

Safety Literature 30th August 2020

'Believe the positive' aggregation of fall risk assessment methods reduces the detection of risk of falling in older adults

Menezes M, Meziat-Filho NAM, Lemos T, Ferreira AS. Arch. Gerontol. Geriatr. 2020; 91: e104228.

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Abstract

OBJECTIVES: Screening programs for fall prevention in older adults may include several assessment methods. This study investigated the validity of aggregating fall risk assessment methods for stratifying the risk of falling in older adults.

METHODS: This secondary data analysis included 52 community-dwelling residents aged [median (interquartile range)] 74 (69-80) years. Fall occurrences were registered prospectively for six months, with 9 (17%) participants reporting at least one fall during follow-up. The fall risk assessment included the Berg Balance Scale (BBS); polypharmacy (POLY); Falls Risk Assessment Score (FRAS); Fall Risk Assessment Tool (FRAT-up); Falls Efficacy Scale (FES); and posturography with the Wii Balance Board (WBB). Aggregation of methods' results was performed according to the risk classification ('high risk' or 'low risk') assigned by their respective cut-off values under the 'believe the positive' (BP) strategy.

RESULTS: Aggregating 1 (POLY), 2 (+BBS), 3 (+FES), 4 (+FRAT-up), 5 (+FRAS), and 6 (+BBS) methods resulted in a monotonic decrease of several validity indices including (index [95% confidence interval]) diagnostic odds ratio (10.82 [2.38-54.28] to 0.59 [0.12-2.09]) and accuracy (0.67 [0.54-0.78] to 0.20 [0.11-0.31]).

CONCLUSIONS: Aggregating fall risk assessment methods-BBS, POLY, FRAS, FRAT-up, FES, WBB-under the BP strategy does not increase the validity of stratification of the risk of falling in older adults.

Language: en

Keywords

aging; rehabilitation; creening programs; elderly health; risks

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

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

A systematic review of the guidelines and Delphi study for the multifactorial fall risk assessment of community-dwelling elderly

Kim J, Lee W, Lee SH. *Int. J. Environ. Res. Public Health* 2020; 17(17).

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Abstract

As falls are among the most common causes of injury for the elderly, the prevention and early intervention are necessary. Fall assessment tools that include a variety of factors are recommended for preventing falls, but there is a lack of such tools. This study developed a multifactorial fall risk assessment tool based on current guidelines and validated it from the perspective of professionals. We followed the Meta-Analysis of Observational Studies in Epidemiology's guidelines in this systematic review. We used eight international and five Korean databases to search for appropriate guidelines. Based on the review results, we conducted the Delphi survey in three rounds; one open round and two scoring rounds. About nine experts in five professional areas participated in the Delphi study. We included nine guidelines. After conducting the Delphi study, the final version of the "Multifactorial Fall Risk Assessment tool for Community-Dwelling Older People" (MFA-C) has 36 items in six factors; general characteristics, behavior factors, disease history, medication history, physical function, and environmental factors. The validity of the MFA-C tool was largely supported by various academic fields. It is expected to be beneficial to the elderly in the community when it comes to tailored interventions to prevent falls.

Language: en

Keywords

accidental falls; aged; systematic review; risk assessment; community health nursing; Delphi technique

Effects of an intervention to reduce fear of falling and increase physical activity during hip and pelvic fracture rehabilitation

Pfeiffer K, Kampe K, Klenk J, Rapp K, Kohler M, Albrecht D, Büchele G, Hautzinger M, Taraldsen K, Becker C. *Age Ageing* 2020; 49(5): 771-778.

(Copyright © 2020, Oxford University Press)

DOI 10.1093/ageing/afaa050 PMID 32832985

Abstract

BACKGROUND: fear of falling and reduced fall-related self-efficacy are frequent consequences of falls and associated with poorer rehabilitation outcomes. To address these psychological consequences, geriatric inpatient rehabilitation was augmented with a cognitive behavioural intervention ("Step by Step") and evaluated in a RCT.

METHODS: one hundred fifteen hip and pelvic fracture patients (age = 82.5 years, 70% female) admitted to geriatric inpatient rehabilitation were randomly allocated to the intervention or control group. The intervention consisted of eight additional individual sessions during inpatient rehabilitation, one home visit and four telephone calls delivered over 2 months after discharge. Both groups received geriatric inpatient rehabilitation. Primary outcomes were fall-related self-efficacy (short falls efficacy scale-international) and physical activity as measured by daily walking duration (activPAL3™ sensor) after admission to rehabilitation, before discharge and 1-month post-intervention.

