

Neurological Conditions

This document contains all abstracts for publications relating to neurological conditions and falls 2020. These abstracts have been sourced from [SafetyLit.org](https://www.safetylit.org) and include only those relevant to falls prevention.

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Parkinson's Disease

Risk factors for falls in patients with de novo Parkinson's disease: a focus on motor and non-motor symptoms

Kwon KY, Lee M, Ju H, Im K. J. Mov. Disord. 2020; 13(2): 142-145.

(Copyright © 2020, Korean Movement Disorders Society)

DOI 10.14802/jmd.20009 **PMID** 32498497

Abstract

OBJECTIVE: We aimed to identify risk factors for falls in patients with de novo Parkinson's disease (PD).

METHODS: Forty-six patients with de novo PD were retrospectively included in the study. We assessed details on the patients' motor symptoms as well as non-motor symptoms using several representative scales for global cognition, depression, fatigue, and dysautonomia. Fallers and non-fallers were identified according to their history of falls during the preceding year.

RESULTS: Twenty-two patients (45.8%) with de novo PD had a history of falls. Compared with the non-faller group, the faller group exhibited higher scores for postural instability/gait difficulty (PIGD), anxiety, fatigue, total dysautonomia, gastrointestinal dysfunction, and thermoregulatory dysfunction. Moreover, logistic regression analysis showed that falling was positively correlated with anxiety and gastrointestinal symptoms but negatively associated with the tremor scores.

CONCLUSION: Our findings suggest that falling in patients with de novo PD is significantly associated with PIGD/non-tremor symptoms, anxiety, and gastrointestinal dysfunction.

Language: en

Keywords

Motor; Fall; Risk factor; Parkinson's disease; De novo; Non-motor

Predictive factors of fall-related activity avoidance in people with Parkinson disease-a longitudinal study with a 3-year follow-up

Nilsson MH, Jonasson SB, Zijlstra GAR. *J. Neurol. Phys. Ther.* 2020; 44(3): 188-194.

(Copyright © 2020, Neurology Section, American Physical Therapy Association)

DOI 10.1097/NPT.0000000000000316 **PMID** 32516298

Abstract

BACKGROUND AND PURPOSE: Knowledge of predictive factors can foster the development of preventive approaches. This study examined how prevalence and severity of fall-related activity avoidance evolve over a 3-year period in people with Parkinson disease (PD). A specific aim was to identify predictive factors of fall-related activity avoidance (ie, modified Survey of Activities and Fear of Falling in the Elderly [mSAFFE] scores) after 3 years.

METHODS: The sample included 151 people with PD (mean [SD] age: 68 [8.8] years). The mSAFFE score was the dependent variable in multivariable linear regression analyses, with 17 potential predictors. On the basis of a collinearity check, 2 models studying various risk factors were developed. Model 1 included concerns about falling and model 2 walking difficulties.

RESULTS: After 3 years, more participants reported fall-related activity avoidance, that is, 34% versus 50% ($P < 0.001$). Regression model 1 explained 63% of the variance. The strongest predictive factor was concerns about falling (standardized regression coefficient, $\beta = 0.589$), followed by pain ($\beta = 0.161$), unsteadiness while turning ($\beta = 0.137$), and age ($\beta = 0.136$). These variables remained significant when adjusting for mSAFFE baseline scores. In model 2 (explained 50% of the variance), the strongest predictive factor was perceived walking difficulties ($\beta = 0.392$), followed by age ($\beta = 0.238$), unsteadiness while turning ($\beta = 0.198$), and pain ($\beta = 0.184$). Unlike the other factors, walking difficulties were not significant when adjusting for mSAFFE baseline scores.

DISCUSSION AND CONCLUSIONS: Fall-related activity avoidance increased over time in people with PD. If fall-related activity avoidance is to be targeted, this study suggests that interventions should address concerns about falling, pain, unsteadiness while turning, and walking difficulties. Video Abstract available for more insights from the authors (see Video, Supplemental Digital Content 1, <http://links.lww.com/JNPT/A310>).

Language: en

Parkinson disease and orthostatic hypotension in the elderly: recognition and management of risk factors for falls

LeWitt PA, Kymes S, Hauser RA. *Aging Dis.* 2020; 11(3): 679-691.

(Copyright © 2020, JKL International)

DOI 10.14336/AD.2019.0805 PMID 32489712

Abstract

Parkinson disease (PD) is often associated with postural instability and gait dysfunction that can increase the risk for falls and associated consequences, including injuries, increased burden on healthcare resources, and reduced quality of life. Patients with PD have nearly twice the risk for falls and associated bone fractures compared with their general population counterparts of similar age. Although the cause of falls in patients with PD may be multifactorial, an often under-recognized factor is neurogenic orthostatic hypotension (nOH). nOH is a sustained decrease in blood pressure upon standing whose symptomology can include dizziness/lightheadedness, weakness, fatigue, and syncope. nOH is due to dysfunction of the autonomic nervous system compensatory response to standing and is a consequence of the neurodegenerative processes of PD. The symptoms associated with orthostatic hypotension (OH)/nOH can increase the risk of falls, and healthcare professionals may not be aware of the real-world clinical effect of nOH, the need for routine screening, or the value of early diagnosis of nOH when treating elderly patients with PD. nOH is easily missed and, importantly, healthcare providers may not realize that there are effective treatments for nOH symptoms that could help lessen the fall risk resulting from the condition. This review discusses the burden of, and key risk factors for, falls among patients with PD, with a focus on practical approaches for the recognition, assessment, and successful management of OH/nOH. In addition, insights are provided as to how fall patterns can suggest fall etiology, thereby influencing the choice of intervention.

Language: en

Keywords

elderly; treatment; falls; Parkinson disease; neurodegeneration; neurogenic orthostatic hypotension

The association between freezing of gait, fear of falling and anxiety in Parkinson's disease: a longitudinal analysis

Ghielen I, Koene P, Twisk JW, Kwakkel G, van den Heuvel OA, van Wegen EE. *Neurodegener. Dis. Manag.* 2020; ePub(ePub): ePub.

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(Copyright © 2020, Future Medicine)

DOI 10.2217/nmt-2019-0028 **PMID** 32552383

Abstract

Aim: We studied the longitudinal associations between freezing of gait (FoG), fear of falling (FoF) and anxiety, and how these associations are influenced by confounding factors. **Materials & methods:** We analyzed longitudinal motor and nonmotor measurements from 153 Parkinson's disease patients. Possible confounding factors were divided into three subgroups: demographics, disease characteristics, medication use and adverse effects of medication. **Results:** All crude associations between FoG, FoF and anxiety were significant and remained so after adjusting for confounders. When analyzing FoF and anxiety together as independent variables, the association between FoG and FoF remained, and the association between FoG and anxiety diminished. **Conclusion:** We confirm the complex interactions between motor and nonmotor symptoms in Parkinson's disease, and plead for a multidisciplinary approach.

Language: en

Keywords

Parkinson's disease; anxiety; fear of falling; freezing of gait; multidisciplinary; neuropsychiatry; symptom interaction

Participant expectations and experiences of a tailored physiotherapy intervention for people with Parkinson's and a history of falls

Rowell A, Ashburn A, Fitton C, Goodwin VA, Hulbert S, Lamb SE, McIntosh E, Nieuwboer A, Pickering R, Rochester L, Chivers-Seymour K, Ballinger C. *Disabil. Rehabil.* 2020; ePub(ePub): ePub.

(Copyright © 2020, Informa - Taylor and Francis Group)

DOI 10.1080/09638288.2020.1779824 **PMID** 32573284

Abstract

PURPOSE: People with Parkinson's are twice as likely to fall as older people within the general population. This longitudinal qualitative study was part of a larger programme of research including a randomised controlled trial to test the effectiveness of a tailored physiotherapy intervention. Specific qualitative aims focused on a subsample of trial participants in the intervention arm of the trial, and comprised the following: To explore the expectations of participants about the intervention. To investigate participants' experiences of the intervention, and its perceived impacts. To understand the facilitators and barriers to engagement.

METHODS: Two semi-structured interviews were completed with a theoretical sample of people with Parkinson's from the intervention arm, initially after randomisation but before the intervention commenced, and then again six months later.

RESULTS: Forty-two participants out of a large clinical trial were interviewed initially, with 37 agreeing to a second interview at six months. Prior experience of rehabilitation plus information accessed through the trial consent procedure informed participants' realistic expectations. Most found the level of the intervention acceptable, and perceived a range of benefits. However, views about equipment provided were more equivocal. The biggest barriers to participation were time and motivation, whilst social support facilitated engagement with the intervention.

CONCLUSIONS: This study is the first to capture expectations about participation in a programme of exercises and strategies. It highlights that previous challenges to engagement in physical exercises and activities are not a barrier to future participation and provides new insights into the role of equipment and technology in programmes of physical activity for people with Parkinson's. The challenge of ensuring that programmes of exercise and strategies become an embedded feature of everyday life is highlighted, particularly alongside busy social engagements and leisure pursuits. Implications for rehabilitation For people with Parkinson's, a programme of exercises and strategies has the potential to reduce the risk of falls amongst those with a history of falling. Adherence to such programmes can prove challenging for a variety of reasons, even when participants have realistic expectations about the commitment and effort needed. Clear explanations about the role of equipment and technology within such programmes could enhance adherence. In order to further individualise programmes of exercise for people with Parkinson's, choice regarding social support, reminders and integration into everyday activities should be explored.

Language: en

Keywords

barriers; qualitative research; adherence; expectations; experiences; facilitators; falls prevention programmes; Parkinson's

Reduced gray matter volume and risk of falls in Parkinson's disease with dementia patients: a Voxel-based morphometry study

Cheng KL, Lin LH, Chen PC, Chiang PL, Chen YS, Chen HL, Chen MH, Chou KH, Li SH, Lu CH, Lin WC. *Int. J. Environ. Res. Public Health* 2020; 17(15): e5374.

