Safety Literature 4th February 2024

Tailored implementation of national recommendations on fall prevention among older adults in municipalities in Norway (FALLPREVENT trial): a study protocol for a cluster-randomised trial

Bjerk M, Flottorp SA, Pripp AH, Øien H, Hansen TM, Foy R, Close J, Linnerud S, Brovold T, Solli R, Olsen NR, Skelton DA, Rydwik E, Helbostad JL, Idland G, Kvæl L, Vieira E, Taraldsen K. Implement. Sci. 2024; 19(1): e5.

DOI: 10.1186/s13012-024-01334-2 **PMID**: 38273325

Abstract

BACKGROUND: Despite substantial research evidence indicating the effectiveness of a range of interventions to prevent falls, uptake into routine clinical practice has been limited by several implementation challenges. The complexity of fall prevention in municipality health care underlines the importance of flexible implementation strategies tailored both to general determinants of fall prevention and to local contexts. This cluster-randomised trial (RCT) investigates the effectiveness of a tailored intervention to implement national recommendations on fall prevention among older home-dwelling adults compared to usual practice on adherence to the recommendations in health professionals.

METHODS: Twenty-five municipalities from four regions in Norway will be randomised to intervention or control arms. Each municipality cluster will recruit up to 30 health professionals to participate in the study as responders. The tailored implementation intervention comprises four components: (1) identifying local structures for implementation, (2) establishing a resource team from different professions and levels, (3) promoting knowledge on implementation and fall prevention and (4) supporting the implementation process. Each of these components includes several implementation activities. The Consolidated Framework for Implementation Research (CFIR) will be used to categorise determinants of the implementation process and the Expert Recommendations for Implementing Change (ERIC) will guide the matching of barriers to implementation strategies. The primary outcome measure for the study will be health professionals' adherence to the national recommendations on fall prevention measured by a questionnaire. Secondary outcomes include injurious falls, the feasibility of the intervention, the experiences of the implementation process and intervention costs. Measurements will be carried out at baseline in August 2023, post-intervention in May 2024 and at a follow-up in November 2024.

DISCUSSION: This study will provide evidence on the effectiveness, intervention costs and underlying processes of change of tailored implementation of evidence-based fall prevention recommendations. TRIAL REGISTRATION: The trial is registered in the Open Science Registry: https://doi.org/10.17605/OSF.IO/JQ9T5. Registered: March 03, 2023.

Language: en

Keywords: Guidelines; Older adults; 3–10 Implementation science; Cluster-randomised trial; Fall prevention; Implementation intervention; Implementation strategies; Municipal health services; National recommendations

NSW Fall Prevention & Healthy Ageing Network

BERT-based neural network for inpatient fall detection from electronic medical records: retrospective cohort study

Cheligeer C, Wu G, Lee S, Pan J, Southern DA, Martin EA, Sapiro N, Eastwood CA, Quan H, Xu Y. JMIR Med. Inform. 2024; 12: e48995.

DOI: 10.2196/48995 **PMID**: 38289643

Abstract

BACKGROUND: Inpatient falls are a substantial concern for health care providers and are associated with negative outcomes for patients. Automated detection of falls using machine learning (ML) algorithms may aid in improving patient safety and reducing the occurrence of falls.

OBJECTIVE: This study aims to develop and evaluate an ML algorithm for inpatient fall detection using multidisciplinary progress record notes and a pretrained Bidirectional Encoder Representation from Transformers (BERT) language model.

METHODS: A cohort of 4323 adult patients admitted to 3 acute care hospitals in Calgary, Alberta, Canada from 2016 to 2021 were randomly sampled. Trained reviewers determined falls from patient charts, which were linked to electronic medical records and administrative data. The BERT-based language model was pretrained on clinical notes, and a fall detection algorithm was developed based on a neural network binary classification architecture.

RESULTS: To address various use scenarios, we developed 3 different Alberta hospital notes-specific BERT models: a high sensitivity model (sensitivity 97.7, IQR 87.7-99.9), a high positive predictive value model (positive predictive value 85.7, IQR 57.2-98.2), and the high F(1)-score model (F(1)=64.4). Our proposed method outperformed 3 classical ML algorithms and an International Classification of Diseases code-based algorithm for fall detection, showing its potential for improved performance in diverse clinical settings.

