

Safety Literature 11th September 2022

Associations of fall history and fear of falling with multidimensional cognitive function in independent community-dwelling older adults: findings from ORANGE study

Shiratsuchi D, Makizako H, Nakai Y, Bae S, Lee S, Kim H, Matsuzaki-Kihara Y, Miyano I, Ota H, Shimada H. Aging Clin. Exp. Res. 2022; ePub(ePub): ePub.

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DOI 10.1007/s40520-022-02235-4 **PMID** 36050582

Abstract

BACKGROUND: Falls and fear of falling (FoF) inhibit healthy longevity and have been suggested to be associated with cognitive function. However, the domains of cognitive function that are associated with them remain controversial. It is speculated that clarifying this will help in the assessment of health status and interventions in the community.

AIM: To analyse the associations between fall history and FoF and multidimensional cognitive function in independent community-dwelling older adults.

METHODS: The data from 9759 (73.3 ± 5.4 years, 59.9% women) older individuals enrolled in the cross-sectional ORANGE study were analysed. Simple questions were used to assess fall history in the past year and current FoF. Assessments of multidimensional cognitive function were performed using the National Center for Geriatrics and Gerontology-Functional Assessment Tool (NCGG-FAT) to evaluate memory, attention, executive function, and processing speed. The independent associations of fall history and FoF with multidimensional cognitive function were assessed using multivariate linear regressions adjusted for potential confounding variables.

RESULTS: A total of 18.3% and 35.4% of participants presented with fall history and FoF, respectively. Fall history ($p = 0.008$) and FoF ($p = 0.002$) were significantly associated with memory. FoF, but not fall history was associated with attention ($p = 0.004$), executive function ($p < 0.01$), and processing speed ($p < 0.01$).

CONCLUSION: In independent community-dwelling older adults, fall history was associated only with the memory domain; in contrast, fear of falling was associated with multidimensional cognitive function. This study provides weak evidence suggesting the need to assess falls and FoF in all situations involving independent community-dwelling older adults.

Language: en

Keywords

Attention; Executive function; Healthy aging; Memory; Processing speed

Characteristics of falls occurring during rehabilitation in an acute care hospital in older and non-older patients: a retrospective cohort study

Kinoshita T, Nishimura Y, Umemoto Y, Kawasaki S, Yasuoka Y, Minami K, Koike Y, Tajima F. *Front. Med. (Lausanne)* 2022; 9: e969457.

(Copyright © 2022, Frontiers Media)

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Abstract

INTRODUCTION: Although falls are often reported in hospitals and are common in older individuals, no reports on falls during rehabilitation exist. This study evaluated patients with falls occurring during rehabilitation and identified the characteristics of older and non-older patients.

MATERIALS AND METHODS: Our study retrospectively analyzed reports of falls occurring during rehabilitation at a university hospital from April 1, 2020 to March 31, 2022. The survey items included the number of falls in the hospital as a whole and during rehabilitation, age, gender, modified Rankin Scale (mRS) before admission and at the time of fall, functional independence measure (FIM) at admission, patient communication status at the time of fall, and whether a therapist was near the patient. Patients aged ≥ 65 were considered older; aged ≤ 64 , non-older; and those with the same age, gender, and clinical department, randomly selected as non-falling patients.

RESULTS: Thirty-five falls occurred during rehabilitation (14 in the non-older and 21 in the older patients), significantly lower than the 945 for the entire hospital, without any significant difference between non-older and older patients. No significant differences in mRS before admission and FIM at admission were noted for both groups in comparison with the non-falling patient group. Furthermore, gender, mRS, FIM, good communication status, and presence of therapist near the patient were similar between non-older and older patients (non-older 71.4%, older 52.4%). Most falls were minor adverse events that did not require additional treatment.

CONCLUSION: The rate of falls during rehabilitation was much lower than that during hospitalization, and many falls had minimal impact on the patient. It was also difficult to predict falls in daily life and communication situations, and there was no difference in characteristics between the older and non-older groups. Since more than half of the falls occurred during training with the therapist, it is necessary to reconsider the training content.

Language: en

Keywords

accident; incident; inpatients; patient safety; rehabilitation

Digital care technologies in people with dementia living in long-term care facilities to prevent falls and manage behavioural and psychological symptoms of dementia: a systematic review

Chan DKY, Chan LKM, Kuang YM, Le MNV, Celler B. Eur. J. Ageing 2022; 19(3): 309-323.