(Copyright © 2020, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/ijerph17155374 **PMID** 32722623

Abstract

PURPOSE: Risk of falls is a common sequela affecting patients with Parkinson's disease (PD). Although motor impairment and dementia are correlated with falls, associations of brain structure and cognition deficits with falls remain unclear. **Material and Methods:** Thirty-five PD patients with dementia (PDD), and 37 age- and sex-matched healthy subjects were recruited for this study. All participants received structural magnetic resonance imaging (MRI) scans, and disease severity and cognitive evaluations. Additionally, patient fall history was recorded. Regional structural differences between PDD with and without fall groups were performed using voxel-based morphometry processing. Stepwise logistic regression analysis was used to predict the fall risk in PDD patients.

RESULTS: The results revealed that 48% of PDD patients experienced falls. Significantly lower gray matter volume (GMV) in the left calcarine and right inferior frontal gyrus in PDD patients with fall compared to PDD patients without fall were noted. The PDD patients with fall exhibited worse UPDRS-II scores compared to PDD patients without fall and were negatively correlated with lower GMV in the left calcarine ($p/r = 0.004/-0.492$). Furthermore, lower GMV in the left calcarine and right inferior frontal gyrus correlated with poor attention and executive functional test scores. Multiple logistic regression analysis showed that the left calcarine was the only variable ($p = 0.004$, 95% CI = 0.00-0.00) negatively associated with the fall event.

CONCLUSIONS: PDD patients exhibiting impaired motor function, lower GMV in the left calcarine and right inferior frontal gyrus, and notable cognitive deficits may have increased risk of falls.

Language: en

Keywords

dementia; fall; brain structure; executive function; Parkinson's disease

Impact of trunk resistance and stretching exercise on fall-related factors in patients with Parkinson's disease: a randomized controlled pilot study

Youm C, Kim Y, Noh B, Lee M, Kim J, Cheon SM. *Sensors (Basel)* 2020; 20(15): e4106.

(Copyright © 2020, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/s20154106 **PMID** 32717956

Abstract

BACKGROUND: This study aimed to examine the effect of a 12-week progressive trunk resistance and stretching exercise program on fall-related factors in patients with Parkinson's disease (PD).

METHODS: A randomized study assessed a progressive trunk resistance and stretching exercise program over a 12-week period. A total of 17 patients with PD participated and were randomly allocated into an exercise group (n = 10) or a control group (n = 7). Participants in the exercise group completed the exercise program in 60- to 90-min sessions for three days per week. Primary and secondary outcome measures included the trunk mobility scale, functional fitness test, standing balance, and sit-to-walk test.

RESULTS: The exercise group showed improvements in functional fitness, trunk mobility, standing balance, and dynamic stability compared with the control group (all $p < 0.05$). The 2.44 m timed up and go test (odds ratio (OR): 0.125) and the 2 min step test (OR: 10.584) of the functional fitness test, and the first-step length (OR: 3.558) and first-toe clearance height (OR: 4.777) of the sit-to-walk test, were different between the groups following the exercise program.

CONCLUSION: This 12-week exercise program improved fall-related factors in patients with PD and may lead to prevention of fall-related injuries.

Language: en

Keywords

falling; parkinson's disease; postural deformity; rigidity

The safety and feasibility of a Halliwick style of aquatic physiotherapy for falls and balance dysfunction in people with Parkinson's disease: a single blind pilot trial

Terrens AF, Soh SE, Morgan P. PLoS One 2020; 15(7): e0236391.

(Copyright © 2020, Public Library of Science)

DOI 10.1371/journal.pone.0236391 PMID 32730325

Abstract

BACKGROUND: There is growing evidence that aquatic physiotherapy may be effective for people with Parkinson's Disease (PD) but most studies have investigated land based type exercises in the aquatic environment. Few studies have examined customised aquatic therapies such as the Halliwick concept which focuses on trunk rotation and core stabilisation.

OBJECTIVE: The primary aim was to determine the feasibility of a Halliwick style aquatic physiotherapy intervention for people with PD. The secondary aim was to compare the Halliwick intervention with traditional aquatic and land based physiotherapy in terms of disease severity, balance and fear of falling.

METHODS: Halliwick style aquatic, traditional aquatic and land based physiotherapy were trialled in a single blind pilot study. All interventions ran for 60 minutes per week over 12 weeks. Feasibility outcomes were safety, adherence and attrition. Secondary outcomes included the Unified Parkinson's Disease Rating Scale motor subsection (UPDRS-III), Berg Balance Scale (BBS), Mini BESTest and modified Falls Efficacy Scale (mFES).

RESULTS: 30 participants with moderate PD were recruited. Participant mean age was 72 years (SD 8.4; range 51-86) with moderate disease severity (median Hoehn & Yahr score 3; IQR 1). No falls occurred during intervention sessions, however ten participants reported falls during the study period. No other adverse consequences were reported. All groups had adherence over 85%. No within group significant differences were found in UPDRS-III, BBS or mFES scores post-intervention for all groups, but the Halliwick aquatic group improved significantly in the Mini BESTest post-intervention ($p = 0.011$, 95% CI -7.36,-1.31, $t(10) = -2.98$).

CONCLUSIONS: Despite people with PD being a vulnerable population, aquatic physiotherapy, including the Halliwick style is a safe treatment option. Promising results for balance in the Halliwick aquatic group were observed, but further studies with larger sample sizes is required to increase confidence in the results.

Language: en

Cost-effectiveness of the PDSAFE personalised physiotherapy intervention for fall prevention in Parkinson's: an economic evaluation alongside a randomised controlled trial

Xin Y, Ashburn A, Pickering RM, Seymour KC, Hulbert S, Fitton C, Kunkel D, Marian I, Roberts HC, Lamb SE, Goodwin VA, Rochester L, McIntosh E, PDSAFE Collaborative group. *BMC Neurol.* 2020; 20(1): e295.

(Copyright © 2020, Holtzbrinck Springer Nature Publishing Group - BMC)

DOI 10.1186/s12883-020-01852-8 **PMID** 32781987

Abstract

BACKGROUND: PDSAFE is an individually-tailored, physiotherapist-delivered, balance, strength and strategy training programme aimed at preventing falls among people with Parkinson's. We evaluated the cost-effectiveness of PDSAFE compared with usual care for people with Parkinson's at higher risk of falling, from a UK National Health Service and Personal Social Service perspective.

METHODS: Resource use and quality of life data (EQ-5D-3L) were collected from 238 participants randomised to the PDSAFE intervention and 236 participants randomised to control, at baseline, 3 months, 6 months (primary outcome), and 12 months. Adjusted cost and quality-adjusted life-years (QALYs) were estimated using generalised linear models and uncertainty estimated using a non-parametric bootstrap.

RESULTS: Over 6 months, the PDSAFE intervention was associated with an incremental cost of £925 (95% CI £428 to £1422) and a very small and statistically insignificant QALY gain of 0.008 (95% CI - 0.006 to 0.021). The resulting incremental cost-effectiveness ratio (ICER) was £120,659 per QALY and the probability of the intervention being cost-effective at a UK threshold of £30,000/QALY was less than 1%. The ICER varied substantially across subgroups although no subgroup had an ICER lower than the £30,000 threshold. The result was sensitive to the time horizon with the ICER reducing to £55,176 per QALY when adopting a 12-month time horizon and assuming a sustained treatment effect on QoL, nevertheless, the intervention was still not cost-effective according to the current UK threshold.

CONCLUSIONS: Evidence from this trial suggests that the PDSAFE intervention is unlikely to be cost-effective at 6 months. The 12-month analysis suggested that the intervention became closer to being cost-effective if quality of life effects were sustained beyond the intervention period, however this would require confirmation. Further research, including qualitative studies, should be conducted to better understand the treatment effect of physiotherapy and its impact on quality of life in people with Parkinson's given existing mixed evidence on this topic.

TRIAL REGISTRATION: ISRCTN48152791. Registered 17 April 2014.

<http://www.isrctn.com/ISRCTN48152791>.

Language: en

Keywords

Cost; Quality of life; Cost-effectiveness; Parkinson's; Physiotherapist

Fall-related measures in elderly individuals and Parkinson's disease subjects

Michalska J, Kamieniarz A, Brachman A, Marszałek W, Cholewa J, Juras G, Słomka KJ. PLoS One 2020; 15(8): e0236886.

(Copyright © 2020, Public Library of Science)

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Abstract

Falls pose a serious problem in elderly and clinical populations. Most often, they lead to a loss of mobility and independence. They might also be an indirect cause of death. The aim of this study was to determine an objective predictor of the fear of falling and falls in elderly subjects (ESs) and Parkinson's disease (PD) subjects. Thirty-two ESs were examined in this study, of whom sixteen were diagnosed with PD. The testing procedures comprised force plate measurements (limit of stability test-LOS test) and clinical tests (Berg Balance Scale, Functional Reach Test, Timed Up and Go test, Tinetti test). The Falls Efficacy Scale International (FES-I) was used to evaluate the fear of falling. The range of the maximum forward lean was normalized to the length from the ankle joint to the head of the first metatarsal bone and was named the functional forward stability indicator (FFSI). The FFSI, derived from the LOS test, allowed us to demonstrate the real deficit in functional stability and individual safety margins. Moreover, the FFSI was highly correlated with the FES-I score and almost all clinical test results in elderly subjects ($r > 0,6$; $p < 0.05$). In PD subjects, the FFSI was poorly correlated with the fear of falling, the BBS score and the FR distance; however, a high correlation with the Tinetti test ($r > 0,6$; $p < 0.05$) was noted. The PD subjects presented a different balance strategy when close to their stability limits, which was also reflected in the lower values of sample entropy ($t = (-2.40)$; $p < 0.05$; $d = 0.87$). The FFSI might be a good predictor of the fear of falling in the group of elderly people. Additionally, the FFSI allows us to show real balance deficits both in PD subjects and in their healthy peers without the need for a reference group and norms. In conclusion, it is postulated that the popular clinical assessments of postural balance in PD subjects should be accompanied by reliable posturography measurements.

Language: en

A new postural stability-indicator to predict the level of fear of falling in Parkinson's disease patients

Pourghayoomi E, Behzadipour S, Ramezani M, Joghataei MT, Shahidi GA. Biomed. Eng. Online 2020; 19(1): e64.

