-fit model determined a significant negative relationship between age and gait speed after the age of 65 (B = -0.0097, p = 0.002). The effect of age on gait speed before age 65 was not significant.

INTERPRETATION: Turning speed significantly declines with age in a linear fashion while gait speed begins to decline after age 65. Turning speed may be more responsive to age than gait speed. More research is needed to determine if the decline in turning speed with age is associated with a decline in function.

Physical therapy and risk of falls among patients with dizziness

Abstract

To the Editor We read with interest the epidemiological study by Marmor et al1 who delved into the association between receipt of physical therapy (PT) and falls requiring medical care within 12 months of presentation for dizziness. Using a multivariable regression with a separate multivariable model, the study indicated that timely physical therapy referral for dizziness could be associated with a reduction in the risk of injurious falls, with the greatest risk reduction found within 3 months after PT (adjusted odds ratio [AOR], 0.14; 95% CI, 0.14-0.15 at 3-12 months vs 0.18; 95% CI, 0.18-0.19 at 6-12 months and 0.23; 95% CI, 0.23-0.24 at 9-12 months). We would like to share some ideas regarding their article.

Language: en

Effects of active vitamin D analogues on muscle strength and falls in elderly people: an updated meta-analysis

Xiong A, Li H, Lin M, Xu F, Xia X, Dai D, Sun R, Ling Y, Qiu L, Wang R, Ding Y, Xie Z.
Front. Endocrinol. (Lausanne) 2024; 15: e1327623.

Abstract

BACKGROUND: Elderly people are at high risk of falls due to decreased muscle strength. So far, there is currently no officially approved medication for treating muscle strength loss. The active vitamin D analogues are promising but inconsistent results have been reported in previous studies. The present study was to meta-analyze the effect of active vitamin D analogues on muscle strength and falls in elderly people.

METHODS: The protocol was registered with PROSPERO (record number: CRD42021266978). We searched two databases including PubMed and Cochrane Library up until August 2023. Risk ratio (RR) and standardized mean difference (SMD) with 95% confidence intervals (95% CI) were used to assess the effects of active vitamin D analogues on muscle strength or falls.

RESULTS: Regarding the effects of calcitriol (n= 1), alfacalcidol (n= 1) and eldecalcitol (n= 1) on falls, all included randomized controlled trials (RCT) recruited 771 participants. Regarding the effects of the effects of calcitriol (n= 4), alfacalcidol (n= 3) and eldecalcitol (n= 3) on muscle strength, all included RCTs recruited 2431 participants. The results showed that in the pooled analysis of three active vitamin D analogues, active vitamin D analogues reduced the risk of fall by 19%. Due to a lack of sufficient data, no separate subgroup analysis was conducted on the effect of each active vitamin D analogue on falls. In the pooled and separate analysis of active vitamin D analogues, no significant effects were found on global muscle, hand grip, and back extensor strength. However, a significant enhancement of quadriceps strength was observed in the pooled analysis and separate analysis of alfacalcidol and eldecalcitol. The separate subgroup analysis on the impact of calcitriol on the quadriceps strength was not performed due to the lack to sufficient data. The results of pooled and separate subgroup analysis of active vitamin D analogues with or without calcium supplementation showed that calcium supplementation did not affect the effect of vitamin D on muscle strength.

CONCLUSIONS: The use of active vitamin D analogues does not improve global muscle, hand grip, and back extensor strength but improves quadriceps strength and reduces risk of falls in elderly population.

The incidence, prevalence, and health burden of hip fractures in China: data from the global burden of disease study 2019

Abstract

BACKGROUND: Hip fracture is commonly in the elderly as a consequence of osteoporsis. Currently, China is entering an aging society and there is a lack of studies about the epidemiology and health burden of hip fracturs there.

METHODS: We used data from the Global Burden of Disease study 2019 (GBD 2019) to estimate the incidence, prevalence and disease burden of hip fractures in China and the temporal trends from 1990 to 2019. These estimates were produced by DisMod-MR 2.1, a Bayesian meta-regression tool. Estimated annual percentage change (EAPC) was used to represent the temporal trends.

RESULTS: In 2019, there was estimated to be 2.0 million incident and 2.6 million prevalent hip fracture cases in China. The age standardized incidence and prevalence rate were estimated to be 117.8 (95 % UI, 83.8 to 161.6) per 100,000 and 139.8 (95 % UI, 125.7 to 154.7) per 100,000, respectively. From 1990 to 2019, the incidence (EAPC, 1.06; 95 % CI, 0.6 to 1.52) and prevalence (EAPC, 1.41; 95 % CI, 1.02 to 1.8) rates have increased, while the age standardized DALY decreased (95 %CI, -1.8; 95 % CI, -2.3 to -1.2). The incidence and DALY rates of hip fractures increased with age, and female people have higher incidence rate and disease burden. Falls were the leading cause for hip fractures, followed by road injuries.

CONCLUSION: Due to population growth and ageing, the challenges from hip fractures are expected to increase in the future, and related measures are in need to reduce the related health and economic burden.

Using a participatory design to develop an implementation framework for integrating falls prevention for older people within the Chinese primary health care system

Abstract

BACKGROUND: Chinese National Essential Public Health Service Package (NEPHSP) has mandated primary health care providers to provide falls prevention for community-dwelling older people. But no implementation framework is available to guide better integration of falls prevention for older people within the primary health care system.

METHODS: This is a two-stage online participatory design study consisting of eight workshops with stakeholders from three purposively selected cities. First, two workshops were organised at each study site to jointly develop the framework prototype. Second, to refine, optimise and finalise the prototype via two workshops with all study participants. Data analysis and synthesis occurred concurrently with data collection, supported by Tencent Cloud Meeting software.

RESULTS: All participants confirmed that the integration of falls prevention for older people within the NEPHSP was weak and reached a consensus on five opportunities to better integrate falls prevention, including workforce training, community health promotion, health check-ups, health education and scheduled follow-up, during the delivery of NEPHSP. Three regional-tailored prototypes were then jointly developed and further synthesised into a generic implementation framework by researchers and end-users. Guided by this framework, 11 implementation strategies were co-developed under five themes.

CONCLUSIONS: The current integration of falls prevention in the NEPHSP is weak. Five opportunities for integrating falls prevention in the NEPHSP and a five-themed implementation framework with strategies are co-identified and developed, using a participatory design approach. These findings may also provide other regions or countries, facing similar challenges, with insights for promoting falls prevention for older people.