CONCLUSIONS: The developed algorithm provides an automated and accurate method for inpatient fall detection using multidisciplinary progress record notes and a pretrained BERT language model. This method could be implemented in clinical practice to improve patient safety and reduce the occurrence of falls in hospitals.

Language: en

Keywords: accidental falls; adverse event; data mining; electronic medical records; machine learning; natural language processing; patient safety

Association of ethnicity with unintentional injury-related hospitalisation and mortality among older people residing in two regions of Aotearoa New Zealand

Dwight E, Cavadino A, Kool B, Kerse N, Hikaka J. Australas. J. Ageing 2024; ePub(ePub): ePub.

DOI: 10.1111/ajag.13279 **PMID**: 38268323

Abstract

OBJECTIVES: To characterise unintentional injury-related hospitalisation and mortality amongst older adults (aged 50+ years) in the Lakes and Bay of Plenty District Health Boards of Aotearoa New Zealand and to examine whether hospitalisation patterns differed by ethnicity.

METHODS: This observational study analysed unintentional injury-related hospitalisations and deaths among older adults between 2014 and 2018. Routinely collected national data sets were used to calculate annualised, age-standardised injury rates. The independent variable of interest was ethnicity (Māori or non-Māori).

RESULTS: There were 11,834 unintentional injury-related hospitalisations in the study period (n = 1444 for Māori). Overall, there was no significant difference in the age-standardised hospitalisation rate between Māori and non-Māori (Standardised Rate Ratio [SRR] = 0.96 [95% CI 0.90, 1.02]). Falls were the most common mechanism of injury among Māori and non-Māori overall (50% and 71%) and relative risks of falls increased with age. Non-Māori were 57% less likely to be hospitalised for unintentional poisoning than Māori (SRR = 0.43, [0.34, 0.59]).

CONCLUSIONS: The mechanisms of injury, and variation in unintentional injury-related hospitalisation rates between Māori and non-Māori, change throughout older age, and incidence increase0073 with age. Falls cause significant injury-related hospitalisations for older Māori and responsive injury prevention and rehabilitation efforts are warranted to achieve equitable health outcomes.

Language: en

Keywords: injury; falls; accessibility of health services; indigenous population; unintentional injury

Decreased joint position sense of the ankle joint is a risk factor for falls in the elderly

Kanemitsu M, Nakasa T, Ikuta Y, Adachi N. Cureus 2023; 15(12): e51084.

DOI: 10.7759/cureus.51084 **PMID**: 38283510 **PMCID**: PMC10810735

Abstract

BACKGROUND: Falls in the elderly are common causes of morbidity, mortality, loss of independence, and poor quality of life. We hypothesized that decreased ankle position sense is one among several risk factors that might lead to falls.

METHODS: A total of 54 feet from 28 patients over 65 years of age and 10 feet from five healthy volunteers were included. Measurements of ankle position sense, medical history, and fall history within a year were obtained, which were compared between the groups.

RESULTS: The mean replication error angle of internal and external rotation was significantly higher in the elderly, and the mean replication error angle of internal rotation was significantly higher in the group with a history of falls.

CONCLUSION: The mean replication error angle of internal rotation and a history of fractures were significant risk factors for falls. Hence, an increase in the mean replication error angle of internal rotation may increase the risk of falls in the elderly population.

Language: en

Keywords: elderly; falls; joint position sense of the ankle; replication error angle; risk of falls

Associations of depressive symptoms with lower extremity function and balance in older adults

Kim BJ, Ha K, Kim HS, Bae HR, Son M. Epidemiol. Health 2024; ePub(ePub): ePub.

DOI: 10.4178/epih.e2024021 **PMID**: 38271960

Abstract

OBJECTIVES: The relationship of depressive symptoms to lower extremity function and balance, especially in older adults without a depression diagnosis, remains unclear. Therefore, our study analyzed this relationship using a large sample of Korean older adults.

METHODS: We used data from the Korean National Health Insurance Service's Health Screening Program database. Individuals aged 66 years who had undergone the National Screening Program for Transitional Ages in Korea and were without a diagnosis of depressive disorder were included. The lower extremity function and balance were evaluated using 2 physical tests, while depressive symptoms were assessed using a 3-question survey. Multivariable-adjusted logistic regression analysis was used to examine the association between depressive symptoms and lower extremity function and balance.