(Copyright © 2020, Holtzbrinck Springer Nature Publishing Group - BMC)

DOI 10.1186/s12938-020-00808-w PMID 32811522

Abstract

BACKGROUND: Fear of falling (FoF) is defined as a lasting concern about falling that causes a person to limit or even stop the daily activities that he/she is capable of. Seventy percent of Parkinson's disease (PD) patients report activity limitations due to FoF. Timely identification of FoF is critical to prevent its additional adverse effects on the quality of life. Self-report questionnaires are commonly used to evaluate the FoF, which may be prone to human error.

OBJECTIVES: In this study, we attempted to identify a new postural stability-indicator to objectively predict the intensity of FoF and its related behavior(s) in PD patients.

METHODS: Thirty-eight PD patients participated in the study (mean age, 61.2 years), among whom 10 (26.32%) were identified with low FoF and the rest (73.68%) with high FoF, based on Falls Efficacy Scale-International (FES-I). We used a limit of stability task calibrated to each individual and investigated the postural strategies to predict the intensity of FoF. New parameters (FTR_i; functional time ratio) were extracted based on the center of pressure presence pattern in different rectangular areas ($i = 1, 2, \text{ and } 3$). The task was performed on two heights to investigate FoF-related behavior(s).

RESULTS: FTR_{1/2} (the ratio between FTR₁ and FTR₂) was strongly correlated with the FES-I ($r = -0.63, p < 0.001$), Pull test ($r = -0.65, p < 0.001$), Timed Up and Go test ($r = -0.57, p < 0.001$), and Berg Balance Scale ($r = 0.62, p < 0.001$). The model of FTR_{1/2} was identified as a best-fitting model to predicting the intensity of FoF in PD participants (sensitivity = 96.43%, specificity = 80%), using a threshold level of ≤ 2.83 .

CONCLUSIONS: Using the proposed assessment technique, we can accurately predict the intensity of FoF in PD patients. Also, the FTR_{1/2} index can be potentially considered as a mechanical biomarker to sense the FoF-related postural instability in PD patients.

Language: en

Keywords

Diagnosis; Fear of falling; Parkinson's disease; Postural control; Force platform

Relating Parkinson freezing and balance domains: a structural equation modeling approach

Peterson DS, Van Liew C, Stuart S, Carlson-Kuhta P, Horak FB, Mancini M. Parkinsonism Relat. Disord. 2020; 79: 73-78.

(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.parkreldis.2020.08.027 PMID 32889503

Abstract

BACKGROUND: People with PD who exhibit freezing of gait (FOG) also exhibit poor balance compared to those who do not freeze. However, balance is a broad construct that can be subdivided into subdomains that include dynamic balance (gait), anticipatory postural adjustments (APAs) & gait initiation, postural sway in stance, and automatic postural responses (e.g., reactive stepping). Few studies have provided a robust investigation on how each of these domains is impacted by FOG, and no studies have compared balance across groups while rigorously controlling for disease severity.

METHODS: Structural equation modeling was used to evaluate the relationships between FOG and balance domains constructed as latent variables and controlling for disease severity. Domains included: dynamic balance (gait), APAs, postural sway, and reactive stepping. Models were run relating domains to both the presence and severity of FOG.

RESULTS: Latent variables reflecting domains of Gait and APAs, but not postural sway or reactive stepping, were significantly related to the severity of FOG. Models for presence of FOG showed the same results, as Gait and APAs, but not postural sway or reactive stepping, were related to presence of FOG.

CONCLUSION: These results are consistent with hypotheses that balance deficits in people with PD who freeze are most pronounced in gait and anticipatory postural adjustments. Reactive stepping and postural sway domains are less effected in PD patients who freeze compared to those who do not. These findings suggest that rehabilitative strategies focused on gait and APAs may be most effective for people with PD who freeze.

Language: en

Keywords

Gait; Freezing of gait; Parkinson's disease; Postural instability; Posture

Stroke

Clinical features of fallers among inpatient subacute stroke: an observational cohort study

Morone G, Martino Cinnera A, Paolucci T, Beatriz HDR, Paolucci S, Iosa M. *Neurol. Sci.* 2020; ePub(ePub): ePub.

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DOI 10.1007/s10072-020-04352-2 **PMID** 32253635

Abstract

BACKGROUND AND PURPOSE: The aim of this study is to observe the differences between fallers, common fallers, and non-fallers in stroke patients compared with the global ability in a rehabilitation setting.

MATERIALS AND METHODS: An observational and prospective study has been carried out. A total of 476 subacute stroke patients have been observed. The main outcome measures were assessed using the Canadian Neurological Scale (CNS), Barthel Index (BI), Functional Ambulatory Category (FAC), and Trunk Control Test (TCT) at admission to the rehabilitation unit and after 90 days of the rehabilitation treatment (nearly 3 h for day for 5 days for week) at the discharge with intermediate evaluations after the first and second months.

RESULTS: Out of 397 patients, 109 reported 1 or more falls (27.5%), of whom 67 fell 1 time (fallers) in the hospital (16.9%) and 42 fell 2 or more times (common fallers) (10.6%). For fallers, BI and FAC scores had a significant effect ($p = 0.003$ for both). Common fallers had statistically significant differences in BI ($p = 0.002$), FAC ($p = 0.012$), and TCT scores (0.023) compared with non-fallers.

CONCLUSIONS: The severity of stroke may directly increase the risk of fall, and also indirectly, lengthening the hospitalization. Our study seems to suggest that patients with BI scores of between 21 and 30 on admission are more prone to fall in the first period of hospitalization, whereas in the second month, those with scores of between 11 and 20 on admission have a higher risk of falls. In the third month, patients with BI scores below 10 on admission are more susceptible to falls.

Language: en

Keywords

Accidental falls; Gait; Postural balance; Rehabilitation; Stroke; Stroke rehabilitation

A structural equation model of falls at home in individuals with chronic stroke, based on the international classification of function, disability, and health

Kongwattanakul K, Hiengkaew V, Jalayondeja C, Sawangdee Y. PLoS One 2020; 15(4): e0231491.

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Institute for Population and Social Research, Mahidol University, Salaya, Nakhon Pathom, Thailand.

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DOI 10.1371/journal.pone.0231491 **PMID** 32275692

Abstract

PURPOSE: To use structural equation model (SEM) to explain falls at home in individuals with chronic stroke, based on the International Classification of Functioning, Disability and Health (ICF).

MATERIALS AND METHODS: A cross sectional observation study was conducted in home-dwelling individuals with chronic stroke (N = 236; 148 non-fallers, 88 fallers). Participants were assessed; structural impairments using Modified Ashworth Scale, Fugl-Meyer Assessment upper (FMA-UE), lower (FMA-LE), and sensory function, ankle plantarflexor strength; activity limitations using Timed Up and Go Test, Step Test, Berg Balance Scale, Barthel Index (BI); participation restrictions using Stroke Impact Scale-participation (SIS-P); and contextual factors using home hazard environments, home safety surroundings, risk behaviors, and Fall-related Self Efficacy. The measurement model was analyzed by confirmatory factor analysis. The SEM was conducted to analyze a structural model of falls at home.

RESULTS: FMA-UE was significantly ($p < 0.01$) associated with FMA-LE, combining as one variable in the structural impairments. In the measurement model, variables were fit to their domains, except variables of contextual factors, but the ICF domains did not correspond to disability. A structural model of falls at home demonstrated a significant ($p < 0.01$) direct path of contextual factors and activity limitations with falls at home. The structural impairments showed a significant ($p < 0.01$) direct path with activity limitations. All variables, except BI, SIS-P and risk behaviors, related to their domains in the structural model.

CONCLUSIONS: A structural model of falls at home proposes contextual factors being the strongest association with falls at home that home hazard environments seem the most influence in its domain. The activity limitations presented by balance ability are directed to falls at home. The structural impairments are associated with falls at home through activity limitations. Home assessment to decrease home hazard environments is suggested to prevent falls at home for individuals with chronic stroke.

Language: en

Clinical features of fallers among inpatient subacute stroke: an observational cohort study

Morone G, Martino Cinnera A, Paolucci T, Beatriz HDR, Paolucci S, Iosa M. *Neurol. Sci.* 2020; ePub(ePub): ePub.

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DOI 10.1007/s10072-020-04352-2 PMID 32253635

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BACKGROUND AND PURPOSE: The aim of this study is to observe the differences between fallers, common fallers, and non-fallers in stroke patients compared with the global ability in a rehabilitation setting.

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RESULTS: Out of 397 patients, 109 reported 1 or more falls (27.5%), of whom 67 fell 1 time (fallers) in the hospital (16.9%) and 42 fell 2 or more times (common fallers) (10.6%). For fallers, BI and FAC scores had a significant effect ($p = 0.003$ for both). Common fallers had statistically significant differences in BI ($p = 0.002$), FAC ($p = 0.012$), and TCT scores (0.023) compared with non-fallers.

CONCLUSIONS: The severity of stroke may directly increase the risk of fall, and also indirectly, lengthening the hospitalization. Our study seems to suggest that patients with BI scores of between 21 and 30 on admission are more prone to fall in the first period of hospitalization, whereas in the second month, those with scores of between 11 and 20 on admission have a higher risk of falls. In the third month, patients with BI scores below 10 on admission are more susceptible to falls.

Language: en

Keywords

Accidental falls; Gait; Postural balance; Rehabilitation; Stroke; Stroke rehabilitation

A structural equation model of falls at home in individuals with chronic stroke, based on the international classification of function, disability, and health

Kongwattanakul K, Hiengkaew V, Jalayondeja C, Sawangdee Y. PLoS One 2020; 15(4): e0231491.

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DOI 10.1371/journal.pone.0231491 **PMID** 32275692

Abstract

PURPOSE: To use structural equation model (SEM) to explain falls at home in individuals with chronic stroke, based on the International Classification of Functioning, Disability and Health (ICF).

MATERIALS AND METHODS: A cross sectional observation study was conducted in home-dwelling individuals with chronic stroke (N = 236; 148 non-fallers, 88 fallers). Participants were assessed; structural impairments using Modified Ashworth Scale, Fugl-Meyer Assessment upper (FMA-UE), lower (FMA-LE), and sensory function, ankle plantarflexor strength; activity limitations using Timed Up and Go Test, Step Test, Berg Balance Scale, Barthel Index (BI); participation restrictions using Stroke Impact Scale-participation (SIS-P); and contextual factors using home hazard environments, home safety surroundings, risk behaviors, and Fall-related Self Efficacy. The measurement model was analyzed by confirmatory factor analysis. The SEM was conducted to analyze a structural model of falls at home.