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Abstract

Fall prevention and management of behavioural and psychological symptoms of dementia (BPSD) in long-term care (LTC) facility is a major challenge. The objective of this systematic review is to assess the evidence of digital technology in their management. All studies of English-language excluding case-reports were eligible for review. Databases chosen were MEDLINE, EMBASE, Scopus, Web of Science and PSYCINFO from January 2000 to June 2020. Downs and Black checklist was used to check for risk of bias. Papers with a focus in LTC setting, using digital technology as intervention for older adults with dementia, and with measurable outcomes (outcomes that are quantified, not descriptive) were included in the final review. Seventeen original papers (8 RCTs, 8 quasi-experimental and 1 mixed method) were included. Three articles examining position-sensor technology for fall prevention showed mixed results. Two showed no difference and 1 showed small reduction in fall after alarm removal but the positive effect might be due to bias. Overall, the sample sizes were too small to draw meaningful conclusion. Fourteen studies (9 pet robots of which 8 were robotic seal/PARO) were identified for BPSD and results were mixed. Overall, PARO might have modest benefit in BPSD compared to usual care but might be no better than plush toy with more hallucinations or delusions seen in advanced dementia. However, the significant heterogeneity in methodology (intervention intensity, lack of record in psychoactive drug use), clinical tools used (different BPSD scales, different digital technologies) and variability in outcomes made it difficult to draw clear-cut conclusion. Studies involving other digital technologies are scarce and in pilot phases; hence, conclusion is premature. One limitation of the review was that only 9 out of 17 studies were of good quality. The limited research work in position-sensors meant insufficient evidence to prove efficacy for their use in LTC setting. The possible modest benefit of PARO in BPSD (e.g. in agitation, apathy or reduction in psychoactive drugs) was off-set by possible adverse events such as delusions or hallucinations in advanced dementia. **SUPPLEMENTARY INFORMATION:** The online version contains supplementary material available at [10.1007/s10433-021-00627-5](https://doi.org/10.1007/s10433-021-00627-5).

Language: en

Keywords

Behaviour; Falls; Mood; Dementia; Digital technology; Long-term care

Ditangquan exercises based on safe-landing strategies prevent falls and injury among older individuals with sarcopenia

Li ZR, Ma YJ, Zhuang J, Tao XC, Guo CY, Liu ST, Zhu RR, Wang JX, Fang L. *Front. Med. (Lausanne)* 2022; 9: e936314.

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DOI 10.3389/fmed.2022.936314 PMID 36052330

Abstract

BACKGROUND: Sarcopenia is the age-related loss of skeletal muscle mass and function; it is a risk factor for falls among older individuals. Few studies have focused on training such individuals to adopt a safe-landing strategy that would protect them from fall-related injuries. Ditangquan is a traditional Chinese martial art comprising movements that conform to the principles of safe landing. This study aims to investigate the effectiveness of Ditangquan in preventing fall-related injuries among older individuals with sarcopenia.

METHODS: A total of 70 participants (21 males and 49 females with sarcopenia) between 60 and 80 years of age were recruited from three local communities and randomly assigned to the Ditangquan exercise group (DG) or the control group (CG) in a 1:1 ratio. Three times a week for 24 weeks, both the DG and CG received an hour of conventional exercise and an hour of Ditangquan exercise based on safe landing. Primary outcomes were the modified falls efficacy scale (MFES), the number of falls, and fall injuries; the secondary outcome was the Timed Up & Go (TUG) test.

RESULTS: The DG had significantly fewer falls (1 vs. 8, $P = 0.028$) and fall injuries (0 vs. 6, $P = 0.025$) than the CG. Furthermore, at the end of the study, the DG had a significantly improved MFES (mean difference: 32.17 scores; 95% CI: 21.32, 43.02; $P < 0.001$) and TUGT (mean difference: -4.94 s; 95% CI: -7.95, -1.93; $P = 0.002$) as compared with the CG.

CONCLUSION: Ditangquan exercise based on the safe-landing strategy effectively improves the functional mobility of the elderly, reduces the occurrence of falls and injuries, and increases the individual's confidence in preventing falls.