RESULTS: Among 66,041 individuals, those with depressive symptoms showed significantly higher rates of abnormal lower extremity function and abnormal balance. The adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for the association of depressive symptoms to abnormal lower extremity function and abnormal balance were (OR=1.34; 95% CI, 1.25-1.44) and (OR=1.38; 95% CI, 1.29-1.48), respectively. Assessment of the relationship based on depressive symptom scores revealed that higher scores were associated with higher ORs (p for trend <0.001). Subgroup analyses further confirmed this relationship, especially among patients with cerebrovascular disease or dementia.

CONCLUSION: This study revealed an association between depressive symptoms and the abnormal lower extremity function and balance of 66-year-old individuals without a diagnosis of depressive disorder.

Language: en

Keywords: Aged; Depression; Lower extremity; Postural balance

Differences in falls and physical activity in older women from two generations

Kwok WS, Khalatbari-Soltani S, Dolja-Gore X, Byles J, Oliveira JS, Pinheiro MB, Sherrington C. J. Gerontol. A Biol. Sci. Med. Sci. 2024; ePub(ePub): ePub.

DOI: 10.1093/gerona/glae033 **PMID**: 38285003

Abstract

BACKGROUND: Falls and physical inactivity increase with age. However, physical activity, falls and their associations in older people born at different times is unclear.

METHODS: Women born 1921-26 and 1946-51 who completed follow-up questionnaires in 1999 (n=8,403, mean (SD) age: 75 (1) years) and 2019 (n=7,555, 71 (1) years) in the Australian Longitudinal Study on Women's Health. Self-reported non-injurious and injurious falls in the previous 12 months and weekly amounts and types of physical activity (brisk walking, moderate- and vigorous-intensity) were compared between the cohorts using Chi-square tests. Associations between physical activity, and non-injurious and injurious falls were estimated using multinomial logistic regressions informed by a directed acyclic graph (DAG).

RESULTS: A greater proportion of the later (1946-51) cohort (59%) reached 150-300 minutes of weekly physical activity, as recommended by World Health Organization, compared to the earlier (1921-26) cohort (43%, p<0.001). A greater proportion of the later cohort reported non-injurious falls (14% versus 8%). Both cohorts reported similar proportions of injurious falls (1946-51:15%, 1921-26:14%). In both cohorts, participation in 150-300 minutes of physical activity was associated with lower odds of non-injurious falls (adjusted Odds Ratio (ORs), 95% CI 1921-26: 0.66, 0.52-0.84; 1946-51: 0.78, 0.63-0.97) and injurious falls (1921-26: 0.72, 0.60-0.87; 1946-51: 0.78, 0.64-0.96).

CONCLUSION: Participation in recommended levels of physical activity was associated with reduced falls in both cohorts. However, generational differences were found with more falls and more physical activities in the women born later. Future studies could examine the reasons contributing to the generational differences.

Language: en

Keywords: Physical activity; Women; Accidental falls; Older adults; Directed acyclic graph

Leisure-time physical activity and falls with and without injuries among older adult women

Kwok WS, Khalatbari-Soltani S, Dolja-Gore X, Byles J, Tiedemann A, Pinheiro MB, Oliveira JS, Sherrington C. JAMA Netw. Open 2024; 7(1): e2354036.

DOI: 10.1001/jamanetworkopen.2023.54036 **PMID**: 38294812

Abstract

IMPORTANCE: Falls and fall-related injuries are common among older adults. Older adults are recommended to undertake 150 to 300 minutes of physical activity per week for health benefits; however, the association between meeting the recommended level of physical activity and falls is unclear.

OBJECTIVES: To examine whether associations exist between leisure-time physical activity and noninjurious and injurious falls in older women. DESIGN, SETTING, AND PARTICIPANTS: This population-based cohort study used a retrospective analysis of the Australian Longitudinal Study on Women's Health (ALSWH). ALSWH participants born from 1946 to 1951 who completed follow-up questionnaires in 2016 (aged 65-70 years) and 2019 (aged 68-73 years) were included. Statistical analysis was performed from September 2022 to February 2023. EXPOSURE: Self-reported weekly amounts (0, 1 to <150, 150 to <300, ≥300 minutes) and types of leisure-time physical activity, including brisk walking and moderate- and vigorous-intensity physical activity, in the 2016 survey. MAIN OUTCOME AND MEASURES: Noninjurious and injurious falls in the previous 12 months reported in the 2019 survey. Associations between leisure-time physical activity and falls were quantified using directed acyclic graph-informed multinomial logistic regression and presented in odds ratios (ORs) and 95% CIs.