RESULTS: FMA-UE was significantly ($p < 0.01$) associated with FMA-LE, combining as one variable in the structural impairments. In the measurement model, variables were fit to their domains, except variables of contextual factors, but the ICF domains did not correspond to disability. A structural model of falls at home demonstrated a significant ($p < 0.01$) direct path of contextual factors and activity limitations with falls at home. The structural impairments showed a significant ($p < 0.01$) direct path with activity limitations. All variables, except BI, SIS-P and risk behaviors, related to their domains in the structural model.

CONCLUSIONS: A structural model of falls at home proposes contextual factors being the strongest association with falls at home that home hazard environments seem the most influence in its domain. The activity limitations presented by balance ability are directed to falls at home. The structural impairments are associated with falls at home through activity limitations. Home assessment to decrease home hazard environments is suggested to prevent falls at home for individuals with chronic stroke.

Language: en

Standardized outcome measures in stroke rehabilitation and falls after discharge: a cohort study

Campo M, Toglia J, Batistick-Aufox H, O'Dell MW. PM R 2020; ePub(ePub): ePub.

Affiliation

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Abstract

INTRODUCTION: Individuals with stroke discharged from inpatient rehabilitation units (IRUs) are at increased risk for falls. In IRUs, standardized outcome measures (SOMs) have been used to predict falls, but the results have been mixed.

OBJECTIVE: The objective of this study was to examine the relationship between SOMs and the risk of falls in individuals with stroke within 6 months of discharge from an IRU.

DESIGN: This was a prospective cohort study with 6-month follow-up. **SETTING:** The setting was an IRU that was part of a large, urban academic medical center.

PARTICIPANTS: Participants were individuals with stroke who underwent rehabilitation.

MAIN OUTCOME MEASURES: The outcome was self-reported falls within 6 months of discharge.

RESULTS: The study included 105 participants who were discharged to their homes after inpatient rehabilitation and who responded to a 6-month follow-up (57% response rate) phone call. Twenty-nine participants (28%) reported falling. Significant Odds Ratios (ORs) adjusted for age, sex, and stroke severity, were found for the following measures: Berg Balance Scale (OR=0.95, 95% CI=0.92-0.99), Activity Measure for Post-Acute Care basic mobility (OR=0.89, 95% CI=0.81-0.97), Motricity Index (OR=0.96, 95% CI=0.94-0.98), Functional Independence Measure mobility subscale (OR=0.89, 95% CI=0.80-0.98), and Trunk Control Test (OR=0.97, 95% CI=0.95-0.99). Areas under the curve (AUC) ranged from .64 to .71. In samples of 82 to 90 patients who could complete the tests, gait speed, the Functional Reach Test, the 6-Minute Walk Test, and Timed Up and Go did not result in significant ORs.

CONCLUSIONS: At discharge, SOMs were associated with the odds of falls within 6 months. The multifactorial nature of falls will continue to make prediction challenging but SOMs can be helpful. Lower extremity strength deserves more attention as a risk factor. This article is protected by copyright. All rights reserved.

Language: en

Keywords

Falls; Inpatient rehabilitation; Physical Therapy; Stroke

Interventions for preventing falls in people after stroke

Scruth E. Res. Nurs. Health 2020; ePub(ePub): ePub.

Affiliation

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Abstract

Persons suffering from a stroke often experience long-lasting complications after rehabilitation. One of the most common complications involves falls (Denissen et al., 2019). The decline of neuromotor performance caused by the underlying disease resulting in a stroke contributes to the majority of falls in stroke survivors (Yang and Butler, 2020). Muscle weakness, impairment in balance, loss of sensation, and limited mobility after a stroke increase the likelihood of a fall (Yang and Butler, 2020). Falls result in further complications for stroke survivors placing both psychological and economic burdens on the person and the family.

Walking recovery for stroke survivors is the most important priority. Research to date has shown that only 50% of stroke survivors demonstrate walking improvements after rehabilitation (Little, Perry, Mercado, Kautz, & Patten, 2020) Nurses caring for stroke survivors play an important role in balancing the goals of the patient with the trajectory of the diagnosis and aims of rehabilitation. Additionally, nurses must understand the type of gait disorders the stroke has resulted in. Stroke survivors often have gait asymmetries, which fall into two categories: spatial and temporal. Both gait asymmetries are predictors of falls in stroke survivors (Little et al., 2020).

Preventing falls in stroke survivors has resulted in various exercise-based fall prevention training programs being developed and outcomes published (Little et al., 2020). Interventions aimed at preventing falls in stroke survivors in the literature to date include assistive devices, post-hospitalization intensive therapy through home visits, brain stimulation, and targeted exercises (Denissen et al., 2019). Preventing falls both in the hospital setting and in the home for the stroke survivor starts early in the hospitalization with the nurse and other healthcare team members and involves many different interventions ...

Language: en

Turning duration and steps predict future falls in poststroke hemiplegic individuals: a preliminary cohort study

Zou TE, Liang PJ, Lee SC. *Top. Stroke Rehabil.* 2020; ePub(ePub): ePub.

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DOI 10.1080/10749357.2020.1760644 PMID 32397952

Abstract

Introduction: Turning was reported as one of the activities that most frequently leads to falling among stroke patients. This study investigated whether the duration and steps of a 180° turn while walking can distinguish retrospective fallers from non-fallers and predict future falls in a 1-year period in patients with poststroke hemiplegia. **Methods:** Thirty stroke patients were recruited. They were instructed to get up from a chair, walk straight 3 m, turn around, and return to seated position to assess the 180° walking-turn task. Turning performance was measured by two inertial sensor units of Physilog. Turn duration and steps were recorded for analysis. The numbers of retrospective and prospective falls were also obtained. **Results:** No significant difference was observed between retrospective stroke fallers and non-fallers in turn duration and steps. Turn duration and steps were significantly greater in prospective stroke fallers than in non-fallers. The cutoff turn duration of 4 s (area under the curve 0.75, 95% CI: 0.56-0.93, sensitivity 67%, specificity 80%, $p = .04$) and turn step of 7 steps (area under the curve 0.73, 95% CI: 0.51-0.94, sensitivity 56%, specificity 85%, $p = .05$) were found to most accurately predict prospective stroke fallers from non-fallers. **Conclusions:** Turn duration and steps were unable to discriminate between retrospective fallers and non-fallers but could predict prospective falls in patients with stroke. More than 4 s or 7 steps to complete a 180° turn while walking can be a predictor for patients with stroke at an increased risk of falling.

Language: en

Keywords

Falls; prediction; stroke; turning

Immersive virtual reality in stroke patients as a new approach for reducing postural disabilities and falls risk: a case series

Cortés-Pérez I, Nieto-Escamez FA, Obrero-Gaitán E. Brain Sci. 2020; 10(5): e296.

(Copyright © 2020, Switzerland Molecular Diversity Preservation International (MDPI) AG)

DOI 10.3390/brainsci10050296 PMID unavailable

Abstract

Stroke is a neurologic disorder considered the first cause of disability worldwide due to motor, cognitive, and sensorial sequels. Balance dysfunctions in stroke survivors increase the risk of falls and physiotherapeutic rehabilitation is essential to reduce it. Virtual reality (VR) seems to be an alternative to conventional physiotherapy (CT), providing virtual environments and multisensorial inputs to train balance in stroke patients. The aim of this study was to assess if immersive VR treatment is more effective than CT to improve balance after stroke. This study got the approval from the Ethics Committee of the University of Almeria. Three chronic ischemic stroke patients were selected. One patient who received 25 sessions of immersive VR intervention for two months was compared with another patient who received equivalent CT and a third patient with no intervention. Balance, gait, risk of falling, and vestibular and visual implications in the equilibrium were assessed. After the interventions, the two patients receiving any of the treatments showed an improvement in balance compared to the untreated patient. In comparison to CT, our results suggest a higher effect of immersive VR in the improvement of balance and a reduction of falls risk due to the active upright work during the VR intervention.

Language: en

Keywords

gait; stroke; balance; falls risk; conventional physiotherapy; immersive virtual reality

Association of subsequent falls with evidence of dual-task interference while walking in community-dwelling individuals after stroke

Tsang CSL, Pang MYC. Clin. Rehabil. 2020; ePub(ePub): ePub.

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Abstract

OBJECTIVE: The aim of this study was to examine the fall predictive value of single-task walking tests and extent of interference observed in dual-task walking tests in ambulatory individuals post stroke.

DESIGN: This is an observational study with prospective cohort.

SETTING: The study was conducted at the university laboratory.

PARTICIPANTS: A total of 91 community-dwelling individuals with chronic stroke participated in the study.

MAIN OUTCOME MEASURES: Time required to complete a 10-m walk test with and without obstacle negotiation was measured in isolation and in conjunction with performance of a verbal fluency task (category naming). Fall incidence, circumstances, and related injuries were recorded by monthly telephone calls for 12 months.

RESULTS: A total of 91 individuals (mean (SD) age = 62.7 (8.3) years; mean (SD) post-stroke duration = 8.8 (5.3) years) participated in the study; 29 (32%) of them reported at least one fall during the follow-up period, with a total of 71 fall episodes. There was a significant difference in obstacle-crossing time under single-task (mean difference = 8.3 seconds) and dual-task (mean difference = 7.4 seconds) conditions, and also the degree of interference in mobility performance (increased dual-task obstacle-crossing time relative to the single-task obstacle-crossing time; mean difference = 3.3%) between the fallers and the non-fallers ($P < 0.05$). After adjusting for the effects of other relevant factors, a greater degree of interference in mobility performance remained significantly associated with a decreased risk of falling (adjusted odds ratio = 0.951, 95% CI = 0.907-0.997, $P = 0.037$).

CONCLUSION: The degree of mobility interference during dual-task obstacle-crossing was the most effective in predicting falls among all the single-task and dual-task walking measure parameters tested. This simple dual-task walking assessment has potential clinical utility in identifying people post stroke at high risk of future falls.