Language: en

Keywords

fall injury prevention; modified falls efficacy scale; safe landing; sarcopenia; traditional Chinese exercise

Effects of nurse-led fall prevention programs for older adults: a systematic review

Ojo EO, Thiamwong L. *Pac. Rim. Int. J. Nurs. Res. Thail.* 2022; 26(3): 417-431.

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DOI unavailable **PMID** 36051891

Abstract

Falls among older adults are preventable events and fall prevention programs led by nursing staff are promising and viable programs for preventing falls. This systematic review aimed to gain insight into the effects of nurse-led fall prevention programs for older adults. The Preferred Reporting Items for Systemic Reviews and Meta-Analysis was used as a guideline in reporting this literature search conducted through CINAHL, MEDLINE, Eric, Science Direct, and Google Scholar databases. The Johns Hopkins Nursing Evidence-Based Practice was used to determine the level of evidence and quality rating of the articles, while data extraction was done by a matrix review method. The review included six randomized controlled trials, two non-randomized controlled trials, and three quasi-experimental designs. Six studies directed their education component of the intervention on the nursing staff, while three focused on the older participants. Nurses' roles were patient assessment, patient education, administration of exercise programs, and follow-up post interventions. Fall rates and fall incidents were reduced in five studies, while three studies changed patients' behavior. Fall prevention programs with education components specific for older adults and nursing staff resulted in positive outcomes. Nursing staff make a significant contribution to improving patients' outcomes, and a fall prevention program that focuses on reducing injurious fall rates and enhancing participants' behavior could maximize its effects.

Language: en

Keywords

Education; Fall Injury; Fall Prevention; Fall Rates; Literature Review; Nurse-led; Older Adults

Optimizing falls-related planning and intervention for nursing facilities by ownership type

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Abstract

Falls among older adults are a major public health concern: They result in \$30 billion in direct US healthcare costs annually and take an immense psychological and physical toll on older adults. Particularly concerning are falls in nursing home settings, which account for three times as many falls in adults over 65 than in any other setting.

OBJECTIVES: We hypothesized that tailoring falls prevention and response plans to nursing home profit model (for- or nonprofit) and ownership type (public, private, franchise) would greatly improve effectiveness of general plans.

METHODS: To this end, we extracted data from existing government databases, collected qualitative data through structured interviews with home employees, and collected novel quantitative data through web surveys from a representative sample of 40 Pennsylvania nursing homes about prevention and mitigation protocols, population, and facility characteristics, and falls outcome metrics. We analyzed fall-related risk factors that we scored and used to build multivariate logistic regression models to predict falls rates, and subsequently used to build multilevel logistic regression multivariate models to pinpoint the influence of facility type.

RESULTS: We found a significant correlation between facility ownership and profit type and falls rates and outcomes.

CONCLUSIONS: Armed with these analytical insights, we formulated improved falls prevention plans targeted to home types to achieve better falls outcomes as predicted by the models. Finally, we quantify the predicted impact of implementing these targeted plans on fall rates and outcomes in the homes in our study.

Language: en

Keywords

elderly; Accidental falls; healthcare costs; nursing home; ownership

Physical activity and recurrent fall risk in community-dwelling Japanese people aged 40-74 years: the Murakami cohort study

Kamimura S, Iida T, Watanabe Y, Kitamura K, Kabasawa K, Takahashi A, Saito T, Kobayashi R, Oshiki R, Takachi R, Tsugane S, Iki M, Sasaki A, Yamazaki O, Watanabe K, Nakamura K. *Eur. Rev. Aging Phys. Activ.* 2022; 19(1): e20.

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DOI 10.1186/s11556-022-00300-5 PMID 36056330

Abstract

BACKGROUND: Falls are important causes of injury and mortality in older people, and associated medical costs can be enormous. Physical activity (PA) is a potential preventive factor for falls. However, few studies have examined the effect of different types of PA on fall prevention. This study aimed to evaluate the association between PA levels and the incidence of recurrent falls by type of PA in middle-aged and older people.

