

**Safety Literature 17<sup>th</sup> November 2019**

**Association between urinary urgency and falls among rural dwelling older women**

Park J, Lee K, Lee K. J. Adv. Nurs. 2019; ePub(ePub): ePub.

**Affiliation**

Yonsei University College of Nursing, Seoul, South Korea.

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**DOI** 10.1111/jan.14284 **PMID** 31808191

**Abstract**

**AIM:** To examine the association between urinary urgency and falls in older women living in rural areas in South Korea.

**DESIGN:** A secondary analysis was conducted using cross-sectional data.

**METHODS:** This study used dataset obtained from 246 women aged 65 years or older living in 15 rural mountain communities in South Korea between February 2016 and March 2016. Falls were measured by self-reports including the number, location, reasons of falls during the past year. Frequency of urinary urgency and nocturia were assessed by self-reports. Covariates included age, body mass index, self-reported health problems. Mixed-effects negative binomial regression was used to analyze the association between urinary urgency and the number of falls.

**RESULTS:** The mean age of the 246 women was 77.3 years. Among the sample, 30.1% experienced at least one fall in the past year and 16% had required hospital treatments. The analysis showed that urinary urgency and osteoporosis were significantly associated with a greater number of falls after adjusting for other covariates. Among those who had experienced falls, nearly 60% reported that the reasons for falls were environmental factors, such as slippery floors or uneven sidewalks/thresholds.

**CONCLUSION:** Improving urinary urgency may be a strategy to decrease the fall risk in older women. Accordingly, community nurses can provide intervention programs on lifestyle and behavioral changes such as bladder training, dietary modification and pelvic floor muscle training. Interventions for fall prevention need to be developed while considering the unique features of indoor and outdoor environments. **IMPACT:** The findings have implications for healthcare providers and policymakers with regard to the development of safer indoor and outdoor environments for older women living in rural areas by remodeling their residential spaces and neighborhoods. In addition, more prospective studies using larger samples are needed to investigate the causal mechanism between urinary urgency and falls.

Language: en

**Keywords** accidental falls; aged; nurses; nursing; osteoporosis; urinary urgency

## Balance control mechanisms do not benefit from successive stimulation of different sensory systems

Cyr JP, Anctil N, Simoneau M. PLoS One 2019; 14(12): e0226216.

### Affiliation

Centre interdisciplinaire de recherche en réadaptation et intégration sociale (CIRRIS) du CIUSSS de la Capitale Nationale, Québec, Québec, Canada.

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### Abstract

In humans, to reduce deviations from a perfect upright position, information from various sensory cues is combined and continuously weighted based on its reliability. Combining noisy sensory information to produce a coherent and accurate estimate of body sway is a central problem in human balance control. In this study, we first compared the ability of the sensorimotor control mechanisms to deal with altered ankle proprioception or vestibular information (i.e., the single sensory condition). Then, we evaluated whether successive stimulation of different sensory systems (e.g., Achilles tendon vibration followed by electrical vestibular stimulation, or vice versa) produced a greater alteration of balance control (i.e., the mix sensory condition). Electrical vestibular stimulation (head turned  $\sim 90^\circ$ ) and Achilles tendon vibration induced backward body sways. We calculated the root mean square value of the scalar distance between the center of pressure and the center of gravity as well as the time needed to regain balance (i.e., stabilization time). Furthermore, the peak ground reaction force along the anteroposterior axis, immediately following stimulation offset, was determined to compare the balance destabilization across the different conditions. In single conditions, during vestibular or Achilles tendon vibration, no difference in balance control was observed. When sensory information returned to normal, balance control was worse following Achilles tendon vibration. Compared to that of the single sensory condition, successive stimulation of different sensory systems (i.e., mix conditions) increased stabilization time. Overall, the present results reveal that single and successive sensory stimulation challenges the sensorimotor control mechanisms differently.

Language: en

## Can the wii fit balance board be used as a fall risk assessment tool among poststroke patients?

Beato MC, Morton E, Iadarola C, Winterberger L, Dawson N. J. Stroke Cerebrovasc. Dis. 2019; ePub(ePub): ePub.