Language: en

Keywords

cognition; falls; walking; stroke; Dual-task interference

Determinants of recurrent falls after stroke: a one-year follow-up of the Fall Study of Gothenburg

Samuelsson CM, Hansson PO, Persson CU. Arch. Phys. Med. Rehabil. 2020; ePub(ePub): ePub.

(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.apmr.2020.05.010 PMID 32497600

Abstract

OBJECTIVE: To identify the occurrence of recurrent falls and the determinants in the acute phase post stroke that are associated with recurrent falls within the first year after stroke onset.

DESIGN: Prospective follow-up study.

SETTING: Stroke unit and community.

PARTICIPANTS: 504 patients with acute stroke.

INTERVENTIONS: Not applicable.

MAIN OUTCOME MEASURES: The dependent variable was recurrent falls, defined as two or more falls, within the first year after stroke onset. The independent baseline variables were related to function, activity, participation, personal and environmental factors and comorbidity and were assessed within four days after admission to a stroke unit. Fall data were registered at the stroke unit and self-reported fall data were collected during follow-up using a standardized questionnaire. Determinants of recurrent falls were identified using univariable and multivariable logistic regression analyses.

RESULTS: Within 12 months after stroke onset, 95 of 348 participants (27%) had experienced recurrent falls. Poor postural control (odds ratio [OR] 5.85, 95% confidence interval [CI] 2.84-12.02, $P < .0001$), moderate postural control (OR 2.41, 95% CI 1.21-4.80, $P = .012$) and using a walking aid in the acute phase (OR 2.51, 95% CI 1.45-4.36, $P = .0010$) are statistically significant determinants that are associated with recurrent falls within the first year after stroke onset. The determinant of using a walking aid appears to be primarily driven by those younger than 80 years. In addition to impaired postural control and using a walking aid, a fall at the stroke unit is a determinant associated with recurrent falls after discharge within 6 months after stroke onset.

CONCLUSIONS: More than one in four individuals with stroke experienced recurrent falls within the first year after stroke onset. Impaired postural control, using a walking aid in the acute phase and fall during hospitalization are determinants associated with recurrent falls during follow-up. The determinants differ somewhat at different ages.

Language: en

Keywords

Accidental falls; rehabilitation; stroke; postural balance

Investigating the relationship between spatiotemporal gait variability and falls self-efficacy in individuals with chronic stroke

Sheikh M, Hosseini HA. *Physiother. Theory Pract.* 2020; ePub(ePub): ePub.

(Copyright © 2020, Informa - Taylor and Francis Group)

DOI 10.1080/09593985.2020.1771799 PMID 32482118

Abstract

AIM: To investigate the relationship between spatiotemporal gait variability and falls self-efficacy after chronic stroke while taking into account the effect of some known potential confounders including fall numbers and gait velocity.

METHODS: Participants ($n = 62$) walked at their preferred speed to calculate gait variability for stride time, stride length, swing time, and double-support percent. The Falls Efficacy Scale-International (FES-I) assessed falls self-efficacy. The linear regression tests were used for statistical analysis. Age, sex, time since stroke, paretic side, motor impairments, fall numbers, and gait velocity were considered as independent variables.

RESULTS: Increased FES-I score was related to higher stride time variability ($R^2 = 0.65$, $F(8,53) = 15.44$, $P < .05$). Increased FES-I was associated with higher stride length variability ($R^2 = 0.42$, $F(6,55) = 8.44$, $P < .05$). However, further adjustment on gait velocity and fall numbers made the association non-significant ($R^2 = 0.41$, $F(8,53) = 6.4$, $P > .05$). No significant relationship was identified between FES-I and swing time ($R^2 = 0.08$, $F(8,53) = 0.39$, $P > .05$) and FES-I and double-support percent variability ($R^2 = 0.04$, $F(8,53) = 0.67$, $P > .05$).

CONCLUSION: The results indicate that increased FES-I score may be related to increased stride variability post stroke.

Language: en

Keywords

accidental falls; Fear; gait; stroke

Predicting falls using the stroke assessment of fall risk tool

Yang C, Ghaedi B, Campbell M, Rutkowski N, Finestone H. PM R 2020; ePub(ePub): ePub.

(Copyright © 2020, American Academy of Physical Medicine and Rehabilitation, Publisher Elsevier Publishing)

DOI 10.1002/pmrj.12434 PMID 32515060

Abstract

INTRODUCTION: Falls in the inpatient stroke population are common, resulting in increased morbidity and slow rehabilitation progress. Falls may result from stroke-specific neurologic deficits, however assessment of these deficits is lacking in many fall screening tools.

OBJECTIVE: To compare the ability of the Stroke Assessment of Fall Risk (SAFR) tool, which includes items related to stroke-specific neurologic deficits, to predict falls to the commonly used Morse Fall Scale, which does not include these items.

DESIGN: Prospective cohort study.

SETTING: Inpatient tertiary stroke rehabilitation unit.

PARTICIPANTS: Patients (N = 220) with acute stroke.

MAIN OUTCOME MEASURES: Falls were captured by the medical records from January 2017 to September 2018. Logistic regression analysis evaluated both screening tools for predicting falls by calculating sensitivity, specificity, area under the receiver operating characteristic (AUC-ROC) curve and odds ratio (OR). We compared SAFR and Morse mean scores between fallers and non-fallers using t-tests.

RESULTS: Forty-eight (21.8%) patients experienced ≥ 1 fall. SAFR, but not Morse, scores showed a statistically significant difference between fallers and non-fallers ($P = 0.001$ vs $P = 0.24$, respectively). Higher SAFR score was associated with higher odds of falls (OR 1.36, 95% CI [1.12, 1.64]), while Morse was not (OR 1.04, 95% CI [0.97, 1.12]). SAFR showed a statistically significant difference in hemi-neglect between fallers and non-fallers ($P = 0.03$). Sensitivity and specificity of SAFR were 47.9% and 76.7%, vs 45.8% and 68.0% for Morse, respectively. SAFR PPV and NPV were 36.5% and 84.1%, respectively, similar to Morse (28.6% and 81.8%). The AUC-ROC was 0.65 for SAFR, and 0.56 for Morse.

CONCLUSION: SAFR was significantly associated with fall risk and had better discrimination between fallers and non-fallers than Morse. The neurologic-specific hemi-neglect component of SAFR, a component not present on the Morse, was a fall risk factor. Further research evaluating the predictive value of fall scales that include neurologic deficits is needed. This article is protected by copyright. All rights reserved.

Language: en

Keywords

Falls; Rehabilitation; Prediction; Stroke

Lateral perturbation-induced and voluntary stepping in fallers and nonfallers after stroke

Gray VL, Fujimoto M, Rogers MW. Phys. Ther. 2020; ePub(ePub): ePub.

(Copyright © 2020, American Physical Therapy Association)

DOI 10.1093/ptj/pzaa109 PMID 32529236

Abstract

OBJECTIVE: A loss of balance poststroke from externally induced-perturbations or during voluntary movements is often recovered by stepping. The purpose of this study was to characterize stepping behavior during lateral induced waist-pull perturbations and voluntary steps in community-dwelling fallers and nonfallers with chronic stroke.

METHODS: This study used a cohort design. Thirty participants > 6 months poststroke were exposed to 24 externally triggered lateral waist-pull perturbations and 20 voluntary steps. Balance-tolerance-limit (BTL) (transition from single to multiple steps) and first step type were determined for the waist-pull perturbations. Step parameters of initiation time, velocity, first step length, and clearance were calculated at and above BTL and for the voluntary steps. Hip abductor/adductor torque, foot cutaneous sensation, and self-reported falls that occurred 6 months prior were evaluated.

RESULTS: Twelve participants were classified retrospectively as fallers and 18 as nonfallers. Fallers had a reduced BTL and took more medial first steps than nonfallers. Above BTL, no between-group differences were found in medial steps. At BTL, the nonparetic step clearance was reduced in fallers. Above BTL, fallers took longer to initiate a paretic and nonparetic step and had a reduced nonparetic step length and clearance when compared with nonfallers. There was a between group difference in step initiation time for voluntary stepping with the paretic leg ($P < .05$). Fallers had a reduced paretic abductor torque and impaired paretic foot cutaneous sensation.

CONCLUSION: A high fall rate poststroke necessitates effective fall prevention strategies. Given that more differences were found during perturbation induced stepping between fallers and non-fallers, further research assessing perturbation induced training on reducing falls is needed.

IMPACT: Falls assessments should include both externally induced perturbations, along with voluntary movements in determining the fall risk.

Language: en

Keywords

Falls; Balance; Reaction Time; Step; Stroke

Boxing training in patients with stroke causes improvement of upper extremity, balance, and cognitive functions but should it be applied as virtual or real?

Ersoy C, Iyigun G. *Top. Stroke Rehabil.* 2020; ePub(ePub): ePub.

(Copyright © 2020, Informa - Taylor and Francis Group)

DOI 10.1080/10749357.2020.1783918 **PMID** 32574096

Abstract

BACKGROUND: Upper extremity hemiparesis is one of the most common post-stroke disabilities requiring rehabilitation.

OBJECTIVE: To compare the effects of virtual and real boxing training in addition to neurodevelopmental treatment on the upper extremity, balance, and cognitive functions in hemiparetic stroke patients.

METHODS: Forty hemiparetic stroke patients were assigned to either real boxing group-RBG (n=20) or virtual boxing group-VBG (n=20), for a total of 24 sessions (3 sessions/week for 8 weeks). The primary outcome was upper extremity motor ability (Wolf Motor Function Test-WMFT). The secondary outcomes were arm-hand dexterity (Manual Dexterity Test-MMDT), goal-oriented performance (Video Boxing Analysis-VBA), balance functions (Fullerton Advanced Balance Scale-FAB-T), and cognitive functions (Addenbrooke's Cognitive Examination-Revised-ACE-R).

