

Dementia and Cognition

This document contains all abstracts for publications relating to dementia and cognition for 2021 so far and will be updated quarterly. These abstracts have been sourced from [SafetyLit.org](https://www.safetylit.org) and include only those relevant to falls prevention.

SafetyLit provides weekly abstracts of peer reviewed articles from researchers who work in the more than 30 distinct professional disciplines relevant to preventing and researching unintentional injuries, violence, and self-harm. Each week citations and summaries of about 400 articles and reports are included in a PDF document or through an RSS subscription.

Contents:

Dementia: p2

Cognition: p16

Dementia

Prevalence of falls and fractures in Alzheimer's patients compared to general population

Dev K, Javed A, Bai P, Murlidhar, Memon S, Alam O, Batool Z. *Cureus* 2021; 13(1): e12923.

(Copyright © 2021, Curēus)

DOI 10.7759/cureus.12923 PMID 33656497

Abstract

Introduction Alzheimer's disease (AD), found in the aging elderly population, is a progressive neurodegenerative disorder that leads to worsening memory loss and cognitive impairment. Falls and fractures are common in the overall elderly population. Hence, the purpose of this study is to determine the prevalence of falls and fractures in Alzheimer's patients compared to the general population.

METHODology This longitudinal study was conducted at the neurology outpatient department (OPD) in a tertiary healthcare setup in Pakistan from November 2019 till April 2020. Previously confirmed diagnosed Alzheimer's patients from neurology OPD were included in one group. Equal number of gender and age-matched healthy participants were included in the reference group. Participants were followed for 12 months to determine the incidence of falls and non-vertebral fractures.

RESULTS The incidence of fall was significant in the Alzheimer group compared to the reference group (22.8% vs. 10.9%; relative risk (RR): 2.08; P-value: 0.01). Fractures were also significantly more common in the Alzheimer group compared to the reference group (12.8% vs. 5.1%; RR: 2.51; P-value: 0.03).

CONCLUSION This study demonstrated a higher incidence of falls and fractures in Alzheimer's patients compared to healthy non-Alzheimer individuals. Management of AD should include measures to reduce falls and fractures in addition to standard therapy.

Language: en

Keywords

falls; fractures; alzheimer's

Risk Factors for Falls in Patients with Alzheimer Disease: A Retrospective Study of Balance, Cognition, and Visuospatial Ability

Oki M, Matsumoto M, Yoshikawa Y, Fukushima M, Nagasawa A, Takakura T, Suzuki Y. *Dement. Geriatr. Cogn. Dis. Extra* 2021; 11(1): 58-63.

(Copyright © 2021, Karger Publishers)

DOI 10.1159/000514285 PMID unavailable

Abstract

AIM: This study aimed to determine the main risk factors for falls in patients with Alzheimer disease (AD) by comparing balance, cognition, and visuospatial ability between those who have experienced a fall and those who have not.

METHODS: Forty-seven AD patients were admitted to a ward for patients with dementia (22 men and 25 women). The balance of patients was evaluated using the Functional Reach Test (FRT), the one-leg standing duration, and the Timed Up and Go (TUG) test. The Mini-Mental State Examination-Japanese (MMSE-J) was used to evaluate cognition. For visuospatial ability assessment, the Clock-Drawing Test (CDT) as well as overlapping figure identification and shape discrimination in the Visual Perception Test for Agnosia (VPTA) were used. The patients were allocated to either the fall group or the nonfall group based on their history of falls in the past year. The relationships between patients' characteristics and evaluation outcomes were compared and examined. Logistic regression analysis was performed using a fall as the objective variable. The area under the curve (AUC) and the cutoff value were calculated.

RESULTS: Of the 47 participants, 22 had experienced falls within the past year (46.8%). The results of the FRT, one-leg standing duration, the TUG, the CDT, and the VPTA were significantly lower in the fall group. No significant difference between the MMSE-J scores of the fall group and those of the nonfall group was observed. The results of the logistic regression analysis indicated that falls in AD patients were significantly associated with the FRT. It was found that a shorter FRT distance (cm) had a significant impact on falls. For the FRT, the fall-related AUC was 0.755. At a cutoff value of 24.5 cm, the level of sensitivity was 68.0%, and the level of specificity was 77.3%.

CONCLUSIONS: The findings of this study indicate that balance and visuospatial abilities are risks factors for falls in AD patients. In contrast, cognitive impairment was not a risk factor for falls. It was demonstrated that the FRT could be an appropriate risk predictor for falls in AD patients. In particular, falls in AD patients were strongly affected by a reduced dynamic balance.

Language: en

Keywords Fall; Alzheimer disease; Cutoff; Functional reach test

Occupational therapy utilization in veterans with dementia: a retrospective review of root cause analyses of falls leading to adverse events

Rhodus EK, Lancaster EA, Hunter EG, Nudell T, Humphrey C, Duke M, Harris AM. J. Patient Saf. 2021; ePub(ePub): ePub.

(Copyright © 2021, Lippincott Williams and Wilkins)

DOI 10.1097/PTS.0000000000000860 **PMID** unavailable

Abstract

INTRODUCTION: Falls in persons with dementia are associated with increased mortality. Occupational therapy (OT) is a rehabilitation discipline, which has, among its goals, the promotion of safety and fall prevention in older adults and those with dementia. The purpose of this study was to evaluate root cause analysis (RCA) data to identify causes of falls with adverse events in patients with dementia who were referred to or receiving OT services within the Veterans Health Administration (VHA).

METHODS: This study used retrospective review of RCAs within the National Center for Patient Safety database for the VHA. The RCA database was searched using these terms: falls with adverse events, dementia, and OT. Descriptive statistical analysis of demographic information, location, occurrence of orthopedic fracture, and mortality was used. All root causes were qualitatively categorized using thematic analysis of determined causes.