METHODS: This cohort study targeted 7,561 community-dwelling individuals aged 40-74 years who did not experience recurrent falls in the year before baseline. Information on PA levels, demographics, body size, lifestyle, and fall/disease history was obtained using a self-administered questionnaire in the baseline survey. Levels of total PA, leisure-time PA, and non-leisure-time PA (occupation, commuting, and housework) were estimated using metabolic equivalent (MET) scores (MET-h/day; hours spent on a given activity per day multiplied by its MET intensity). PA levels were categorized into four groups. Falls were recorded as none, once, or twice or more (recurrent falls). The outcome of the study was the incidence of recurrent falls in the past year before a survey conducted 5 years after the baseline survey. Logistic regression analyses were performed to calculate odds ratios for recurrent falls.

RESULTS: Higher total PA and non-leisure-time PA levels were associated with a higher risk of recurrent falls (P for trend = 0.0002 and 0.0001, respectively), with the highest total PA and non-leisure-time PA groups having a significantly higher adjusted OR (1.96 [95%CI:1.33-2.88] and 2.15 [95%CI:1.48-3.14], respectively) relative to the lowest group (reference). As for leisure-time PA, the medium group had a significantly lower adjusted OR (0.70 [95%CI:0.49-0.99]) relative to the reference group. By sex, the adjusted OR in the medium leisure-time PA group was significantly lower relative to the reference group in women (0.50 [95%CI: 0.29-0.85]) but not in men.

CONCLUSIONS: Medium level leisure-time PA reduces the risk of recurrent falls in middle-aged and older people, whereas higher level non-leisure-time PA is associated with a higher risk of recurrent falls.

Language: en

Keywords

Physical activity; Falls; Risk factor; Cohort studies; Leisure activities

Potentially inappropriate medication use, polypharmacy, and falls among hospitalized patients

Li SJ, Hwang HF, Yu WY, Lin MR. *Geriatr. Gerontol. Int.* 2022; ePub(ePub): ePub.

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Abstract

AIM: This matched case-control study investigated potentially inappropriate medication (PIM) use, polypharmacy, and other potential risk factors for falls among hospitalized older adults in Taiwan.

METHODS: During an 18-month study period, 131 case patients who experienced a fall during hospitalization in an acute-care hospital were identified and matched by the time of day, hospital ward, and age to controls (five for each case) who were selected through random systematic sampling. Data on demographics, medical characteristics, and all orally and intravenously administered medications during hospitalization prior to a fall were collected. PIMs were assessed using the 2019 Beers criteria.

RESULTS: A conditional logistic regression analysis revealed that admission to the departments of internal medicine (odds ratio [OR] = 2.33; 95% confidence interval [CI] = 1.09-4.91) and neurology and rehabilitation (OR = 4.67; 95% CI = 2.08-10.5), diabetes with end-organ damage (OR = 2.07; 95% CI = 1.11-3.86), PIM use of central nervous system drugs (OR = 1.81; 95% CI = 1.15-2.86), use of colchicine (OR = 5.49; 95% CI = 1.34-22.5) and spironolactone (OR = 4.54; 95% CI = 1.31-15.8) for renal function impairment, and polypharmacy (≥ 5 medications; OR = 1.81; 95% CI = 1.05-3.10) significantly increased the risk of falls. By contrast, being overweight or obese (OR = 0.47; 95% CI = 0.29-0.78) was associated with a significantly lower risk of falls.

CONCLUSIONS: PIM use may increase the risk of falls in hospitalized older patients, and PIM identification and evaluation can reduce this risk. *Geriatr Gerontol Int* 2022; ••: ••-••.

Language: en

Keywords

falls; risk factor; hospital; older patients; potentially inappropriate medications

Risk factors associated with falls and fractures following prescription of opioids among privately insured patients with osteoarthritis

Silverman S, Schepman P, Rice JB, Beck CG, Pajerowski W, White AG, Thakkar S, Robinson RL, Emir B. J. Health Econ. Outcomes Res. 2022; 9(2): 47-56.

(Copyright © 2022, Columbia Data Analytics)

DOI 10.36469/001c.32584 **PMID** 36060224

Abstract

BACKGROUND: While prior research has shown that patients with osteoarthritis (OA) who are prescribed opioids have higher rates of falls and fractures following drug initiation, there is a limited body of work establishing a comprehensive model of factors that influence the risk of falls or fractures among these patients.

OBJECTIVE: Opioids are associated with negative clinical outcomes, including increased risk of falls and fractures. This study assessed the frequency, treatment characteristics, and risk factors associated with falls or fractures among patients with OA taking opioids.