RESULTS: This study included 7139 women (mean [SD] age, 67.7 [1.5] years). Participation in leisure-time physical activity at or above the level recommended by the World Health Organization (150 to <300 min/wk) was associated with reduced odds of noninjurious falls (150 to <300 min/wk: OR, 0.74 [95% CI, 0.59-0.92]; ≥300 min/wk: OR, 0.66 [95% CI, 0.54-0.80]) and injurious falls (150 to <300 min/wk: OR, 0.70 [95% CI, 0.56-0.88]; ≥300 min/wk: OR, 0.77 [95% CI, 0.63-0.93]). Compared with women who reported no leisure-time physical activity, those who reported brisk walking (OR, 0.83 [95% CI, 0.70-0.97]), moderate leisure-time physical activity (OR, 0.81 [95% CI, 0.70-0.93]), or moderate-vigorous leisure-time physical activity (OR, 0.84 [95% CI, 0.70-0.99]) had reduced odds of noninjurious falls. No statistically significant associations were found between the types of leisure-time physical activity and injurious falls.

CONCLUSIONS AND RELEVANCE: Participation in leisure-time physical activity at the recommended level or above was associated with lower odds of both noninjurious and injurious falls. Brisk walking and both moderate and moderate-vigorous leisure-time physical activity were associated with lower odds of noninjurious falls.

Language: en

Keywords: *Accidental Falls/prevention & control; *Exercise; Aged; Australia/epidemiology; Cohort Studies; Female; Humans; Longitudinal Studies; Retrospective Studies; Walking

Normalized stability time analysis within the boundaries between adults with and without fear of falling

Lee D, Sung PS. Aging Clin. Exp. Res. 2024; 36(1): e13.

DOI: 10.1007/s40520-023-02651-0 **PMID**: 38281190

Abstract

BACKGROUND: The unilateral stance test, measured by the center of pressure (COP), has been widely used to identify balance deficits. However, there is a critical gap in understanding the specific COP thresholds on postural stability in adults with a fear of falling (FOF). AIMS: To investigate the normalized stability time, which was defined as the ratio of time spent within stability boundaries to the total test duration, under different visual conditions and specific thresholds between adults with and without FOF.

METHODS: Twenty-one older adults with FOF and 22 control subjects completed the unilateral limb standing test in eyes-open and eyes-closed conditions. Normalized stability times were computed based on five pre-determined COP sway range thresholds: 10 mm, 15 mm, 20 mm, 25 mm, and 30 mm.

RESULTS: Receiver operating characteristic analysis determined the diagnostic accuracy of FOF. There were significant differences in the effects of both visual conditions ($F = 46.88$, $p = 0.001$) and threshold settings ($F = 119.38$, $p = 0.001$) on stability time between groups. The FOF group significantly reduced normalized stability time at the 10 mm COP threshold under eyes-closed conditions ($t = - 1.95$, $p = 0.03$).

DISCUSSION: The findings highlight the heightened sensitivity of the 10 mm COP threshold in identifying group variances in postural stability when eyes are closed. Moreover, the FOF group displayed a marked reduction in stability duration based on visual scenarios and normalized thresholds.

CONCLUSION: The study highlights the need to account for both COP boundaries and visual conditions in adults with FOF. When assessing postural control during unilateral stances, clinicians must also give attention to non-visual cues.

Language: en

Keywords: Thresholds; Fear of falling; Normalized stability time; Unilateral standing; Visual input

Effect of hardware balance trainings on postural control, risk of falls and cognitive function on elderly people with chronic cerebral ischemia. (Randomized controlled trial)

Litvina LD, Konev SM, Koneva ES, Butko DU, Lyadov KV, Zhumanova EN, Gridin LA, Korchazhkina NB, Kotenko KV. Vopr. Kurortol. Fizioter. Lech. Fiz. Kult. 2023; 100(6): 31-39.