RESULTS: There was small treatment effect on ACE-R, small-medium effect for WFMT and MMDT and large effect on bilateral punching time [VBA (Cohen's d- VBG=0.83; RBG=0.95)] and balance [FAB-T (Cohen's d - VBG=0.89; RBG=0.82)] after treatment in both groups. No significant differences were found for training effects between the groups for upper extremity functions [WMFT (p=0.799; Cohen's d=-0.07), MMDT-PT (p=0.327; Cohen's d=-0.10), MMDT-THTPT (p=0.779; Cohen's d=-0.17) and VBA bilateral punch number (p=0.068; Cohen's d=0.15)], balance functions [FAB-T (p=0.602; Cohen's d=-0.19)] and cognitive functions [ACE-R total (p=0.947, Cohen's d=0.09)].

CONCLUSION: The study showed that virtual and real boxing training methods, in addition to neurodevelopmental treatment, are effective in improving upper extremity, balance, and cognitive functions in patients with hemiparetic stroke. The training effects were higher on bilateral punching time and balance functions for both groups. There was no superiority of either approach.

Language: en

Keywords

postural balance; virtual reality; Stroke; boxing; cognitive functions; upper extremity functions

Evaluating a novel multifactorial falls prevention activity programme for community-dwelling older people after stroke: a mixed-method feasibility study

Koh JSG, Hill AM, Hill KD, Etherton-Ber C, Francis-Coad J, Bell E, Bainbridge L, de Jong LD. *Clin. Interv. Aging* 2020; 15: 1099-1112.

(Copyright © 2020, Dove Press)

DOI 10.2147/CIA.S251516 **PMID** 32764897

Abstract

PURPOSE: The overall purpose of this study was to explore participants' and physiotherapists' experiences regarding the acceptability, implementation, and practicality of a novel group-based multifactorial falls prevention activity programme for community-dwelling older people after stroke. Specifically, the purpose was to explore if and how participating could impact on the participants' health-related quality of life (HRQoL) in terms of their daily lived experience regarding physical, mental, emotional and social well-being. A secondary purpose was to explore whether participating in the programme could positively influence participants' balance, strength, falls efficacy, mobility and motor impairment of the trunk.

Materials and Methods: This was an exploratory mixed-method Phase I feasibility study. A convenience sample of five older community-dwelling people after stroke participated in a novel eight-week multifactorial activity programme which included falls education, a mix of individually tailored and group-based strength and balance exercises, exploring limits of stability and safe landing techniques and a social element. Qualitative data from post-intervention interview transcripts with the participants and the physiotherapists who delivered the programme were thematically analysed using both deductive and inductive approaches to explore the participants' and therapists' experiences with the programme. Quantitative outcomes included balance, strength, falls efficacy, mobility and motor impairment of the trunk.

Results: The programme was deemed feasible in terms of acceptability, implementation and practicality by the participants as well as the physiotherapists delivering the programme. The overarching theme regarding HRQoL identified that participating in the programme was perceived to empower the participants living with stroke and positively influenced their daily physical, mental, emotional and social well-being. Participant outcomes showed a change in the direction of improvements in balance, strength, mobility, motor impairment of the trunk and reduced concerns about falling. Subjectively, participants only reported perceived improvements in balance and strength.

Conclusion: Running a novel multifactorial falls prevention activity programme for older community-dwelling people after stroke was feasible. Participating in the programme helped participants to perceive improved balance, strength and empower them to make meaningful changes, improving their daily lived experiences. A future fully powered study could build on these results to investigate physical improvements, prevention of falls and improvements to domains of HRQoL.

Language: en

Keyword

accidental falls; aged; quality of life; qualitative research; exercise; stroke; evaluation studies as topic

External validation of the recurrent falls risk scale in community-dwelling stroke individuals

Guimarães M, Monteiro MM, Matos RT, Furtado MC, Maia HF, Almeida LRS, Filho JO, Pinto EB. *J. Stroke Cerebrovasc. Dis.* 2020; 29(9): e104985.

(Copyright © 2020, National Stroke Association (U.S.A.), Publisher Elsevier Publishing)

DOI 10.1016/j.jstrokecerebrovasdis.2020.104985 **PMID** 32807417

Abstract

OBJECTIVE: To externally validate the Recurrent Fall Risk Scale (ReFR) in community-dwelling stroke survivors.

METHODS: Cohort of stroke survivors with independent gait ability recruited from a reference outpatient stroke clinic. Besides sociodemographic and clinical data, the following scales were used: Modified Barthel Index (mBI), ReFR scale and National Institutes of Health Stroke Scale (NIHSS). Participants were followed up for 12 months to record the incidence of falls. Accuracy of the ReFR scale was measured by the area under the ROC curve.

RESULTS: One hundred and thirteen individuals were recruited between April 2016 and November 2016: mean age 54 years (\pm 14), 55% women, median time since the last stroke 24 months (range 12 -48 months), posterior vascular territory affected in 35% of the sample. Median NIHSS was 3 (range 1 to 6), median mBI 49 (range 46-50), median ReFR 3 (range 2 to 5). During the follow-up period, 32 (33%) subjects had at least one fall and 18 (19%) were recurrent fallers (two or more falls). The accuracy of ReFR scale was 0.67 (95% CI= 0.54-0.79), $p = 0.026$.

CONCLUSION: This study externally validated the ReFR as a tool to predict recurrent falls in individuals after stroke.

Language: en

Keywords

Community; Stroke; Recurrent falls; Prediction; Scale

A comparison of three balance-assessment scales for patients after stroke with various levels of balance disorder

Rudolf M, Vidmar G, Goljar N. *Int. J. Rehabil. Res.* 2020; ePub(ePub): ePub.

(Copyright © 2020, Lippincott Williams and Wilkins)

DOI 10.1097/MRR.0000000000000431 PMID 32815824

Abstract

It is often difficult for the clinician to choose the most appropriate balance-assessment measure. We wanted to facilitate this decision based on the stroke patient's functional abilities. The aim of our study was to compare three established scales [Berg Balance Scale (BBS), mini-BESTest (MBT) and Functional Gait Assessment (FGA)] in terms of responsiveness, floor and ceiling effects at different levels of ambulation as defined by the Functional Ambulation Classification (FAC). The 18-month prospective study included 88 patients after cerebral stroke, who were able to walk independently or with assistance of one person (FAC 2-6). BBS showed the highest relative gain in the FAC 2-3 group (17% of maximum scale score); in the other two groups (FAC 4-5 and FAC 6), MBT showed the highest relative gain (16 and 13%, respectively), followed by FGA (11 and 10%, respectively). Among the patients with initial FAC 2-3, a floor effect occurred with FGA, while a ceiling effect occurred with BBS among patients with initial FAC 6. Gain in FGA correlated slightly more with improvement detected by MBT ($r = 0.60$) than with BBS ($r = 0.50$). We can conclude that BBS seems to be suitable for stroke patients with initial FAC 2-5, whereas MBT and FGA for those with FAC 4-6.

Language: en

Slip-fall predictors in community-dwelling, ambulatory stroke survivors: a cross-sectional study

Gangwani R, Dusane S, Wang S, Kannan L, Wang E, Fung J, Bhatt T. J. Neurol. Phys. Ther. 2020; ePub(ePub): ePub.

(Copyright © 2020, Neurology Section, American Physical Therapy Association)

DOI 10.1097/NPT.0000000000000331 PMID 32815890

Abstract

BACKGROUND AND PURPOSE: Considering the multifactorial nature and the often-grave consequences of falls in people with chronic stroke (PwCS), determining measurements that best predict fall risk is essential for identifying those who are at high risk. We aimed to determine measures from the domains of the International Classification of Functioning, Disability and Health (ICF) that can predict laboratory-induced slip-related fall risk among PwCS.

METHODS: Fifty-six PwCS participated in the experiment in which they were subjected to an unannounced slip of the paretic leg while walking on an overground walkway. Prior to the slip, they were given a battery of tests to assess fall risk factors. Balance was assessed using performance-based tests and instrumented measures. Other fall risk factors assessed were severity of sensorimotor impairment, muscle strength, physical activity level, and psychosocial factors. Logistic regression analysis was performed for all variables. The accuracy of each measure was examined based on its sensitivity and specificity for fall risk prediction.

RESULTS: Of the 56 participants, 24 (43%) fell upon slipping while 32 (57%) recovered their balance. The multivariate logistic regression analysis model identified dynamic gait stability, hip extensor strength, and the Timed Up and Go (TUG) score as significant laboratory-induced slip-fall predictors with a combined sensitivity of 75%, a specificity of 79.2%, and an overall accuracy of 77.3%.

DISCUSSION AND CONCLUSIONS: The results indicate that fall risk measures within the ICF domains-body, structure, and function (dynamic gait stability and hip extensor strength) and activity limitation (TUG)-could provide a sensitive laboratory-induced slip-fall prediction model in PwCS. Video Abstract available for more insights from the authors (see the Video, Supplemental Digital Content 1, available at: <http://links.lww.com/JNPT/A323>).

Language: en

Determining the optimal dose of reactive balance training after stroke: study protocol for a pilot randomised controlled trial

Mansfield A, Inness EL, Danells CJ, Jagroop D, Bhatt T, Huntley AH. *BMJ Open* 2020; 10(8): e038073.

(Copyright © 2020, BMJ Publishing Group)

DOI 10.1136/bmjopen-2020-038073 PMID 32847916

Abstract

INTRODUCTION: Falls risk poststroke is highest soon after discharge from rehabilitation. Reactive balance training (RBT) aims to improve control of reactions to prevent falling after a loss of balance. In healthy older adults, a single RBT session can lead to lasting improvements in reactive balance control and prevent falls in daily life. While increasing the dose of RBT does not appear to lead to additional benefit for healthy older adults, stroke survivors, who have more severely impaired balance control, may benefit from a higher RBT dose. Our long-term goal is to determine the optimal dose of RBT in people with subacute stroke. This assessor-blinded pilot randomised controlled trial aims to inform the design of a larger trial to address this long-term goal.