METHODS: Optum Healthcare Solutions, Inc data (January 2012-March 2017) were used to identify patients over 18 with at least 2 diagnoses of hip and/or knee OA, and at least 90 days' supply of opioids. Patients with cancer were excluded. Falls or fractures outcomes were assessed in the 36-month follow-up period after the date of the first opioid prescription after first OA diagnosis. Demographic, treatment, and clinical characteristics associated with falls or fractures were assessed using logistic regression.

RESULTS: Of 16 663 patients meeting inclusion criteria, 3886 (23%) had at least 1 fall or fracture during follow-up. Of these 3886 patients, 1349 (35%) had at least 1 fall with an average of 3 fall claims, and 3299 (85%) patients had at least 1 fracture with an average of 8 claims during follow-up. Spine (15.8%) and hip (12.5%) fractures were most common. Median time to fall or fracture was 18.6 and 13.9 months, respectively. Significant ($P < .05$) risk factors associated with at least 1 fall or fracture during the follow-up period included alcohol use (odds ratio [OR], 3.41), history of falling (OR, 2.19), non-tramadol opioid use (OR, 1.31), age (OR, 1.03), benzodiazepine use (OR, 1.21), and at least 1 osteoporosis diagnosis (OR, 2.06).

DISCUSSION: This study is among only a few that clearly identifies the substantial impact and frequency of falls and fractures associated with prescribing non-tramadol opioids to patients with OA.

FINDINGS suggest that fall or fracture risks need to be considered when managing OA pain with opioids.

CONCLUSION: Falls and fractures impose a major clinical burden on patients prescribed opioids for OA-related pain management. Falls or fracture risks should be an important consideration in the ongoing treatment of patients with OA.

Language: en

Keywords

accidental falls; analgesic; bone; hip osteoarthritis; knee osteoarthritis; opioid; tramadol

The effect of age and fall history on lower extremity neuromuscular function during descent of a single transition step

Gerstle EE, O'Connor K, Keenan KG, Slavens BA, Cobb SC. *J. Aging Phys. Act.* 2022; ePub(ePub): ePub.

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DOI 10.1123/japa.2021-0521 **PMID** 36068074

Abstract

Despite the higher injury rate of falls on steps versus level ground, few studies have examined the influence of age and fall history on step descent. The purpose of this study was to determine the lead and trail limb neuromuscular function (peak joint moments and powers, electromyographic activity) differences between young females ($n = 15$) and older females with ($n = 15$) and without ($n = 15$) a fall history while descending a single step. Trail limb moments and powers did not differ between groups. Lead limb sagittal plane powers at the hip and knee were greater in the young adults. Electromyographic co-activation levels (knee and ankle) were not significantly different between groups. However, peroneal activation was greater in the older groups, which may have assisted in stabilizing the ankle joint in lieu of increased co-activation at the ankle. These results demonstrate consideration of step descent is important in working with older women at risk of falls.

Language: en

Keywords

older adults; co-activation; curb; stair

The prevention of falls in patients with Parkinson's disease with in-home monitoring using a wearable system: a pilot study protocol

Campani D, De Luca E, Bassi E, Busca E, Airoidi C, Barisone M, Canonico M, Contaldi E, Capello D, De Marchi F, Magistrelli L, Mazzini L, Panella M, Scotti L, Invernizzi M, Dal Molin A. *Aging Clin. Exp. Res.* 2022; ePub(ePub): ePub.

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DOI 10.1007/s40520-022-02238-1 **PMID** 36053444

Abstract

BACKGROUND: Parkinson's disease (PD) is a chronic, progressive neurodegenerative condition that gradually worsens motor function and leads to postural instability and, eventually, falls. Several factors may influence the frequency of future falls, such as slowness, freezing of gait, loss of balance, and mobility problems, cognitive impairments, and the number of previous falls. The TED bracelet is an advanced technological wearable device able to predict falls. **AIMS:** This principal aim is to investigate the feasibility of a full-scale research project that uses the TED bracelet to identify whether individuals with PD are at risk of falling.

METHODS: This study will involve a pilot prospective observational study design; the subjects will include 26 patients suffering from mild PD and 26 others with no PD and no gait problems. Data will be collected from the TED bracelet and then compared to a paper-based fall diary. The enrolled participants will have a scheduled outpatient evaluation to collect both clinical and instrumental data as well as biological samples.