DOI: 10.17116/kurort202310006131 **PMID**: 38289302

Abstract

INTRODUCTION: As a prevention of falls in elderly people with chronic cerebral ischemia, it is necessary to carry out rehabilitation measures with the inclusion of training aimed at improving statolocomotor and cognitive functions, improving proprioceptive sensitivity and reaction speed to external stimuli. AIMS: To compare the effectiveness of inclusion of hardware balance training on Huber ("LPG-Systems", France) and C-mill ("Physiomed Elektromedizin AG", Germany) simulators in complex postural control rehabilitation programs for elderly patients with chronic cerebral ischemia (CCI). MATERIAL AND METHODS: The study included 48 patients (19 men, 29 women), 81% of whom had moderate cognitive impairment. The median age was 76.2±8.5 years. The median Morse scale score before rehabilitation was 50.2 (CI 74-80). The patients were divided into three groups by randomization method: the patients of the 1st comparison group (n=16) were assigned to the Huber stabilizer; the patients of the 2nd comparison group (n=16) underwent training on the track with BOS-video reconstruction of walking "C-mill"; the patients of the control group (n=16) underwent the course of therapeutic gymnastics according to the developed method. The duration of the course in each group amounted to 8 therapeutic procedures. In the dynamics of the conducted trainings we evaluated: the risk of falls, parameters of postural disorders in statics and dynamics, as well as criteria determining cognitive dysfunction and quality of life of patients.

RESULTS: A pronounced improvement of static and dynamic postural indices was observed in the first comparison group, where there was a significant improvement of stabilometric indices: "SL" (p=0.001), amplitude of saggital sway (p=0.014), walking speed (p=0.001) and percentage of hitting the marks (p=0.001). The second comparison group showed significant improvement in dynamic balance parameters: walking speed (p=0.001), stride width (p=0.006), percentage of hitting the marks (p=0.001).

CONCLUSION: Training on rehabilitation simulators according to the applied methods contributed to the improvement of fall risk related indicators as well as the effectiveness of improving motor performance in older adults with HIM compared to the control group. However, training on the stable-platform induced more significant clinical effects on both static and dynamic balance.

Language: ru

Keywords: Humans; Aged; Female; Male; Aged, 80 and over; *Accidental Falls/prevention & control; *Brain Ischemia; balance; C-mill; Cognition; Huber; old age; Postural Balance; postural disorders; Quality of Life; rehabilitation; stability training

Fall risk classification with posturographic parameters in community-dwelling older adults: a machine learning and explainable artificial intelligence approach

Liang HW, Ameri R, Band S, Chen HS, Ho SY, Zaidan B, Chang KC, Chang A. J. Neuroengineering Rehabil. 2024; 21(1): e15.

DOI: 10.1186/s12984-024-01310-3 **PMID**: 38287415

Abstract

BACKGROUND: Computerized posturography obtained in standing conditions has been applied to classify fall risk for older adults or disease groups. Combining machine learning (ML) approaches is superior to traditional regression analysis for its ability to handle complex data regarding its characteristics of being high-dimensional, non-linear, and highly correlated. The study goal was to use ML algorithms to classify fall risks in community-dwelling older adults with the aid of an explainable artificial intelligence (XAI) approach to increase interpretability.

METHODS: A total of 215 participants were included for analysis. The input information included personal metrics and posturographic parameters obtained from a tracker-based posturography of four standing postures. Two classification criteria were used: with a previous history of falls and the timed-up-and-go (TUG) test. We used three meta-heuristic methods for feature selection to handle the large numbers of parameters and improve efficacy, and the SHapley Additive exPlanations (SHAP) method was used to display the weights of the selected features on the model.

RESULTS: The results showed that posturographic parameters could classify the participants with TUG scores higher or lower than 10 s but were less effective in classifying fall risk according to previous fall history. Feature selections improved the accuracy with the TUG as the classification label, and the Slime Mould Algorithm had the best performance (accuracy: 0.72 to 0.77, area under the curve: 0.80 to 0.90). In contrast, feature selection did not improve the model performance significantly with the previous fall history as a classification label. The SHAP values also helped to display the importance of different features in the model.

CONCLUSION: Posturographic parameters in standing can be used to classify fall risks with high accuracy based on the TUG scores in community-dwelling older adults. Using feature selection improves the model's performance. The results highlight the potential utility of ML algorithms and XAI to provide guidance for developing more robust and accurate fall classification models. Trial registration Not applicable.

Language: en

Keywords: Humans; Aged; Machine learning; *Artificial Intelligence; *Independent Living; Falls; Machine Learning; Older adults; Physical Therapy Modalities; Risk classification; Trunk sway

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Fall detection system based on point cloud enhancement model for 24 GHz FMCW radar

Liang T, Liu R, Yang L, Lin Y, Shi CJR, Xu H. Sensors (Basel) 2024; 24(2).