RESULTS: in covariance analyses, patients in the intervention group showed a significant improvement in fall-related self-efficacy ($P = 0.025$, $d = -0.42$), but no difference in total daily walking duration ($P = 0.688$, $d = 0.07$) 1-month post-intervention compared to the control condition. Further significant effects in favour of the intervention group were found in the secondary outcomes "perceived ability to manage falls" ($P = 0.031$, $d = 0.41$), "physical performance" (short physical performance battery) ($P = 0.002$, $d = 0.58$) and a lower "number of falls" ($P = 0.029$, $d = -0.45$).

CONCLUSIONS: the intervention improved psychological and physical performance measures but did not increase daily walking duration. For the inpatient part of the intervention further research on the required minimum intensity needed to be effective is of interest. Duration and components used to improve physical activity after discharge should be reconsidered.

Language: en

Keywords

older people; fear of falling; physical activity; falls efficacy; hip fractures; pelvic fractures

Epidemiological characteristics of fall injuries and their related outcome in Riyadh, Saudi Arabia: a descriptive study from a Level-I trauma center

Alghnam S, Alsayyari AS, Towhari JA, Alsayer RM, Almohaimed MY, Aldebasi MH, Albabtin IT. *J. Family Community Med.* (2010) 2020; 27(2): 114-119.

(Copyright © 2020, Saudi Society of Family and Community Medicine, Publisher Medknow Publications)

DOI 10.4103/jfcm.JFCM_245_19 **PMID** 32831557

Abstract

BACKGROUND: Falls are the leading cause of admissions for trauma emergency in Saudi Arabia. However, the scarcity of evidence of what the burden of falls is locally limits the understanding of the underlying risk factors and hinders planning of effective prevention. The objective of this study was to describe patients' characteristics and health outcomes after hospital admissions as a result of a fall injury.

MATERIALS AND METHODS: A retrospective analysis was conducted using a trauma registry from a level-I trauma center in Riyadh. All patients admitted as a result of a fall between 2001 and 2018 were included (n = 4825). Variables included were demographics, mechanism of fall, length of hospital stay, surgery, intensive care unit admission, intubation rate, and severity of the injury. For continuous variables, means and standard deviations were calculated, whereas, frequencies and proportions were used to describe categorical.

RESULTS: Majority of the patients (63.6%) were male and about 39% of the sample were children. The most common mechanism of falls was standing (52.6%) followed by slipping (23.0%). Overall, limb fractures were the most common injury (73.3%). While upper limb fractures were more common in children (44.5%; $P < 0.01$), lower limb fractures were more prevalent among the older patients (70.2%; $P < 0.01$). Fall injuries in the elderly were significantly associated with higher mortality (3.5%; $P < 0.01$).

CONCLUSION: This study highlights the significant burden fall injuries impose on population health. Prevention programs may use these findings to guide and tailor interventions for specific age groups. Furthermore, this study underlines the need for a national recording system for injuries to guide policymakers in evidence-based decisions.

Language: en

Keywords

Epidemiology; injuries; Saudi Arabia; fall

Polypharmacy, declined walking speed, bent back, and disability associated with a history of falls in Japanese patients with rheumatoid arthritis: results from the IORRA cohort study

Oh K, Furuya T, Ikari K, Inoue E, Tanaka E, Yamanaka H, Okazaki K, Harigai M. *Mod. Rheumatol.* 2020; ePub(ePub): ePub.

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DOI 10.1080/14397595.2020.1812200 **PMID** 32812455

Abstract

[Abstract unavailable]

Language: en

Keywords

Falls; Walking speed; Polypharmacy; Back bent; Japanese; Rheumatoid arthritis

Postural control and perturbation response in aging populations: fall risk implications

Dominguez L. J. *Neurophysiol.* 2020; ePub(ePub): ePub.

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Abstract

Falls are an increasing cause of mortality in an ever-growing aging population. The main factors to consider in reducing mortality rates due to falls are postural control, consisting of the vestibular, visual, and proprioceptive system, and perturbation response. This Neuro Forum article reviews recent literature highlighting the developmental changes that occur in aging populations and the possible avenues for interventions and training to mitigate fall risk.