METHODS AND ANALYSIS: Participants (n=36) will be attending out-patient stroke rehabilitation, and will be randomly allocated to one of three groups: one, three or six RBT sessions. RBT will replace a portion of participants' regular physiotherapy so that the total physical rehabilitation time will be the same for the three groups. Balance and balance confidence will be assessed at: (1) study enrolment; (2) out-patient rehabilitation discharge; and (3) 6 months postdischarge. Participants will report falls and physical activity for 6 months postdischarge. Pilot data will be used to plan the larger trial (ie, sample size estimate using fall rates, and which groups should be included based on between-group trends in pre-to-post training effect sizes for reactive balance control measures). Pilot data will also be used to assess the feasibility of the larger trial (ie, based on the accrual rate, outcome completion rate and feasibility of prescribing specific training doses).

ETHICS AND DISSEMINATION: Institutional research ethics approval has been received. Study participants will receive a lay summary of results. We will also publish our findings in a peer-reviewed journal.

TRIAL REGISTRATION NUMBER: NCT04219696; Pre results.

Language: en

Keywords

rehabilitation medicine; stroke; stroke medicine

Multiple Sclerosis

Discriminative ability of Fall Efficacy Scale International in Iranian people with multiple sclerosis

Choobsaz H, ShahAli S, Salehi R, Noorizadeh Dehkordi S, Shanbehzadeh S. *Mult. Scler. Relat. Disord.* 2020; 42: e102083.

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Abstract

BACKGROUND: The discriminative validity of fall efficacy scale international (FES-I) in differentiating between fallers and non-fallers, levels of functional mobility, dynamic balance and disability has not been assessed in Persian speaking people with multiple sclerosis (MS).

OBJECTIVE: To assess reliability, factor structure, construct and known group validity, sensitivity and specificity of FES-I for differentiating individuals with and without a history of fall and determining a cutoff point of the Persian version of the FES-I in people with MS.

METHOD: One hundred thirty people with all subtypes of MS were included. The ability of FES-I in differentiating fall history was assessed using receiver operating characteristic (ROC). Also the FES-I score of groups based on expanded disability status scale (EDSS) 1-3.5 low and 4-6 moderate, time up and go (TUG) ≥ 14 sec and functional reach test (FRT) ≥ 25 cm were compared. The correlation between FES-I with EDSS, TUG, FRT and short form health survey (SF-36) was assessed.

RESULTS: The ROC curve analysis revealed that the FES-I could differentiate people with MS based on fall history at a cutoff score of 35.5. The area under the curve (AUC) was 0.86 (sensitivity 76%; specificity 95%). Significant difference was observed between the FES-I score of groups with moderate and low EDSS scores ($d = 2.98$), higher than 14 sec TUG ($d = 2.18$) and lower than 25 cm FRT ($d = 2.53$). Significant high correlation was observed between FES-I with TUG ($r = 0.88$), EDSS ($r = 0.91$), FRT ($r = -0.83$), SF-36 physical ($r = -0.87$) and mental ($r = -0.70$) subscales.

CONCLUSIONS: The Persian versions of the FES-I could differentiate people with MS with fall history, higher disability, lower functional mobility and balance deficiency.

Language: en

Keywords

Accidental falls; Multiple sclerosis; Postural balance; Psychometrics; Rehabilitation

Discriminative ability of Fall Efficacy Scale International in Iranian people with multiple sclerosis

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CONCLUSIONS: The Persian versions of the FES-I could differentiate people with MS with fall history, higher disability, lower functional mobility and balance deficiency.

Language: en

Keywords

Accidental falls; Multiple sclerosis; Postural balance; Psychometrics; Rehabilitation

Fall definitions, faller classifications and outcomes used in falls research among people with multiple sclerosis: a systematic review

O'Malley N, Clifford AM, Comber L, Coote S. *Disabil. Rehabil.* 2020; ePub(ePub): ePub.

(Copyright © 2020, Informa - Taylor and Francis Group)

DOI 10.1080/09638288.2020.1786173 **PMID** 32628889

Abstract

PURPOSE: To identify the definitions of a fall, faller classifications and outcomes used in prospectively-recorded falls research among people with Multiple Sclerosis (MS).

Methods: A systematic review of peer-reviewed journal articles was conducted using electronic databases. Relevant data were extracted by one reviewer and verified by a second independent reviewer.

Results: Twenty-six papers met the inclusion criteria. A relative degree of heterogeneity existed amongst studies for the outcomes of interest to this review. Thirteen different fall definitions were identified. Fourteen different falls outcomes were used across the included studies, with six of these reported by only one study each. Data regarding injurious falls were presented by only eight papers. The majority ($n = 17$) of papers classified individuals as a faller if they fell at least once.

Conclusions: This review highlights the large variation in fall definitions, faller classifications and outcomes used in this research field. This hinders cross-comparison and pooling of data, thereby preventing researchers and clinicians from drawing conclusive findings from existing literature. The creation of an international standard for the definition of a fall, faller classification and falls outcomes would allow for transparent and coordinated falls research for people with MS, facilitating progression in this research field. Implications for rehabilitation Falls are a common occurrence among people with Multiple Sclerosis (MS) resulting in numerous negative consequences. There is large heterogeneity in the definitions, methods and outcomes used in falls research for people with MS. This lack of standardisation prevents the accurate cross-comparison and pooling of data, impeding the identification of falls risk factors and effective falls prevention interventions for people with MS. Consequently, clinicians should interpret the outcomes of falls research for people with MS with caution, particularly when comparing studies regarding falls risk assessments and falls prevention interventions for use in clinical practice.

Language: en

Keywords

systematic review; falls; outcomes; Multiple Sclerosis; methodology; definitions

Which interventions are effective in preventing falls in people with multiple sclerosis? A Cochrane Review summary with commentary

Amatya B, Khan F. NeuroRehabilitation 2020; ePub(ePub): ePub.

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DOI 10.3233/NRE-209005 PMID 32675429

Abstract

BACKGROUND: Falls are common and serious health concern in people with Multiple Sclerosis (MS). Various types of falls prevention interventions are currently investigated in people with MS.

OBJECTIVE: To assess the effectiveness of interventions to reduce falls in people with MS.

METHODS: To summarize falls prevention interventions from the published Cochrane Review "Interventions for preventing falls in people with multiple sclerosis" conducted by Hayes et al. Best available evidence was discussed from the rehabilitation perspective.

RESULTS: Overall 13 RCTs with 839 participants were included. The interventions evaluated included: exercise, education, and functional electrical stimulation alone or in combination. Majority of the included studies demonstrated high risk of bias. The findings suggest that the evidence was uncertain regarding the effects of evaluated interventions on preventing or reducing falls.

CONCLUSIONS: The evidence for any falls prevention interventions in people with MS is sparse and uncertain, and more robust studies are needed.

Language: en

Keywords

falls; rehabilitation; Multiple sclerosis

Backward walking sensitively detects fallers in persons with multiple sclerosis

Edwards EM, Daugherty AM, Nitta M, Atalla M, Fritz NE. *Mult. Scler. Relat. Disord.* 2020; 45: e102390.

(Copyright © 2020, Elsevier Publishing)

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Abstract

BACKGROUND: Individuals with multiple sclerosis experience deficits in mobility resulting in injurious falls. Fall detection has proved challenging; the majority of clinical measures rely on forward walking and balance measures, yet these measures have poor sensitivity and predictive value for differentiating between fallers and non-fallers. Backward walking better differentiates fallers from non-fallers in the elderly and other neurodegenerative diseases; therefore, the objective of this study was to examine both forward and backward walking to determine the strongest, unique contributor that differentiates fallers from non-fallers in persons with multiple sclerosis.

METHODS: In a single session, spatiotemporal measures of forward and backward walking and fall history were collected. For the subsequent six months, individuals recorded falls in a fall diary. Discriminant function analysis was used to determine what variables most strongly and uniquely differentiate multiple sclerosis fallers from non-fallers.

RESULTS: Thirty-eight individuals with multiple sclerosis participated. Forward and backward velocity, stride length, and double support time as well as age, disease severity, and symptom duration were included in the models. Together, the variables differentiated between fallers and non-fallers (Wilk's lambda χ^2 (8, N = 36) = 0.497, $p < 0.001$) and in rank order, backward walking velocity was the strongest unique predictor. Repeating the analysis with a stepwise approach yielded that backward walking velocity in the first step (χ^2 (1, 34) = 0.68, $F = 15.96$, $p < 0.001$) and symptom duration in the second step ($\chi^2 = 0.59$, F (2, 33) = 11.46; $p < 0.001$) most strongly differentiated retrospective fallers and non-fallers. This stepwise model with backward walking velocity and symptom duration accurately classified 76.3% of cases. Addition of forward walking measures did not significantly improve the models, and indeed the accuracy of classification was reduced to 71.1%. Exploratory analysis showed that backward walking velocity was the best predictor of prospectively reported fallers and non-fallers (χ^2 (1, 7) = 0.43, $F = 9.20$, $p = 0.02$).

CONCLUSION: Backward walking velocity exhibits the highest effect magnitude and specificity in differentiating fallers from non-fallers in individuals with MS and demonstrates potential as clinically feasible and efficient fall detection tool.

Language: en

Keywords

Falls; Walking; Multiple Sclerosis; Backward walking

Trunk and foot acceleration variability during walking relates to fall history and clinical disability in persons with multiple sclerosis

Craig JJ, Bruetsch AP, Lynch SG, Huisinga JM. Clin. Biomech. 2020; 80: e105100.

(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.clinbiomech.2020.105100 PMID 32798813

Abstract

BACKGROUND: Persons with multiple sclerosis are often at higher risk for falling, but clinical disability scales and fall risk questionnaires are subjective and don't provide specific feedback about why an individual is unstable. The purpose of this study was to determine how relationships between trunk and foot acceleration variability relate to physiological impairments, clinical disability scales, and mobility questionnaires in persons with multiple sclerosis.

METHODS: 15 fallers and 25 non-fallers with multiple sclerosis walked on a treadmill at normal walking speed while trunk and foot accelerations were recorded with wireless accelerometers and variability measures were extracted and used to calculate the gait stability index metrics as a ratio of trunk acceleration variability divided foot acceleration variability. Subjects' sensorimotor delays and lower extremity vibration sensitivity were tested. Subjects also completed clinical disability scales (Guy's Neurological Disability Scale and Patient Reported Expanded Disability Status Scale) and mobility questionnaires (Falls Efficacy Scale, Activities Balance Confidence Scale, 12 Item Multiple Sclerosis Walk Scale).