RESULTS: Eighty RCAs were included in analysis. Mean age of veterans included was 80 years; 96% were male; 76% resulted in hip fracture; and 20% died as a result of the fall. Occupational therapy evaluations occurred within 7 days of admission to VHA and falls most frequently occurred within 4 days of OT evaluation. Most common causes included inappropriate or lack of equipment (21%), need for falls/rehabilitation assessment (20%), compliance/training to fall protocol of all staff (19%), and behavior/medical status (17%).

CONCLUSIONS: Earlier identification for OT evaluation need may improve access to services, and use of proper equipment to decrease frequency of falls may improve patient safety for older adults with dementia.

Language: en

Dementia care, fall detection, and ambient-assisted living technologies help older adults age in place: a scoping review

Gettel CJ, Chen K, Goldberg EM. *J. Appl. Gerontol.* 2021; ePub(ePub): ePub.

(Copyright © 2021, SAGE Publishing)

DOI 10.1177/07334648211005868 **PMID** unavailable

Abstract

OBJECTIVES: We aimed to describe recent technologic advances in the three domains of dementia care, falls, and home supports; summarize existing literature on usability; and identify knowledge gaps.

METHODS: A comprehensive search of five databases for recent peer-reviewed publications was conducted in May 2020. Independent reviewers performed title/abstract review, full-text screening, data extraction, and study characteristic summarization.

RESULTS: Out of 2,696 citations, 151 articles were retrieved for full-text evaluation, after which 54 studies were included in this scoping review. For each domain, different technologies are available to enhance the health and well-being of older adults; many users deemed them usable and useful. Technologies targeted improving function, psychosocial and cognitive status, home safety, and caregiver burden. Barriers to widespread uptake include privacy concerns, suboptimal user experience, and willingness to accept assistance.

CONCLUSION: Technologic innovations directed toward dementia care, fall detection, and ambient-assisted living can aid older adults "aging in place."

Language: en

Keywords

dementia; geriatrics; falls; technology; successful aging

The effect of the group-based Otago exercise program on frailty among nursing home older adults with cognitive impairment

Feng H, Zou Z, Zhang Q, Wang L, Ouyang YQ, Chen Z, Ni Z. *Geriatr. Nurs.* 2021; 42(2): 479-483.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.gerinurse.2021.02.012 PMID unavailable

Abstract

This study investigated the effect of the group-based Otago exercise program (OEP) on frailty and physical function in older adults with cognitive impairment. We recruited eighteen older adults with cognitive impairment from a nursing-home to perform the OEP three times a week, for a period of three months in a nursing home. The intervention was feasible with attending an average of 21 out of 36 sessions. The frailty score decreased significantly ($p < 0.05$). Physical function including Time Up and Go test (TUG), 30 seconds Sit-To-Stand Test (30 s-SST) and Four-Stage Balance Test was significantly positive after intervention (all $p < 0.001$). The group-based OEP is a potentially effective strategy for reversing frailty and improving physical function among older adults with cognitive impairment.

Language: en

Keywords

Frailty; Older adults; Cognitive impairment; Physical function; Otago exercise program

Risk of fall among older adults and its association with cognitive impairment in a semi-urban community

Monachan D, Vargese SS, Johny V, Mathew E. Indian J. Community Med. 2020; 45(4): 463-466.

(Copyright © 2020, Indian Association of Preventive and Social Medicine, Publisher MedKnow)

DOI 10.4103/ijcm.IJCM_491_19 PMID 33623202

Abstract

CONTEXT: Fall in older people is a major public health concern. Two-third of the death due to fall are preventable. Risk assessment in older adults therefore is the first step to identify the high-risk group to plan need-based intervention. **AIMS:** The aim of the study was to determine the prevalence of risk of fall among older adults and its association with cognitive impairment and sociodemographic characteristics. **SETTINGS AND DESIGN:** A cross-sectional study was conducted in the field practice areas of the department of community medicine in a teaching hospital in South Kerala, India.

SUBJECTS AND METHODS: A semi-structured questionnaire was used to collect the data. Berg Balance Scale and Mini-Cog Test were used for measuring risk of fall and cognitive impairment. **STATISTICAL ANALYSIS USED:** Descriptive statistics and logistic regression were used for the statistical analysis using SPSS.

RESULTS: Among the older adults, 45% were at risk of fall, 42.4% in males and 57.6% in females. The risk of fall was found to be significantly associated with cognitive impairment, (odds ratio = 3.89, confidence interval at 95% = 2.06-7.31, $P < 0.001$). Advanced age, female gender, and unemployed status were significantly associated with the risk of fall.

CONCLUSIONS: The risk of fall prevalence was high and significantly related to cognitive impairment, advanced age, female gender, and occupational status, with more than half of those currently not working having a higher risk. The study would recommend regular follow-up of risk groups for prevention a good percentage of fall and thereby the related injuries.

Language: en

Keywords

older adults; Cognitive impairment; community dwelling; risk of fall

Frailty, with or without cognitive impairment, is a strong predictor of recurrent falls in a US population-representative sample of older adults

Ge ML, Simonsick EM, Dong BR, Kasper JD, Xue QL. J. Gerontol. A Biol. Sci. Med. Sci. 2021; ePub(ePub): ePub.

(Copyright © 2021, Gerontological Society of America)

DOI 10.1093/gerona/qlab083 PMID unavailable

Abstract

BACKGROUND: Physical frailty and cognitive impairment have been separately associated with falls. The purpose of the study is to examine the associations of physical frailty and cognitive impairment separately and jointly with incident recurrent falls among older adults.