Language: en

Keywords

Aging Populaions; Fall Risk; Perturbation Response; Postural Control; Sensory Reweighting

Power training improves bone mineral density and fall risk for a postmenopausal woman with a history of osteoporosis and increased risk of falling: a case report

Aquino M, DiMenna FJ, Petrizzo J, Otto RM, Wygand J. J. Bodyw. Mov. Ther. 2020; 24(3): 44-49.

(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.jbmt.2020.02.026 PMID 32826007

Abstract

The purpose of this case study was to assess the degree to which a 12-month power-based resistance-training program improved bone mineral density (BMD) and fall risk for a 70-year-old postmenopausal woman with osteoporosis and increased risk of falling. After an eight-week strength-development phase, we had the patient perform 44 weeks of resistance training with maximal force mobilization by instructing her to complete as many repetitions as possible during each 60-s set. We used dual-energy X-ray absorptiometry (DEXA) to assess BMD and Dynamic Gait Index (DGI) to assess fall risk before and after the intervention. Post compared to pre-training testing indicated an increase in BMD in the lumbar spine (24%) and femoral neck (29%) resulting in changes in T-score of 0.7 and 0.4 SD, respectively. Testing also revealed a seven-point change in DGI which improved her status to "safe ambulator." After a 12-month period of power training, BMD was increased and fall risk was reduced for a postmenopausal woman with osteoporosis and increased risk of falling.

Language: en

Keywords

Fall risk; Physical therapy; Osteoporosis; Postmenopausal; Power resistance training

Predicting falls in nursing homes: a prospective multicenter cohort study comparing fall history, staff clinical judgment, the care home falls screen, and the fall risk classification algorithm

Vlaeyen E, Poels J, Colemonts U, Peeters L, Leysens G, Delbaere K, Dejaeger E, Dobbels F, Milisen K. J. Am. Med. Dir. Assoc. 2020; ePub(ePub): ePub.

(Copyright © 2020, Lippincott Williams and Wilkins)

DOI 10.1016/j.jamda.2020.06.037 PMID 32819818

Abstract

OBJECTIVES: To evaluate and compare the predictive accuracy of fall history, staff clinical judgment, the Care Home Falls Screen (CaHFRiS), and the Fall Risk Classification Algorithm (FRiCA).

DESIGN: Prospective multicenter cohort study with 6 months' follow-up.

SETTING AND PARTICIPANTS: A total of 420 residents from 15 nursing homes participated.

METHODS: Fall history, clinical judgment of staff (ie, physiotherapists, nurses and nurses' aides), and the CaHFRiS and FRiCA were assessed at baseline, and falls were documented in the follow-up period. Predictive accuracy was calculated at 1, 3, and 6 months by means of sensitivity, specificity, positive and negative predictive value, positive and negative likelihood ratio, Youden Index, and overall accuracy.

RESULTS: In total, 658 falls occurred and 50.2% of the residents had at least 1 fall with an average fall rate of 1.57 (SD 2.78, range 0-20) per resident. The overall accuracy for all screening methods at all measuring points ranged from 54.8% to 66.5%. Fall history, FRiCA, and a CaHFRiS score of ≥ 4 had better sensitivity, ranging from 64.4% to 80.8%, compared with the clinical judgment of all disciplines (sensitivity ranging from 47.4% to 71.2%). The negative predictive value (ranging from 92.9% at 1 month to 59.6% at 6 months) had higher scores for fall history, FRiCA, and a CaHFRiS score of ≥ 4 . Specificity ranged from 50.3% at 1 month to 77.5% at 6 months, with better specificity for clinical judgment of physiotherapists and worse specificity for FRiCA. Positive predictive value ranged from 22.2% (clinical judgment of nurses' aides) at 1 month to 67.8% at 6 months (clinical judgment of physiotherapists).

CONCLUSIONS AND IMPLICATIONS: No strong recommendations can be made for the use of any screening method. More research on identifying residents with the highest fall risk is crucial, as these residents benefit the most from multifactorial assessments and subsequent tailored interventions.

Language: en

Keywords

Fall risk; screening; fall prevention; clinical judgment; fall history; residential care facilities

Predictors of falls in patients during the first year after total hip arthroplasty: a prospective cohort study

Ninomiya K, Takahira N, Ikeda T, Suzuki K, Sato R, Hirakawa K. Health Sci. Rep. 2020; 3(3): e184.