DOI: 10.3390/s24020648 **PMID**: 38276339 **PMCID**: PMC10820484

Abstract

Automatic fall detection plays a significant role in monitoring the health of senior citizens. In particular, millimeter-wave radar sensors are relevant for human pose recognition in an indoor environment due to their advantages of privacy protection, low hardware cost, and wide range of working conditions. However, low-quality point clouds from 4D radar diminish the reliability of fall detection. To improve the detection accuracy, conventional methods utilize more costly hardware. In this study, we propose a model that can provide high-quality three-dimensional point cloud images of the human body at a low cost. To improve the accuracy and effectiveness of fall detection, a system that extracts distribution features through small radar antenna arrays is developed. The proposed system achieved 99.1% and 98.9% accuracy on test datasets pertaining to new subjects and new environments, respectively.

Language: en

Keywords: machine learning; fall detection; radar

Author Response to Letter to the Editor Regarding: "Risk assessment of falls among older adults based on probe reaction time during water-carrying walking" [response to letter]

Liu F, Yu H, Xu Q, Gong J, Huo M, Huang F. Clin. Interv. Aging 2024; 19: 121-122.

DOI: 10.2147/CIA.S460426 **PMID**: 38273872 **PMCID**: PMC10809803

Abstract

We thank Dr. Lameky for the insightful letter concerning our recent publication and appreciate the recognition of the significance of our findings. As Dr. Vernando said, our research aims to propose objective and effective assessment methods and intervention measures for the health of older people in the aging society. We will also improve the two limitations mentioned in the research in future studies. Firstly, measuring reaction time involves a certain degree of subjectivity. In order to reduce subjectivity, future research will consider using automatic timing systems to record response time through wireless control or suggested electronic triggering, in order to minimize human error and improve measurement accuracy.

Secondly, this study did not evaluate gait changes during walking, which is an important aspect of fall risk. In future research, we will incorporate gait analysis to comprehensively assess the risk of falls, using wearable sensors or gait analyzers to objectively measure gait parameters ...

Language: en

The primary care NP's guide to prevention and management of falls in older adults

Mark JA. Nurse Pract. 2024; 49(2): 12-18.

DOI: 10.1097/01.NPR.0000000000000138 **PMID**: 38271144

Abstract

Falls are a growing health concern affecting older adults (defined as ages 65 years and older) that can lead to devastating consequences. NPs in primary care settings play an important role in the prevention and management of older adult falls.

METHODS and resources to screen for fall risk, assess risk factors, and manage falls in older adults are discussed.

Language: en

The rationale and recommendations for inclusion of screening for benign paroxysmal positional vertigo in falls clinics

Metz D, Bryce K. J. Laryngol. Otol. 2024; ePub(ePub): ePub.

DOI: 10.1017/S0022215123002049 **PMID**: 38291914

Abstract

BACKGROUND: There have been many studies linking falls and benign paroxysmal positional vertigo. This article collates those studies, and demonstrates how a community falls service fast-tracked patients with benign paroxysmal positional vertigo by implementing validated screening tools and recognised guidance.

OBJECTIVE: This study aimed to explore whether routine screening of referrals to a community falls service can identify those with benign paroxysmal positional vertigo, for fast-tracked management.

METHODS: Patients referred to a community falls service were screened for possible benign paroxysmal positional vertigo using the Dizziness Handicap Inventory, and triaged to a physiotherapy-led falls and benign paroxysmal positional vertigo assessment service.

RESULTS: Twenty-five per cent of patients were fast-tracked to a falls and benign paroxysmal positional vertigo assessment service for management. The community falls service waiting list reduced by 25 per cent.

CONCLUSION: The data support incorporating assessment and treatment of benign paroxysmal positional vertigo into routine practice within all falls services.

Language: en

Keywords: clinical audit; inner ear; postural balance; primary care; Vertigo

Effect of the visual illusion on stepping-over action and its association with gaze behavior

Sakurai R, Kodama K, Ozawa Y, Kobayashi-Cuya KE. Percept. Mot. Skills 2024; ePub(ePub): ePub.