METHODS: The analysis included 6000 older adults in community or non-nursing home residential care settings who were ≥ 65 years and participated in the National Health Aging Trends Study (NHATS). Frailty was assessed using the physical frailty phenotype; cognitive impairment was defined by bottom quintile of clock drawing test or immediate and delayed 10-word recall, or self/proxy-report of diagnosis of dementia, or AD8 score ≥ 2 . The marginal means/rates models were used to analyze the associations of frailty (by the physical frailty phenotype) and cognitive impairment with recurrent falls over 6 years follow-up (2012-2017).

RESULTS: Of the 6000 older adults, 1,787 (29.8%) had cognitive impairment only, 334 (5.6%) had frailty only, 615 (10.3%) had both, and 3,264 (54.4%) had neither. After adjusting for age, sex, race, education, living alone, obesity, disease burden, and mobility disability, those with frailty (with or without cognitive impairment) at baseline had higher rates of recurrent falls than those without cognitive impairment and frailty (frailty only: Rate ratio (RR)=1.31, 95% confidence interval (CI)=1.18-1.44; both: RR=1.28, 95% CI=1.17-1.40). The association was marginally significant for those with cognitive impairment only (RR=1.07, 95% CI=1.00-1.13).

CONCLUSIONS: Frailty and cognitive impairment were independently associated with recurrent falls in non-institutionalized older adults. There was a lack of synergistic effect between frailty and cognitive impairment.

Language: en

Keywords

Frailty; falls; older adults; cognitive impairment

Mild cognitive impairment is associated with fall-related injury among adults aged ≥ 65 years in low- and middle-income countries

Smith L, Jacob L, Kostev K, Butler L, Barnett Y, Pfeifer B, Soysal P, Grabovac I, López-Sánchez GF, Veronese N, Yang L, Oh H, Koyanagi A. *Exp. Gerontol.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.exger.2020.111222 PMID unavailable

Abstract

OBJECTIVES: There is a scarcity of data on the association between mild cognitive impairment (MCI) and falls, especially from low- and middle-income countries (LMICs) where 70% of all older adults reside. Thus, we investigated the association between MCI and fall-related injury among older adults residing in six LMICs (China, Ghana, India, Mexico, Russia, South Africa).

DESIGN: Cross-sectional, community-based data from the WHO Study on global AGEing and adult health (SAGE) were analyzed.

METHODS: The definition of MCI was based on the National Institute on Ageing-Alzheimer's Association criteria, and information on past 12-month fall-related injury was also collected. Multivariable logistic regression analysis was conducted to assess associations.

RESULTS: The analytical sample consisted of 13,623 individuals aged ≥ 65 years [mean (SD) age 72.3 (10.9) years; 45.6% males]. The prevalence of fall-related injury was higher among those with MCI (6.3%) vs. no MCI (4.1%). After adjustment for potential confounders, MCI was associated with a 1.53 (95%CI = 1.12-2.07) times higher odds for fall-related injury.

CONCLUSIONS: MCI was associated with higher odds for fall-related injury among older adults in LMICs. Future studies are warranted to investigate the mechanisms underlying this association and to elucidate whether targeting those with MCI can lead to reduced risk for falls among older adults.

Language: en

Keywords

Older adults; Fall-related injury; Low-and-middle-income countries; Mild cognitive impairment

Gender differences in the effect of depression and cognitive impairment on risk of falls among community-dwelling older adults

Roh HW, Lee DE, Lee Y, Son SJ, Hong CH. *J. Affect. Disord.* 2020; 282: 504-510.

(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.jad.2020.12.170 PMID unavailable

Abstract

BACKGROUND: The impact of the interrelationship between depression and cognitive impairment on risk of falls remains unclear. In addition, gender differences should be considered to further understand the relationships between depression, cognitive impairment, and risk of falls.

METHODS: Older adults who completed the Living Profiles of Older People Survey in Korea were included. In total, 14,055 participants completed the baseline survey, and 7,150 participants completed a follow-up survey after 3 years. We classified participants into 4 groups based on depression and cognitive impairment.

RESULTS: Using generalized estimating equation models, older adults with depression but without cognitive impairment had a higher risk of falls (OR=1.49, 95% CI=1.35-1.63), compared to a reference group with neither depression nor cognitive impairment. However, older adults who had cognitive impairment but not depression had a similar risk of falls (OR=1.03, 95% CI=0.91-1.16) to the reference group. Finally, older adults who had both depression and cognitive impairment had the highest risk of falls (OR=1.95, 95% CI=1.73-2.20) compared to the reference group. In addition, depression seemed to have a bigger effect on the risk of falls in men compared to women (p for interaction < 0.001).

LIMITATIONS: These results should be interpreted with caution, considering the use of screening tool for defining depression or cognitive impairment, and lack of information on psychotropic medication use.

CONCLUSIONS: Depression alone or depression combined with cognitive impairment was associated with higher risk of falls in older adults. In addition, gender differences in the risk of falls was noted.

Language: en

Keywords

Depression; Elderly; Fall; Cognitive impairment; Gender differences

A comparison of the prevalence of Fear of Falling between older patients with Lewy body dementia, Alzheimer's disease, and without dementia

Soysal P, Tan SG, Smith L. *Exp. Gerontol.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.exger.2021.111248 **PMID** unavailable

Abstract

BACKGROUND: The development of cognitive impairment and Fear of Falling (FoF) are strongly linked, but prevalence of FoF is not known in patients with different types of dementia. This study aims to evaluate and compare the prevalence and severity of FoF in patients' with dementia with Lewy bodies (DLB), Alzheimer disease (AD), and non-dementia.