(Copyright © 2020, John Wiley and Sons)

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Abstract

Background and Purpose: Since falls after total hip arthroplasty (THA) cause severe complications such as dislocation and fractures around the femoral stem, it is important to investigate what factors predict of falls. Thus, investigating predictors of falls in patients waiting for THA would be valuable as it lead to more strategic interventions to prevent these problems. The purpose of this study was to evaluate the predictors of falls in patients during the first year after THA.

Methods: This is a prospective cohort study. A total of 157 patients who underwent THA for unilateral hip osteoarthritis were analyzed. The incidence of falls during the first year after THA was monitored, and patients were classified into a "faller" and "non-faller" group. The following factors were compared between the two groups: demographic data (age, sex, body mass index, leg length discrepancy, length of hospital stay, and history of falling), preoperative hip abductor muscle strength, functional performance (single leg stance and maximum walking speed), pain during walking, and physical activity.

Results: On multivariate logistic regression analysis, preoperative hip abductor muscle strength on the affected side and a history of falling were predictors of falls during the first year after THA. On subsequent receiver operating characteristic curve analysis, preoperative hip abductor muscle strength on the affected side was retained as a significant predictor, with a cut-off strength of 0.46 Nm/kg differentiating the faller and non-faller groups with a specificity of 73.6%, specificity of 50.0%, and area under the curve of 70.2%.

Conclusions: Finding from the present study suggested that clinicians should focus on low preoperative hip abductor muscle strength on the affected side and a history of falling to prevent falls during the first year after THA.

Language: en

Keywords

falls; risk factor; muscle strength; joint replacement

Prehospital and posthospital fall injuries in older US adults

Hoffman GJ, Tinetti ME, Ha J, Alexander NB, Min LC. *JAMA Netw. Open* 2020; 3(8): e2013243.

(Copyright © 2020, American Medical Association)

DOI 10.1001/jamanetworkopen.2020.13243 PMID 32822491

Abstract

Importance: To date, measurement and treatment of older adult fall injury has been siloed within specific care settings, such as a hospital or within a nursing home or community. Little is known about changes in fall risk across care settings. Understanding the occurrence of falls across settings has implications for measuring and incentivizing high-value care across care settings.

Objective: To estimate the risk of older adult fall injury within and across discrete periods during a 12-month care episode anchored by an acute hospitalization.

Design, Setting, and Participants: This cohort study is a longitudinal analysis of 12-month periods that include an anchor hospital stay using national data from 2006 to 2014.

Participants included older (aged ≥ 65 years) Medicare fee-for-service beneficiaries from the Health and Retirement Study. Weekly fall injury rates were computed for 4 periods compared with the anchor hospitalization: at baseline (1-6 months before hospitalization), just before (<1 month before hospitalization), just after (<1 month after hospitalization), and at follow-up (1-6 months after hospitalization). Piecewise logistic regression models estimated weekly marginal risk of fall injury within each period, adjusting for sociodemographic and health characteristics. Fall injury risks for high-risk beneficiaries with a fall injury during the anchor hospitalization were also estimated. Data analysis was performed from November 2019 to April 2020.

Main Outcomes and Measures: Fall injuries.

Results: In total, 10 106 anchor hospitalizations for 4101 beneficiaries (mean [SD] age, 77.1 [7.6] years; 5912 hospitalizations among women [58.5%]) were identified. The overall fall injury risk was 0.77%. In adjusted models, marginal increases in weekly fall injury risk just before hospitalization (0.27 percentage points [95% CI, 0.22 to 0.33 percentage points], or 30.0%; $P < .001$) were 4 times greater than decreases just after hospitalization (-0.18 percentage points [95% CI, -0.23 to -0.13 percentage points], or -9.2%; $P < .001$). A greater risk differential before and after hospitalization was observed for patients with an inpatient fall injury (1.89 percentage points [95% CI, 1.37 to 2.40], or 309.8%; $P < .001$; vs -0.39 percentage points [95% CI, -0.73 to -0.04], or -11.6%; $P = .03$).

Conclusions and Relevance: An episode-based assessment of fall injury illustrates substantial variability in period-specific risks over an extended period including an anchor hospitalization. Risk transitions between periods include sizable increases just before hospitalization that do not fully subside after hospital discharge. Financial incentives to coordinate hospital and posthospital care for patients at risk for fall injury are needed. These could include bundled payments for fall injury episodes that incentivize coordination across settings.