DOI: 10.1177/00315125241230194 **PMID**: 38281966

Abstract

An adequate foot clearance height while stepping over an obstacle is important for safety in daily life. In the present study, we examined whether visual illusions affect foot clearance during a stepping-over action, and whether this is further influenced by gaze behavior. Twelve participants stepped over an obstacle placed four meters away under conditions of three different obstacle characteristics: white, horizontal, or vertical lines. We measured the participants' foot clearances during the step-over action and their gaze behavior during the approaching phase. Participants stepped significantly higher over the obstacles in the vertical lines (illusion) condition. The duration of gaze fixation on the obstacle positively correlated with increased foot clearance in the vertical condition, suggesting that the effect of the visual illusion on foot clearance was enhanced by prolonged gaze fixation. Conversely, prolonged fixation negatively correlated with foot clearance in the white (control) condition, implying that a cautious perception of an obstacle may contribute to efficient stepping-over action.

Language: en

Keywords: foot clearance; gaze behavior; step over; vertical lines; visual illusion

Impact of 10-week evidence-based falls prevention program on outcomes related to falls risk in community-dwelling older adults

Schafer MA, Upright P, Michalik JL, Crandall KJ. Int. J. Exerc. Sci. 2023; 16(7): 1131-1141.

DOI: unavailable **PMID**: 38287933 **PMCID**: PMC10824292

Abstract

This quasi-experimental study evaluated the impact of a 10-week evidence-based falls prevention program (Bingocize®) on self-reported fear of falling, general health, physical activity, social isolation, and avoidance behavior, in community-dwelling older adults in Virginia. Participants > 60 years of age (n= 481) attended BingocizeR group sessions twice per week for 10 weeks. The program combined conventional bingo with periodic strength, balance, flexibility exercises, and fall prevention education. Pre and post assessments gauged participants' self-perception of fear of falling, general health, physical activity, social isolation, and avoidance behavior. 481 participants attended at least 80% of the sessions. Following the intervention, paired sample t-tests revealed statistically significant improvements ($p < .05$) in fear of falling, physical activity, social isolation, avoidance behavior, and yet there was no notable change in self-reported general health. The 10-week BingocizeR program appears to improve physical activity, social isolation, avoidance behavior, and fear of falling. Self-reported general health did not significantly change.

Language: en

Keywords: physical activity; Aging; evidence-based practices; fall risk reduction; quality of life

Improving hip fracture care: a five-year review of the early contributors to the Australian and New Zealand Hip Fracture Registry

Taylor ME, Ramsay N, Mitchell R, McDougall C, Harris IA, Hallen J, Ward N, Hurring S, Harvey LA, Armstrong E, Close JCT. Australas. J. Ageing 2024; ePub(ePub): ePub.

DOI: 10.1111/ajag.13270 **PMID**: 38270215

Abstract

OBJECTIVE: The aim of this study was to examine temporal trends (2016-2020) in hip fracture care in Australian and New Zealand (ANZ) hospitals that started providing patient-level data to the ANZ Hip Fracture Registry (ANZHFR) on/before 1 January 2016 (early contributors).

METHODS: Retrospective cohort study of early contributor hospitals (n = 24) to the ANZHFR. The study cohort included patients aged ≥50 years admitted with a low trauma hip fracture between 1 January 2016 and 31 December 2020 (n = 26,937). Annual performance against 11 quality indicators and 30- and 365-day mortality were examined.

RESULTS: Compared to 2016/2017, year-on-year improvements were demonstrated for preoperative cognitive assessment (2020: OR 3.57, 95% confidence interval [95% CI] 3.29-3.87) and nerve block use prior to surgery (2020: OR 4.62, 95% CI 4.17-5.11). Less consistent improvements over time from 2016/2017 were demonstrated for emergency department (ED) stay of <4 h (2017; 2020), pain assessment ≤30 min of ED presentation (2020), surgery ≤48 h (2020) and bone protection medication prescribed on discharge (2017-2020; 2020 OR 2.22, 95% CI 2.03-2.42). The odds of sustaining a hospital-acquired pressure injury increased in 2019-2020 compared to 2016. The odds of receiving an orthogeriatric model of care and being offered the opportunity to mobilise on Day 1 following surgery fluctuated. There was a reduction in 365-day mortality in 2020 compared to 2016 (OR 0.86, 95% CI 0.74-0.98), whereas 30-day mortality did not change.

CONCLUSIONS: Several quality indicators improved over time in early contributor hospitals. Indicators that did not improve may be targets for future care improvement activities, including considering incentivised hip fracture care, which has previously been shown to improve care/outcomes. COVID-19 and reporting practices may have impacted the study findings.