METHODS: 46 participants with DLB, 86 participants with AD and participants without dementia (controls), underwent Comprehensive Geriatric Assessment (CGA). The Falls Efficacy Scale-International (FES-I) was used to determine and classify FoF. An overall score on the FES-I of 16-19, 20-27 and ≥ 28 , was accepted as low, moderate, and high concern about FoF, respectively.

RESULTS: Prevalence of high FoF was 86.9% in DLB, 36.0% in AD and 37.4% in controls. All CGA parameters were worse in the DLB and AD group than non-dementia group ($p < 0.001$). The prevalence of high FoF/FES-scores was significantly higher in the DLB group than in the AD and non-dementia group ($p < 0.001$), but was similar in AD and non-dementia groups ($p > 0.05$). The significant relationship between DLB and FoF was maintained when adjusted for age, CGA parameters, and orthostatic hypotension (OR: 2.55, CI: 1.03-6.25, $p = 0.041$ comparison to AD; OR: 4.79, CI: 2.10-10.92, $p < 0.001$ comparison to non-dementia).

CONCLUSION: Eight out of ten elderly patients with DLB have high FoF, which is much higher than those with AD and without dementia. Therefore, clinicians should be aware of FoF and its related consequences in the management of DLB in older adults.

Language: en

Keywords

Alzheimer's disease; Dementia with Lewy bodies; Fear of Falling

Effects of multicomponent exercise on cognitive performance and fall risk in older women with mild cognitive impairment

Thaiyanto J, Sittichoke C, Phirom K, Sungkarat S. *J. Nutr. Health Aging* 2021; 25(2): 160-164.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s12603-020-1458-5 PMID unavailable

Abstract

BACKGROUND: Emerging evidence suggests that multicomponent exercise provides greater benefits for physical and cognitive function than single component exercise. However, few studies have been conducted to determine these effects in older adults with mild cognitive impairment (MCI) and findings have been less conclusive. It has been reported that older women have a greater risk of falls and a higher incidence of dementia than men.

OBJECTIVES: To examine the effects of multicomponent exercise on cognitive performance and fall risk in older women with MCI.

DESIGN: An experimental design comparing the exercise and control groups. **SETTING AND PARTICIPANTS:** Forty community-dwelling older women with MCI were allocated to the exercise (n = 20) and control (n = 20) groups. **INTERVENTION:** Twelve weeks of multicomponent exercise program (aerobic, resistance, and balance exercise) 60 mins/day, 3 days/week. **MEASUREMENT:** Cognitive performance including the Alzheimer's Disease Assessment Scale-Cognitive Subscale (ADAS-Cog) and Trail Making Test (TMT) and fall risk including the Timed Up and Go (TUG) single-, dual-task, and Physiological Profile Assessment (PPA) were administered before and after the 12-week exercise program.

RESULTS: At the end of the 12-week training, participants in the exercise group had a significantly greater improvement in TMT part A ($p < 0.05$), TUG dual-task ($p < 0.05$), and PPA composite score ($p < 0.05$) when compared to the control group. The exercise group also demonstrated significant improvement in TUG dual-task, PPA composite score, PPA subcomponents including postural sway and reaction time when compared to baseline ($p < 0.05$). In contrast, at 12-week, the control group showed a decline in TUG dual-task performance as compared to baseline ($p < 0.05$).

CONCLUSION: The 12-week multicomponent exercise improved attention, dual-task ability, and reduced risk of falling in older women with mild cognitive impairment.

Language: en

Keywords

fall risk; cognitive function; Mild cognitive impairment; multicomponent exercise

A man in his forties with impaired cognitive and circulatory function after a fall

Sønstabø K, Gjerde S, Dicko A, Morild I, Heltne JK, Berle M. Tidsskr. Nor. Lægeforen. 2021; 141(2): e546.

Vernacular Title

En mann i 40-årene med mental og sirkulatorisk påvirkning etter falltraume

(Copyright © 2021, Norske Lægeforening)

DOI 10.4045/tidsskr.20.0546 PMID unavailable

Abstract

Falls can be dangerous, but sometimes whatever caused the fall can be even more dangerous. Here we present the case of a man who was hospitalised after a fall, but for whom identifying the cause and appropriate treatment took some time.

Et falltraume kan være farlig, men noen ganger kan årsakene til fallet være farligere. Vi presenterer her en kasuistikk der en mann ble innlagt etter traume, og der det tok tid å komme frem til årsak og riktig behandling.

Language: no

Risk of fall among older adults and its association with cognitive impairment in a semi-urban community

Monachan D, Vargese SS, Johny V, Mathew E. Indian J. Community Med. 2020; 45(4): 463-466.

(Copyright © 2020, Indian Association of Preventive and Social Medicine, Publisher MedKnow)

DOI 10.4103/ijcm.IJCM_491_19 PMID 33623202

Abstract

CONTEXT: Fall in older people is a major public health concern. Two-third of the death due to fall are preventable. Risk assessment in older adults therefore is the first step to identify the high-risk group to plan need-based intervention. **AIMS:** The aim of the study was to determine the prevalence of risk of fall among older adults and its association with cognitive impairment and sociodemographic characteristics. **SETTINGS AND DESIGN:** A cross-sectional study was conducted in the field practice areas of the department of community medicine in a teaching hospital in South Kerala, India.

SUBJECTS AND METHODS: A semi-structured questionnaire was used to collect the data. Berg Balance Scale and Mini-Cog Test were used for measuring risk of fall and cognitive impairment. **STATISTICAL ANALYSIS USED:** Descriptive statistics and logistic regression were used for the statistical analysis using SPSS.

RESULTS: Among the older adults, 45% were at risk of fall, 42.4% in males and 57.6% in females. The risk of fall was found to be significantly associated with cognitive impairment, (odds ratio = 3.89, confidence interval at 95% = 2.06-7.31, $P < 0.001$). Advanced age, female gender, and unemployed status were significantly associated with the risk of fall.