FINDINGS: Multiple gait stability index metrics were significantly correlated with clinical measures of disability and mobility in multiple sclerosis subjects ($r = 0.354-0.528$), but no correlations were found for sensorimotor delays or lower extremity sensation. Multiple gait stability indices performed at least as well as clinical questionnaires for separating fallers from non-fallers.

INTERPRETATION: The gait stability indices can potentially be used outside of a laboratory setting to measure walking characteristics related to fall history and disability level in people with multiple sclerosis.

Language: en

Keywords

Accelerometers; Falls; Multiple sclerosis; Gait

Other Neurological Conditions

Berg Balance Scale: inter-rater and intra-rater reliability of the Spanish version with incomplete spinal cord injured subjects

Freixes O, Passuni DA, Buffetti E, Elizalde M, Lastiri F. Spinal Cord Ser. Cases 2020; 6(1): e28.

Affiliation

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(Copyright © 2020, Nature Publishing Group)

DOI 10.1038/s41394-020-0278-5 **PMID** 32345965

Abstract

STUDY DESIGN: Cross sectional.

OBJECTIVES: To determine the inter-rater and intra-rater reliability of the Spanish version of the Berg Balance Scale with incomplete spinal cord injured subjects. **SETTING:** CINER Rehabilitation Center.

METHODS: We administered and video recorded the Spanish version of the Berg Balance Scale to 20 incomplete SCI patients. Two raters scored the videos on two different occasions at least three weeks apart. We used intraclass correlation coefficient (ICC) and a confidence interval (CI) of 95% to evaluate the inter-rater and intra-rater (test-retest) reliability of the BBS total scores.

RESULTS: ICC values for inter-rater reliability at first and second observation were 0.99 (95% CI 0.97-1.00) and 0.99 (95% CI 0.99-1.00), respectively. Intra-rater ICC for rater 1 was 1.00 (95% CI 1.00-1.00) and for rater 2 was 1.00 (95% CI 0.99-1.00). All of them were excellent.

CONCLUSIONS: The results indicate that the Spanish version of the Berg Balance Scale is a reliable tool to evaluate spinal cord injured patients' balance.

Language: en

Development and validation of the standing balance assessment for individuals with spinal cord injury (SBASCI) - a new outcome measure

Singh M, Sarkar A, Kataria C. NeuroRehabilitation 2020; ePub(ePub): ePub.

(Copyright © 2020, IOS Press)

DOI 10.3233/NRE-203148 PMID 32716325

Abstract

BACKGROUND: Injury to the spinal cord results in standing balance impairment following variable sensorimotor loss. Standing balance training is a realistic goal for the majority of individuals with spinal cord injury (SCI) for which therapists need valid measures to assess standing ability in people with SCI that are relevant to functionality.

OBJECTIVE: The objective of the study was to develop an all inclusive Standing Balance Assessment for Individuals with Spinal Cord Injury (SBASCI) measure and to establish its initial psychometric properties.

METHODS: The study was carried out in three phases: Item development, scale development and scale evaluation. Literature review, focus group discussions and evaluation by experts resulted in the development of a 22-item SBASCI scale. The scale was administered on 120 participants with SCI. Exploratory factor analysis and item analysis were used to determine construct validity and internal consistency of the scale.

RESULTS: Content validity was established qualitatively and quantitatively. The scale shows high internal consistency reliability (Cronbach's alpha 0.96). The results of the exploratory factor analysis suggested a four factor structure retaining all the 22 items.

CONCLUSION: SBASCI is a valid and reliable scale to measure the standing balance of individuals with SCI. Further studies are required to establish other psychometric properties.

Language: en

Keywords

reliability; validity; Spinal cord injury; standing balance

Effectiveness of physical therapy interventions in reducing fear of falling among individuals with neurological diseases: a systematic review and meta-analysis

Abou L, Alluri A, Fliflet A, Du Y, Rice LA. Arch. Phys. Med. Rehabil. 2020; ePub(ePub): ePub.

(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.apmr.2020.06.025 PMID 32745544

Abstract

OBJECTIVE: To summarize the effectiveness of physical therapy (PT) interventions to reduce fear of falling (FOF) among individuals living with neurological diseases.

DATA SOURCES: PubMed, PEDro, Scopus, Web of Science, PsycINFO, CINAHL, and SportDiscuss were searched from inception until December 2019.

STUDY SELECTION: Clinical trials with either the primary or secondary aim to reduce FOF among adults with neurological diseases were selected.

DATA EXTRACTION: Potential papers were screened for eligibility and data extracted by two independent researchers. Risk of bias was assessed by the Cochrane Risk of Bias tool for randomized clinical trials and the NIH Quality Assessment Tool for pre-post studies. A meta-analysis was performed among trials presenting with similar clinical characteristics. The Grading Recommendations, Assessment, Development and Evaluation- GRADE was used to rate the overall quality of evidence.

RESULTS: Sixty-one trials/3954 participants were included in the review and 53 trials/3524 participants in the meta-analysis. The included studies presented, in general, with a low to high risk of bias. A combination of gait and balance training was found to be significantly more effective compared to gait training alone in reducing FOF among individuals with Parkinson's Disease (PD) (Mean Difference- MD = 11.80, 95% CI, 8.22 - 15.38; $p < 0.001$). Home-based exercise and leisure exercise demonstrated significant improvement in reducing FOF over usual care in multiple sclerosis (MS) (MD = 15.27, 95% CI, 6.15 - 24.38, $p = 0.001$). No statistically significant between-groups differences were reported among individuals with stroke and spinal cord injury (SCI). The overall quality of evidence presented in this review ranges from very low to moderate according to the assessment with the GRADE approach.

CONCLUSION: Gait with lower limb training combined with balance training is effective in reducing FOF in individuals with PD. Also, home-based or leisure exercise is effective among individuals with MS. However, due to several limitations of the included studies, further research is needed to examine the effectiveness of FOF intervention among individuals with neurological diseases.

Language: en

Keywords

systematic review; fear of falling; meta-analysis; neurological diseases; physical therapy

Exploring the causes and impacts of falls among ambulators with spinal cord injury using photovoice: a mixed-methods study

Singh H, Shibi Rosen A, Bostick G, Kaiser A, Musselman KE. *BMJ Open* 2020; 10(8): e039763.

(Copyright © 2020, BMJ Publishing Group)

DOI 10.1136/bmjopen-2020-039763 PMID 32868369

Abstract

OBJECTIVES: This study explored: (1) fall circumstances experienced by ambulators with spinal cord injury (SCI) over a 6-month period, (2) the impacts of falls-related injuries and fall risk and (3) their preferences/recommendations for fall prevention.

DESIGN: A sequential explanatory mixed-methods design with two phases.

SETTING: A Canadian SCI rehabilitation hospital and community setting.

PARTICIPANTS: Thirty-three ambulators with SCI participated in phase 1 and eight participants that fell in phase 1 participated in phase 2.

METHODS: In phase 1, fall circumstances were tracked using a survey that was completed each time a participant fell during the 6-month tracking period. Phase 2 involved photovoice; participants took photographs of factors that influenced their fall risk and how their fall risk impacted their work/recreational activities. Participants discussed the photographs and topics related to fall prevention in an individual interview and a focus group.

RESULTS: Of the 33 participants, 21 fell in 6 months. Falls commonly occurred in the home while participants were changing positions or walking. Most falls occurred in the morning or afternoon. In phase 2, interviews and focus group discussion revealed three themes: (1) falls are caused by bodily impairments (eg, impaired reactive response during slips and trips and weakness and altered sensation in legs/feet), (2) impacts of fall-related injuries and fall risk (eg, psychosocial effects of fall-related injuries, limiting community participation due to the risk of falling and activity-dependent concern of falling) and (3) approaches to fall prevention (eg, fall prevention strategies used, components of fall prevention and utility of professional fall prevention strategies/interventions).

CONCLUSIONS: Fall prevention interventions/strategies should focus on minimising a person's fall risk within their home as most falls occurred in the home environment. Ambulators with SCI would benefit from education and awareness about common fall circumstances that they may encounter in their daily lives.

Language: en

Keywords

qualitative research; rehabilitation medicine; neurological injury; protocols & guidelines

Perspectives of wheelchair users with spinal cord injury on fall circumstances and fall prevention: a mixed methods approach using photovoice

Singh H, Scovil CY, Bostick G, Kaiser A, Craven BC, Jaglal SB, Musselman KE. PLoS One 2020; 15(8): e0238116.

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DOI 10.1371/journal.pone.0238116 PMID 32857793

Abstract

INTRODUCTION: Wheelchair users with spinal cord injury are at a high risk of falls. However, the perspectives of wheelchair users with spinal cord injury on their fall circumstances and their preferences for fall prevention strategies/interventions remain understudied. Therefore, we aimed to: a) describe the circumstances of falls experienced by wheelchair users with spinal cord injury over a six-month period, b) explore their perspectives of why falls occurred in certain situations, and c) explore their perspectives on recommended content/structure of fall prevention strategies/interventions.

METHODS: This sequential explanatory mixed methods study had two phases. Phase I involved tracking of falls experienced by wheelchair users with spinal cord injury over six months, in which participants completed a survey after experiencing a fall to track the number/circumstance of each fall. Data from the surveys were descriptively reported. Phase II involved a photovoice focus group discussion of the survey findings and their preferences for fall prevention strategies/interventions. Data from the focus group discussion were analyzed using a thematic analysis.

RESULTS: Thirty-two participants completed phase I. More than half of the participants fell at least once in six months. Falls commonly occurred in the afternoon during a transfer, or when participants were wheeling over uneven ground. One-third of the falls caused an injury. Eleven participants that fell during phase I participated in the focus group. Two main themes were identified from the discussion: 1) "circumstances surrounding the falls" (e.g. when falls occurred, the home is a 'safe space') and 2) "suggestions and preferences for fall prevention strategies/interventions" (e.g. fall prevention involves all, fall prevention training available as needed).

CONCLUSION: Fall prevention strategies/interventions should be an integral component of rehabilitation practices across the lifespan. Participants recommend customizing fall prevention strategies/interventions to their specific needs to guide the structure, content, and delivery of targeted fall prevention programs.

Language: en