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

Tai chi for the prevention of falls among older adults: a critical analysis of the evidence

Nyman SR. *J. Aging Phys. Act.* 2020; ePub(ePub): ePub.

(Copyright © 2020, Human Kinetics Publishers)

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Abstract

Despite interest as to the benefits of Tai Chi, there remains a controversy over its effectiveness as an exercise intervention for preventing falls among older adults. This review synthesizes the evidence base with a focus on meta-analyses and randomized controlled trials with community-dwelling older adults. It provides a critical lens on the evidence and quality of the trials. High-quality evidence suggests that Tai Chi is an effective intervention for preventing falls in community settings; however, there is unclear evidence for long-term care facilities and an absence of evidence for hospital settings. When compared directly with other exercise interventions, Tai Chi may offer a superior strategy for reducing falls through its benefits on cognitive functioning. Using data from the current Cochrane review, a new synthesis is presented suggesting that 71-81% of community-dwelling older adults are adherent to class-based Tai Chi interventions. The practical opportunities and challenges for practitioners are discussed.

Language: en

Keywords

meta-analysis; exercise; review; randomized controlled trial; accidental fall

Executive control, alerting, updating, and falls in cognitively healthy older adults

Zhang C, Dong X, Ding M, Chen X, Shan X, Ouyang H, Tao Q. *Gerontology* 2020; ePub(ePub): ePub.

(Copyright © 2020, Karger Publishers)

DOI 10.1159/000509288 PMID 32841943

Abstract

BACKGROUND: Cognitive impairment represents a risk factor for falls in older adults. However, cognition is a complex construct comprising several functional domains. The relationship between specific cognitive domain and falls in cognitively healthy older adults is unclear.

OBJECTIVES: This study aims to investigate the relationship between falls, attention, and executive function in older adults while considering the three components of attention (alerting, orienting, and executive control) and three components of executive function (updating, inhibition, and shifting).

METHODS: Cognitively healthy older adults were recruited (n = 60 for fallers and n = 100 for non-fallers). The participants were assessed on the Attention Network Test (alerting, orienting, and executive control), running memory test (updating), Stroop test (inhibition), and digit switching test (shifting). Confounder-adjusted logistic models were used to examine the associations between falls and specific cognitive functions in cognitively healthy older adults.

RESULTS: The results showed that falls were associated with alerting, executive control, and updating. These associations were not attenuated when adjusting for a series of covariates such as age, gender, education, balance, general health, and emotional status.

CONCLUSIONS: The results suggest that among cognitively healthy older adults, falls are related to three specific cognitive functions: alerting, executive control, and updating. Disentangling the mechanism and contribution of cognitive deficits in fall risk may provide insights for the development of prevention and rehabilitation strategies for falls in older adults.

Language: en

Keywords

Falls; Aging; Cognitive function; Updating; Alerting; Executive control

Fall prevention decision making of acute care registered nurses

Fehlberg EA, Cook CL, Bjarnadottir RI, McDaniel AM, Shorr RI, Lucero RJ. *J. Nurs. Adm.* 2020; 50(9): 442-448.

(Copyright © 2020, Lippincott Williams and Wilkins)

DOI 10.1097/NNA.0000000000000914 PMID 32826513

Abstract

OBJECTIVE: The aim of this study was to examine acute care registered nurses' (RNs') fall prevention decision-making.

BACKGROUND: The RN decision-making process related to fall prevention needs to be investigated to ensure that hospital policies align with nursing workflow and support nursing judgment.

METHODS: Qualitative semistructured interviews based on the Critical Decision Method were conducted with RNs about their planning and decision making during their last 12-hour shift worked.

RESULTS: Data saturation was achieved with 12 RNs. Nine themes emerged related to the RN decision-making process and included hospital-level (eg, fear of discipline), unit-level (eg, value of bed alarm technology), and nurse-level (eg, professional judgment) factors that could influence fall prevention.

CONCLUSIONS: Nursing administrators should consider a multilevel approach to fall prevention policies that includes promoting a practice environment that embraces self-reporting adverse events without fear of shame or being reprimanded, evaluating unit-level practice and technology acceptance and usability, and supporting autonomous nursing practice.