CONCLUSIONS: The risk of fall prevalence was high and significantly related to cognitive impairment, advanced age, female gender, and occupational status, with more than half of those currently not working having a higher risk. The study would recommend regular follow-up of risk groups for prevention a good percentage of fall and thereby the related injuries.

Language: en

Keywords

older adults; Cognitive impairment; community dwelling; risk of fall

Association between falls in Alzheimer disease and scores on the Balance Evaluation Systems Test (BESTest) and MiniBESTest

Tueth LE, Earhart GM, Rawson KS. Somatosens. Mot. Res. 2021; ePub(ePub): ePub.

(Copyright © 2021, Informa - Taylor and Francis Group)

DOI 10.1080/08990220.2021.1959309 PMID unavailable

Abstract

BACKGROUND AND PURPOSE: Alzheimer disease (AD) is the most common form of dementia and the sixth leading cause of death in the United States. Falls are associated with AD and can lead to injury. The Balance Evaluation Systems Test (BESTest) is a balance measure used in other neurological conditions to predict fall risk. The purpose of this study is to examine the relationship between MiniBESTest, BESTest, and BESTest subsection scores and fall incidence among individuals with a diagnosis of mild AD.

METHODS: The study was a single centre, prospective, observational cohort study. Participants completed baseline questionnaires including a demographic form, a fall history questionnaire and the Barthel Index of Activities of Daily Living (ADLs). Balance and gait were assessed using the MiniBESTest and BESTest. After completing baseline assessment, participants were given monthly fall calendars to track falls for the next 12 months.

RESULTS: MiniBESTest total raw score for fallers was 13.4 out of 28 (SD = 3.6) and for non-fallers was 18.4 out of 28 (SD = 3.7). MiniBESTest total percentage score for fallers was 47.8% (SD = 12.8%) and for non-fallers was 65.5% (SD = 13.1%). BESTest total percentage scores for fallers was 58.2% (SD = 3.9%) and for non-fallers was 73.9% (SD = 7.9%). Subsections II-IV of the BESTest correlated with faller status.

DISCUSSION AND CONCLUSIONS: Among individuals with mild AD, fall status was associated with certain balance deficits on the BESTest including moving body outside base of support (subsection II), changing centre of mass (subsection III), and reacting to external perturbations (subsection IV). Future studies could explore differences between AD and other neurological conditions and how physical therapy could improve these areas to reduce fall risk.

Language: en

Keywords

falls; balance; fall prevention; Alzheimer disease; BESTest; MiniBEST; MiniBESTest

Cognition

Effect of cognitive function on balance and posture control after stroke

Yu HX, Wang ZX, Liu CB, Dai P, Lan Y, Xu GQ. *Neural Plast.* 2021; 2021: e6636999.

(Copyright © 2021, Hindawi Publishing)

DOI 10.1155/2021/6636999 **PMID** 33574837

Abstract

Hemiplegic gait is the most common sequela of stroke. Patients with hemiplegic gait are at a risk of falling because of poor balance. The theory of cognitive-motor networks paved the way for a new field of research. However, the mechanism of the relationship of cognition with gait or posture control networks is unclear because of the dynamic characteristics of walking and changing postures. To explore differences in the balance function and fall risk between patients with and without cognitive impairment after stroke, we utilized the Berg balance scale, Timed "Up and Go" test, and 10 m walking test. Patients were divided into two groups: the observation group (16 patients, female 6 and male 10), comprising patients with cognitive impairment after stroke, and the control group (16 patients, female 7 and male 9), comprising patients without cognitive impairment after stroke. We found that patients with cognitive impairment had worse balance function and a higher risk of falls. They needed a longer time to turn around or sit down. Our findings indicated that posture control in turning around and sitting down required more cognitive resources in daily life.

Language: en

Cognitive and motor slowing mediate the relationship between depression and falls in multiple sclerosis patients

Cohen JN, Seng E, Foley FW. *Mult. Scler. Relat. Disord.* 2021; 50: e102808.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.msard.2021.102808 **PMID** unavailable

Abstract

OBJECTIVE: Given the limited research concerning the relationship between depression and falls in multiple sclerosis (MS), this study aimed to examine the direct and indirect association between fall history and depressive symptoms.

METHODS: One hundred and forty seven MS patients had completed at least one neuropsychological assessment that included detailed information regarding fall history, as well as measures of depression, motor function, and cognitive processing speed.

RESULTS: Fall history was associated with higher depressive symptoms and poorer overall motor function. Higher self-reported depressive symptoms were associated with higher odds of falls in the last year (OR = 1.64, 95% CI 1.16, 2.31) in an age adjusted model. Cognitive and motor slowing serially mediated the relationship between depressive symptoms and fall history (estimate = 0.060, 95% CI = 0.01, 0.15).

CONCLUSIONS: With the extensive research on the cognitive and motor correlates of falls in MS, our findings suggest that depressive symptoms are also associated with falls in people with MS. Moreover, this study provides preliminary support for a pathway by which depressive symptoms are related to falls in part through their relationships with cognitive and motor slowing.

Language: en

Keywords

Falls; Multiple sclerosis; Depressive symptoms; Motor function; Processing speed

Cognitive function and functional mobility predict exercise adherence in older adults who fall

Davis JC, Rhodes RE, Khan KM, Mansournia MA, Khosravi A, Chan P, Zhao M, Jehu DA, Liu-Ambrose T. *Gerontology* 2021; ePub(ePub): ePub.

(Copyright © 2021, Karger Publishers)

DOI 10.1159/000513452 PMID unavailable

Abstract

INTRODUCTION: Strength and balance exercises prevent falls. Yet, exercise adherence is often low. To maximize the benefit of exercise on falls prevention, we aimed to identify baseline cognitive and mobility factors that predict adherence to the Otago Exercise Program (OEP) - a home-based exercise program proven to prevent falls.