Language: en

Keywords: mortality; pain; cognition; fracture fixation; hip fractures; nerve block; orthopedics; osteoporosis

Validation of a method for detecting hospitalizations for falls related to adverse drug reactions in geriatric departments

Vaesken C, Boulouard VL, Fedrizzi S, Abidi H, Richard H, Muzard A, Descatoire P, Villain C, Meurant A. Geriatr. Psychol. Neuropsychiatr. Vieil. 2023; 21(4): 437-446.

DOI: 10.1684/pnv.2023.1132 **PMID**: 38269557

Abstract

Fall is one of the five main causes of drug-related hospital admissions (DRA) in France. A standardized chart review method, to identify DRA adapted to elderly patients, has recently been developed by Thevelin et al. Our first aim was to assess the reliability of this method for detecting DRA for falls in elderly subjects. Our second aim was to assess the feasibility of this method and to evaluate its reliability for assessing causality, the contribution of DRA to hospitalization, and the avoidability of DRAs in elderly patients hospitalized for a medication-related fall. A retrospective observational study was conducted on 16 patient cases admitted to the hospital for falls in May 2022, in the geriatric department of a French university hospital. Six healthcare professionals (pharmacists, pharmacologists, and geriatricians) assessed a method for detecting DRA individually and then in multidisciplinary pairs of raters. Inter-rater agreement (individually and in pairs) was assessed for DRA detection, causality, avoidability, and contribution of the DRA to hospitalization. A $\kappa > 0,4$ was considered a satisfactory threshold for agreement. The mean age was 86 years. When the assessment was done individually, detection of DRA-related hospitalizations ($\kappa = 0,46$; $p < ,001$), and DRA contribution to hospitalization ($\kappa = 0,50$; $p < ,001$) were moderately concordant. The causality assessment ($\kappa = 0,09$; $p = 0,24$) did not agree, and the avoidability assessment ($\kappa = 0,63$; $p < ,001$) agreed substantially. When the evaluation was done in pairs, detection of DRA-related hospitalizations ($\kappa = 0,47$; $p < ,001$) was moderately concordant between pairs. Avoidability assessment ($\kappa = 0,79$; $p < ,001$) concurred substantially. The assessment of causality ($\kappa = 0,29$; $p = 0,01$) and DRA contribution to hospitalization ($\kappa = 0,38$; $p < .001$) agreed fairly well. This study validated, individually and in pairs, the reliability of the method to identify DRA in the context of falls. This method will be of great use in research and epidemiological studies.

Language: fr

Keywords: Aged; Humans; Aged, 80 and over; Hospitalization; elderly; fall; hospitalization; *Accidental Falls/prevention & control; Hospitals, University; Reproducibility of Results; *Drug-Related Side Effects and Adverse Reactions; adverse drug event; iatrogeny

Self-efficacy as a mediator between frailty and falls among community-dwelling older citizens

Valsecchi N, Alhambra-Borrás T, Doñate-Martínez A, Korenhof SA, Raat H, Garcés-Ferrer J. J. Health Psychol. 2024; e13591053231223879.

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Abstract

Frailty is one of the most challenging issues among older adults, and the relationship between frailty and falls has already been assessed numerous times in literature. In the present study, we explored the mediating role of self-efficacy related to falls (FSe) in the relationship between frailty and fall risk. In a cross-sectional design, 1080 community-dwelling older adults from Rotterdam (Netherlands) and Valencia (Spain) completed a questionnaire and data were then analyzed via mediation analysis using a bootstrapping approach.

RESULTS show that higher frailty is associated with higher fall incidence, and higher FSe is a partial mediator of this association, with a confidence interval for the indirect effect of 0.131-0.247. Moreover, results showed gender differences in FSe levels; women had lower FSe scores. Deepening research on the construct of FSe may give potential explanations that account for the emerged gender differences, and it could be more targeted in fall prevention programs.

Language: en

Keywords: frailty; falls; mediation; community-dwelling older adults; falls-related self-efficacy

AI-based decision support to optimize complex care for preventing medication-related falls

van de Loo B, Linn AJ, Medlock S, Belimbegovski W, Seppala LJ, van Weert JCM, Abu-Hanna A, van Schoor NM, van der Velde N. Nat. Med. 2024; ePub(ePub): ePub.

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Abstract

Preventing and managing falls in older adults is a pressing global concern, especially in light of the world's aging population. Falls are the leading cause of injury-related mortality and hospitalization among older adults. Even without injury, falls can substantially affect a person's quality of life ...

Language: en