Language: en

Falls caused by severe restless legs syndrome with persistent periodic limb movements during sleep and wakefulness

Krøigård T, Beier CP. Sleep Med. 2020; 74: 78-80.

(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.sleep.2020.05.015 **PMID** 32841848

Abstract

[Abstract unavailable]

Language: en

Impact of virtual reality-generated construction environments at different heights on postural stability and fall risk

Chander H, Shojaei A, Deb S, Kodithuwakku Arachchige SNK, Hudson C, Knight AC, Carruth DW. *Workplace Health Saf.* 2020; ePub(ePub): ePub.

(Copyright © 2020, American Association of Occupational Health Nurses, Publisher SAGE Publications)

DOI 10.1177/2165079920934000 **PMID** 32812846

Abstract

BACKGROUND: Falls due to postural instability are common in construction environments especially from a height. The purpose of the study was to investigate the impact of virtual reality (VR)-generated environments at different virtual heights on postural stability.

METHODS: Nineteen adults were analyzed for postural stability, tested in real (No VR) environment and in three VR environments, randomly assigned, at virtual heights of 0 ft. (VR0), 40 ft. (VR40), and 120 ft. (VR120). Postural stability was quantified using center of pressure postural sway variables and analyzed using a repeated measures analysis of variance (ANOVA). Participants also completed a simulation sickness questionnaire (SSQ) before and after VR exposure and a presence questionnaire (PQ) after VR exposure.

FINDINGS: Significant postural instability ($p < .05$) was identified between VR and No VR, in which increased postural instability was evident in all VR conditions compared with No VR. Scores from SSQ were within a pre-post score difference of five and the PQ score was (104.21 ± 14.03).

CONCLUSION/APPLICATION TO PRACTICE: Findings suggest that VR environments, regardless of virtual height, induced increased postural instability, which can be attributed to visual sensory conflicts to the postural control system created by VR exposure. Participants' subjective responses on SSQ and PQ confirmed the feasibility of using VR to represent realistic immersions in virtual heights. However, objectively, VR could potentially lead to postural instability, stressing caution. VR can be a potential tool for providing virtual high-altitude environment exposure for fall prevention training, however, more research is needed on postural adaptation with acute and chronic exposure to VR.

Language: en

Keywords

falls; postural stability; virtual reality; construction; height; high altitude

Using machine learning to make predictions in patients who fall

Young AJ, Hare A, Subramanian M, Weaver JL, Kaufman E, Sims C. J. Surg. Res. 2020; 257: 118-127.

(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.jss.2020.07.047 PMID 32823009

Abstract

BACKGROUND: As the population ages, the incidence of traumatic falls has been increasing. We hypothesize that a machine learning algorithm can more accurately predict mortality after a fall compared with a standard logistic regression (LR) model based on immediately available admission data. Secondary objectives were to predict who would be discharged home and determine which variables had the largest effect on prediction.

METHODS: All patients who were admitted for fall between 2012 and 2017 at our level 1 trauma center were reviewed. Fourteen variables describing patient demographics, injury characteristics, and physiology were collected at the time of admission and were used for prediction modeling. Algorithms assessed included LR, decision tree classifier (DTC), and random forest classifier (RFC). Area under the receiver operating characteristic curve (AUC) values were calculated for each algorithm for mortality and discharge to home.

RESULTS: About 4725 patients met inclusion criteria. The mean age was 61 ± 20.5 y, Injury Severity Score 8 ± 7 , length of stay 5.8 ± 7.6 d, intensive care unit length of stay 1.8 ± 5.2 d, and ventilator days 0.7 ± 4.2 d. The mortality rate was 3% and three times greater for elderly (aged 65 y and older) patients (5.0% versus 1.6%, $P < 0.001$). The AUC for predicting mortality for LR, DTC, and RFC was 0.78, 0.64, and 0.86, respectively. The AUC for predicting discharge to home for LR, DTC, and RFC was 0.72, 0.61, and 0.74, respectively. The top five variables that contribute to the prediction of mortality in descending order of importance are the Glasgow Coma Score (GCS) motor, GCS verbal, respiratory rate, GCS eye, and temperature.

CONCLUSIONS: RFC can accurately predict mortality and discharge home after a fall. This predictive model can be implemented at the time of patient arrival and may help identify candidates for targeted intervention as well as improve prognostication and resource utilization.

Language: en

Keywords

Machine learning; Geriatric fall; Traumatic fall