METHODS: We conducted a secondary longitudinal analysis of data from a randomized clinical trial (RCT) (OEP compared with usual care) among 172 participants who were assigned to the OEP intervention of the RCT. Adherence to the OEP was calculated as a percent score (i.e., [frequency of strength and balance retraining session per week/3 strength and balance retraining sessions per week] × 100). Executive function (i.e., mental flexibility) was measured using the Trail Making Tests (Part A and B: TMT B - TMT A) and the Digit Symbol Substitution Test (DSST). Short-term memory and encoding was measured using the Verbal Digits Forward test. Executive function (i.e., inhibition and working memory) was measured using the Stroop Color-Word Test and the Verbal Digits Forward minus Verbal Digits Backward test. Mobility was assessed using the Short Performance Physical Battery and the Timed Up and Go test. We used general estimation equations analysis to determine the predictors of adherence to the OEP.

RESULTS: Better set shifting ($\beta = -0.06$, $z = -2.43$, [SE = 0.02] $p = 0.018$) predicted greater OEP adherence. Greater attention and short-term memory ($\beta = -6.99$, $z = -2.37$ [SE = 2.95]) predicted poorer OEP adherence. Response inhibition, processing speed, working memory, and mobility assessed by the SPPB were not associated with adherence. Poorer baseline Timed Up and Go ($\beta = 1.48$ $z = 1.94$, [SE = 0.76]; $p < 0.001$), predicted better OEP adherence.

CONCLUSION: Specific cognitive processes (i.e., executive function of set shifting, attention, and short-term memory) and functional mobility predicted exercise adherence. Further research needs to explore the pathways that explain why better attention and short-term memory predicted lower adherence and why poorer functional mobility led to better OEP adherence.

Language: en

Keywords

Falls; Cognition; Older adults; Adherence; Otago Exercise Program

The association between injurious falls and older adults' cognitive function: the role of depressive mood and physical performance

Trevisan C, Ripamonti E, Grande G, Triolo F, Ek S, Maggi S, Sergi G, Fratiglioni L, Welmer AK. *J. Gerontol. A Biol. Sci. Med. Sci.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Gerontological Society of America)

DOI 10.1093/gerona/glab061 PMID unavailable

Abstract

BACKGROUND: The impact of falls on cognitive function is unclear. We explored whether injurious falls are associated with cognitive decline in older adults, and evaluated the role of changes in psychological and physical health as mediators of such association.

METHODS: This prospective study involved 2,267 community-dwelling participants in the Swedish National study on Aging and Care in Kungsholmen (≥ 60 years). Data on injurious falls (i.e., falls requiring medical attention) during each 3-year time interval of follow-up were obtained from national registers. Assessment of cognitive function (Mini-Mental State Examination [MMSE]), depressive mood (Montgomery-Åsberg Depression Rating Scale), and physical performance (walking speed) were carried out every 3 or 6 years over a 12-year follow-up. The association between falls and cognition was estimated through linear mixed effects models, and the mediating role of changes in depressive mood and physical performance was tested using mediation analysis.

RESULTS: After adjusting for potential confounders, individuals who experienced injurious falls had a greater annual decline in MMSE in the subsequent time interval ($\beta = -1.49$, 95%CI: -1.84; -1.13), than those who did not. The association increased with the occurrence of ≥ 2 falls ($\beta = -2.13$, 95%CI: -2.70; -1.56). Worsening of walking speed and depressive mood explained around 26% and 8%, respectively, of the association between falls and cognitive decline.

CONCLUSIONS: Injurious falls are associated with greater cognitive decline, and this association is partly mediated by worsening of physical performance and, in a lesser extent, of depressive mood. These findings suggest that physical deficits and low mood are potential therapeutic targets for mitigating the association between falls and cognitive decline.

Language: en

Keywords

falls; cognitive decline; depressive mood; prospective study; walking speed



Postural sway correlates with cognition and quality of life in Parkinson's disease

Apthorp D, Smith A, Ilschner S, Vlieger R, Das C, Lueck CJ, Looi JCL. *BMJ Neurol. Open* 2020; 2(2): e000086.

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Abstract

BACKGROUND: The severity of Parkinson's disease (PD) is difficult to assess objectively owing to the lack of a robust biological marker of underlying disease status, with consequent implications for diagnosis, treatment and prognosis. The current standard tool is the Unified Parkinson's Disease Rating Scale (MDS-UPDRS), but this is hampered by variability between observers and within subjects. Postural sway has been shown to correlate with complex brain functioning in other conditions. This study aimed to investigate the relationship between postural sway, MDS-UPDRS and other non-motor measures of disease severity in patients with PD.

METHOD: 25 patients with PD and 18 age-matched controls participated in the study. All participants underwent assessment of postural sway using a force plate, with eyes open and closed. In addition, participants underwent tests of cognition and quality of life: Montreal Cognitive Assessment (MoCA), Neuropsychiatry Unit Cognitive Assessment (NUCOG) and, for the patients, the Parkinson's Disease Questionnaire (PDQ-39-1), and assessment of clinical status using the motor component of the MDS-UPDRS.

RESULTS: Patients swayed significantly more than controls. This was most obvious in the eyes-closed condition. Sway path length showed strong correlations with PDQ-39-1, MoCA and the verbal fluency component of the NUCOG, and, to a lesser degree, with the UPDRS-III in patients with PD.

CONCLUSION: These results suggest that motor and non-motor symptoms of PD are associated in patients, and, in particular, that postural sway shows potential as a possible measure of underlying disease status in PD, either alone or in combination with other measures.