DISCUSSION: This pilot study could then be implemented in a larger form to further evaluate the effectiveness of the TED device. Finally, it will help further develop gait monitoring systems for people with Parkinson's disease and other neurodegenerative diseases that can affect physical function and mobility, such as dementia and Alzheimer's.

CONCLUSIONS: Preventing falls and their complications could lead to major advancements in the quality of home care for patients with PD, which would significantly impact the quality of life of both these patients and their caregivers.

Language: en

Keywords

Parkinson's disease; Fall prevention; e-health technology; Homecare; Telemedicine; Wearable device

A systematic review of chiropractic care for fall prevention: rationale, state of the evidence, and recommendations for future research

Grabowska W, Burton W, Kowalski MH, Vining R, Long CR, Lisi A, Hausdorff JM, Manor B, Muñoz-Vergara D, Wayne PM. BMC Musculoskelet. Disord. 2022; 23(1): e844.

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DOI 10.1186/s12891-022-05783-y **PMID** 36064383

Abstract

BACKGROUND: Falls in older adults are a significant and growing public health concern. There are multiple risk factors associated with falls that may be addressed within the scope of chiropractic training and licensure. Few attempts have been made to summarize existing evidence on multimodal chiropractic care and fall risk mitigation. Therefore, the broad purpose of this review was to summarize this research to date. **BODY:** Systematic review was conducted following PRISMA guidelines. Databases searched included PubMed, Embase, Cochrane Library, PEDro, and Index of Chiropractic Literature. Eligible study designs included randomized controlled trials (RCT), prospective non-randomized controlled, observational, and cross-over studies in which multimodal chiropractic care was the primary intervention and changes in gait, balance and/or falls were outcomes. Risk of bias was also assessed using the 8-item Cochrane Collaboration Tool. The original search yielded 889 articles; 21 met final eligibility including 10 RCTs. One study directly measured the frequency of falls (underpowered secondary outcome) while most studies assessed short-term measurements of gait and balance. The overall methodological quality of identified studies and findings were mixed, limiting interpretation regarding the potential impact of chiropractic care on fall risk to qualitative synthesis.

CONCLUSION: Little high-quality research has been published to inform how multimodal chiropractic care can best address and positively influence fall prevention. We propose strategies for building an evidence base to inform the role of multimodal chiropractic care in fall prevention and outline recommendations for future research to fill current evidence gaps.

Language: en

Keywords

Falls; Balance; Chiropractic; Chiropractic care; Fall prevention; Gait

Predicting falls in adults with multiple sclerosis using patient-reported measures: are perceptions of dual-tasking missing?

VanNostrand M, Sogoloff B, Giroux C, Bergmans L, Kasser SL. *Mult. Scler. Relat. Disord.* 2022; 68: e104115.

(Copyright © 2022, Elsevier Publishing)

DOI 10.1016/j.msard.2022.104115 **PMID** 36057172

Abstract

BACKGROUND: Mobility challenges and cognitive impairments prominent in adults with multiple sclerosis (MS) significantly increase the risk of falling. Examining perceptions of how the simultaneous performance of completing motor and cognitive tasks impacts fall risk may have clinical utility. The purpose of this study was to identify the most significant self-reported predictors of falling including perceived dual-tasking.

METHODS: Participants included 79 individuals with MS were surveyed and reported their fall history over the previous 3 months and completed the Multiple Sclerosis Walking Scale - 12 (MSWS-12), Modified Fatigue Impact Scale (MFIS), Falls Efficacy Scale International (FES-I), and two Dual-Task Questionnaires (DTQ), a previously published original one and a newly expanded version.

RESULTS: Of the sample, 63 were classified as non-fallers and 16 as fallers. Backward stepwise regression analysis revealed that perceived ambulation disability and dual-tasking best predicted fall status (sensitivity of 57.7%, specificity of 90.6%, area under the receiving operating curve of 0.81 (95% CI 0.70-0.92).

CONCLUSION: The inclusion of self-reported dual-tasking perceptions has utility in predicting fall risk. Effective assessment toward this end offers the potential for early detection and intervention.

Language: en

Keywords

Falls; Multiple sclerosis; Cognitive-motor impairments; Dual-tasking; Risk prediction