Language: en

Keywords

cognition; Parkinson's disease; cognitive neuropsychology; motor physiology

Effects of multicomponent exercise on cognitive performance and fall risk in older women with mild cognitive impairment

Thaiyanto J, Sittichoke C, Phirom K, Sungkarat S. *J. Nutr. Health Aging* 2021; 25(2): 160-164.

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Abstract

BACKGROUND: Emerging evidence suggests that multicomponent exercise provides greater benefits for physical and cognitive function than single component exercise. However, few studies have been conducted to determine these effects in older adults with mild cognitive impairment (MCI) and findings have been less conclusive. It has been reported that older women have a greater risk of falls and a higher incidence of dementia than men.

OBJECTIVES: To examine the effects of multicomponent exercise on cognitive performance and fall risk in older women with MCI.

DESIGN: An experimental design comparing the exercise and control groups. **SETTING AND PARTICIPANTS:** Forty community-dwelling older women with MCI were allocated to the exercise (n = 20) and control (n = 20) groups. **INTERVENTION:** Twelve weeks of multicomponent exercise program (aerobic, resistance, and balance exercise) 60 mins/day, 3 days/week. **MEASUREMENT:** Cognitive performance including the Alzheimer's Disease Assessment Scale-Cognitive Subscale (ADAS-Cog) and Trail Making Test (TMT) and fall risk including the Timed Up and Go (TUG) single-, dual-task, and Physiological Profile Assessment (PPA) were administered before and after the 12-week exercise program.

RESULTS: At the end of the 12-week training, participants in the exercise group had a significantly greater improvement in TMT part A ($p < 0.05$), TUG dual-task ($p < 0.05$), and PPA composite score ($p < 0.05$) when compared to the control group. The exercise group also demonstrated significant improvement in TUG dual-task, PPA composite score, PPA subcomponents including postural sway and reaction time when compared to baseline ($p < 0.05$). In contrast, at 12-week, the control group showed a decline in TUG dual-task performance as compared to baseline ($p < 0.05$).

CONCLUSION: The 12-week multicomponent exercise improved attention, dual-task ability, and reduced risk of falling in older women with mild cognitive impairment.

Language: en

Keywords

fall risk; cognitive function; Mild cognitive impairment; multicomponent exercise

Low serum klotho concentration is associated with worse cognition, psychological components of frailty, dependence, and falls in nursing home residents

Sanz B, Arrieta H, Rezola-Pardo C, Fernández-Atutxa A, Garin-Balerdi J, Arizaga N, Rodriguez-Larrad A, Irazusta J. *Sci. Rep.* 2021; 11(1): e9098.

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Abstract

Serum alpha-klotho (s-klotho) protein has been linked with lifespan, and low concentrations of s-klotho have been associated with worse physical and cognitive outcomes. Although its significance in aging remains unclear, s-klotho has been proposed as a molecular biomarker of frailty and dependence. This study is a secondary analysis of data from a clinical trial performed in a population of 103 older individuals living in 10 nursing homes in Gipuzkoa (Spain). We aimed to elucidate associations between s-klotho (as measured by enzyme-linked immunosorbent assay) and body composition, physical fitness, and cognition, as well as frailty and dependence (determined using validated tests and scales). In addition, we investigated the association of s-klotho concentration with falls in the six months following the initial assessment. Low s-klotho levels were associated with a lower score in the psychological component of the Tilburg Frailty Indicator, a worse score in the Coding Wechsler Adult Intelligence Scale, and a greater dependence in activities of daily living. Moreover, participants with lower s-klotho concentrations suffered more falls during the 6 months after the assessment. Future translational research should aim to validate klotho's putative role as a biomarker that could identify the risk of aging-related adverse events in clinical practice.

Language: en

Prevalence/potential risk factors for motoric cognitive risk and its relationship to falls in Chinese elderly people: a cross-sectional study

Yuan JL, Zhao RX, Ma YJ, Li XD, Zhou XM, Wang XF, Jiang XY, Li SJ. *Eur. J. Neurol.* 2021; ePub(ePub): ePub.

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Abstract

BACKGROUND: Motoric cognitive risk syndrome (MCR) is characterized by slow walking speed and subjective memory complaints (SMCs). This study investigated the prevalence and potential risk factors of MCR and its association with falls in Chinese community-dwelling older adults.

METHODS: The analysis was based on data from the Rugao Longevity and Aging Study (RuLAS). MCR was defined as presence of both SMC and slow walking speed in participants free of major neurocognitive disorders. SMCs were determined according to a positive answer to the question "Do you feel you have more problems with memory than most?" in the 15-item Geriatric Depression Scale. Slow walking speed was defined as ≤ 1 standard deviation below the mean values for patients' age and sex. Data on falls were derived from a standardized questionnaire.

RESULTS: The prevalence of SMC, slow walking speed, and MCR in the RuLAS cohort (N=1592) was 51.9%, 15.6%, and 8.3%, respectively. After adjusting for other covariates, an occupation of farming (OR=2.358; 95% CI: 1.007-5.521, P=0.048), history of cerebrovascular disease (OR=2.215; 95% CI: 1.032-4.752, P=0.041), and hospitalization (OR=2.008; 95% CI: 1.120-3.602, P=0.019) were risk factors for MCR. Binary logistic regression analysis indicated that the risk of falls was increased by MCR (OR=1.547; 95% CI: 1.009-2.371), SMC (OR=1.308; 95% CI: 1.003-1.707), and slow walking speed (OR=1.442; 95% CI: 1.030-2.017).

CONCLUSIONS: Early identification of potential risk factors of MCR can prevent the occurrence of adverse health events such as falls in the elderly.

Language: en

Keywords

Prevalence; Risk factor; Fall; Cognitive risk; Longitudinal cohort study

The influence of cognitive load on balance control during steady-state walking

Small GH, Brough LG, Neptune RR. J. Biomech. 2021; 122: e110466.

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Abstract

For an individual to successfully walk, they must maintain control of their dynamic balance. However, situations that require increased cognitive attention may impair an individual's ability to actively control their balance. While dual-task studies have analyzed walking-while-talking conditions, few studies have focused specifically on the influence of cognitive load on balance control. The purpose of this study was to assess how individuals prioritize their cognitive resources and control dynamic balance during dual-task conditions of varying difficulty. Young healthy adults ($n = 15$) performed two single-task conditions (spelling-while-standing and treadmill walking with no cognitive load) and three dual-task conditions (treadmill walking with increasing cognitive load: attentive listening and spelling short and long words backwards). Cognitive performance did not change between the single- and dual-task as measured by spelling percent error and response rate ($p = 0.300$). Balance control, assessed using the range of whole-body angular momentum, did not change between the no load and listening conditions, but decreased during the short and long spelling conditions ($p < 0.001$). These results highlight that in young adults balance control decreases during dual-task treadmill walking with increased cognitive loads, but their cognitive performance does not change. The decrease in balance control suggests that participants prioritized cognitive performance over balance control during these dual-task walking conditions. This work offers additional insight into the automaticity of walking and task-prioritization in healthy young individuals and provides the basis for future studies to determine differences in neurologically impaired populations.

Language: en

Keywords Balance control; Biomechanics; Cognitive performance; Dual-task; Gait

Sensor-based fall risk assessment in older adults with or without cognitive impairment: a systematic review

Bezold J, Krell-Roesch J, Eckert T, Jekauc D, Woll A. Eur. Rev. Aging Phys. Activ. 2021; 18(1): 15.

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PMID unavailable

Abstract

BACKGROUND: Higher age and cognitive impairment are associated with a higher risk of falling. Wearable sensor technology may be useful in objectively assessing motor fall risk factors to improve physical exercise interventions for fall prevention. This systematic review aims at providing an updated overview of the current research on wearable sensors for fall risk assessment in older adults with or without cognitive impairment. Therefore, we addressed two specific research questions: 1) Can wearable sensors provide accurate data on motor performance that may be used to assess risk of falling, e.g., by distinguishing between faller and non-faller in a sample of older adults with or without cognitive impairment?; and 2) Which practical recommendations can be given for the application of sensor-based fall risk assessment in individuals with CI? A systematic literature search (July 2019, update July 2020) was conducted using PubMed, Scopus and Web of Science databases. Community-based studies or studies conducted in a geriatric setting that examine fall risk factors in older adults (aged ≥ 60 years) with or without cognitive impairment were included. Predefined inclusion criteria yielded 16 cross-sectional, 10 prospective and 2 studies with a mixed design.

RESULTS: Overall, sensor-based data was mainly collected during walking tests in a lab setting. The main sensor location was the lower back to provide wearing comfort and avoid disturbance of participants. The most accurate fall risk classification model included data from sit-to-walk and walk-to-sit transitions collected over three days of daily life (mean accuracy = 88.0%). Nine out of 28 included studies revealed information about sensor use in older adults with possible cognitive impairment, but classification models performed slightly worse than those for older adults without cognitive impairment (mean accuracy = 79.0%).

CONCLUSION: Fall risk assessment using wearable sensors is feasible in older adults regardless of their cognitive status. Accuracy may vary depending on sensor location, sensor attachment and type of assessment chosen for the recording of sensor data. More research on the use of sensors for objective fall risk assessment in older adults is needed, particularly in older adults with cognitive impairment. **TRIAL REGISTRATION:** This systematic review is registered in PROSPERO (CRD42020171118).

Language: en

Keywords

Cognition; Elderly; Dementia; Risk of falling; Wearable sensors



Falls and delirium in older inpatients: work-as-imagined, work-as-done and preferences for clinical decision support systems

Damoiseaux-Volman BA, Medlock S, van der Eijk MD, Romijn JA, Abu-Hanna A, van der Velde N. *Safety Sci.* 2021; 142: e105355.

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Abstract

Background

Falls and delirium are common complications in older inpatients. Implementation of fall and delirium guidelines is complex and may be facilitated by Clinical Decision Support Systems (CDSSs). Our study aimed to understand the differences between guidelines (work-as-imagined) and actual care (work-as-done) and how these can impact the design of a CDSS.

Methods

We used Functional Resonance Analysis Method (FRAM) as structured method to visualize work-as-imagined and work-as-done and to develop an initial CDSS design. As input for work-as-imagined, we used national guidelines. To identify work-as-done and CDSS preferences, we conducted semi-structured interviews in two rounds. We identified differences between guidelines and actual care by creating a FRAM model for work-as-imagined and one for work-as-done. CDSS preferences were coupled to activities in the FRAM models and to the identified barriers and facilitators for following guidelines.

Results

Eighteen clinicians participated in 24 individual and small-group interviews. For both falls and delirium, we found substantial differences between work-as-imagined and work-as-done. Several CDSS opportunities to improve fall and delirium care were identified including reminders for screening, an order set to facilitate risk assessment, automatically-generated advice with personalized preventive interventions and support to facilitate medication reviews. The required CDSSs addressed both barriers and facilitators.

Conclusion

In our study, work-as-done for falls and delirium differed substantially from work-as-imagined and the preferred CDSSs would address both barriers and facilitators. Furthermore, our study showed that FRAM is a suitable tool to identify differences between actual care and guidelines and to design CDSSs from a user-centred approach.

Language: en

Keywords

Decision support systems, clinical; Delirium; Fall; FRAM model; Guideline adherence; Hospitals