### Affiliation

School of Kinesiology and Physical Therapy, University of Central Florida, Orlando, Florida.  
(Copyright © 2019, National Stroke Association (U.S.A.), Publisher Elsevier Publishing)

### DOI

10.1016/j.jstrokecerebrovasdis.2019.104500

### PMID

31818679

### Abstract

**BACKGROUND:** The prevalence of falls can be as high as 73% in the stroke population. Falls occur as a result of multiple factors. Factors such as balance impairments can be improved through physical therapy intervention. However, insurance payers limit the number of visits per patient. It is crucial to find other ways to assess balance after discharge from rehabilitation.

**PURPOSE:** The purpose of this study is to determine if the Nintendo Wii Fit can be used as a fall risk assessment tool among the poststroke population.

**METHODOLOGY:** A sample of 11 stroke survivors were recruited (mean age 63.36 years). Each participant completed a balance and fall risk assessment using the Berg Balance Scale, Timed Up & Go, Four Square Step Test, Five Times Sit-to-Stand and 8-Foot Walk Test. Bivariate correlation will examine the validity of the Nintendo Wii Fit as a fall risk assessment tool in this population.

**RESULTS:** The Nintendo Wii Fit Balance Test was found to be correlated with gait speed measured by the 8-Foot Walk Test. There is no correlation between the Wii Fit Balance Tests and most common standardized fall risk measures. Standardized fall risk outcome measures also significantly correlate with each other.

**CONCLUSIONS:** The study suggests that while there is a potential utility of the game system to be used at home by patient and caregivers, the Wii Fit Balance Test may not be an appropriate substitute to the standardized fall risk assessment tool for stroke patients in the clinical setting.

Language: en

### Keywords

Stroke; Wii Fit; balance; falls; game system; outcome measure; rehabilitation

## **Effectiveness of surgical treatment for degenerative cervical myelopathy in preventing falls and fall-related neurological deterioration: a prospective multi-institutional study**

Kimura A, Takeshita K, Shiraishi Y, Inose H, Yoshii T, Maekawa A, Endo K, Miyamoto T, Furuya T, Nakamura A, Mori K, Seki S, Kanbara S, Imagama S, Matsunaga S, Okawa A. *Spine* 2019; ePub(ePub): ePub.

### **Affiliation**

Department of Orthopedic Surgery, Tokyo Medical and Dental University.

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**DOI** 10.1097/BRS.0000000000003355 **PMID** 31809466

### **Abstract**

**STUDY DESIGN:** Prospective multi-center study.

**OBJECTIVE:** To evaluate the effectiveness of surgical treatment in reducing falls and fall-related neurological deterioration in a prospective cohort of patients undergoing surgery for degenerative cervical myelopathy (DCM). **SUMMARY OF BACKGROUND DATA:** Current evidence is limited for the effectiveness of surgical interventions for DCM in reducing the risk of fall-related neurological deterioration.

**METHODS:** Patients with DCM scheduled for surgical treatment were enrolled prospectively at eight participating institutes. At the time of enrollment, participants were given diaries to record details of their falls, to be returned at the 1-year postoperative follow-up. In the fall diary, patients were asked whether they had experienced any deterioration in neurological symptoms at each fall episode. Deterioration of neurological symptoms was categorized as follows: 1) only deterioration of sensory function in the limbs; or 2) deterioration of motor deficits. The incidence rate of falls was calculated separately for the preoperative and postoperative periods, as the total number of falls divided by the time over which falls were monitored (100 person-years). Functional outcome was assessed with the Japanese Orthopaedic Association (JOA) score and Neck Disability Index.

**RESULTS:** Of the initial 168 participants, 159 completed the 1-year follow-up, and 132 fall diaries were retrieved and analyzed. Of these 132 patients, 65 (49%) reported at least one fall during the survey period. The incidence rate of falls decreased significantly from 497.4 to 90.3 falls per 100 person-years after surgery. The incidence of motor deterioration per fall decreased significantly from 34% to 8% after surgery. Patients who experienced preoperative fall-related motor deterioration had a significantly lower JOA score compared with patients without fall-related motor deterioration at 1-year follow-up.

**CONCLUSION:** Surgical intervention for DCM is effective not only in reducing the frequency of falls, but also in reducing the risk of fall-related deterioration of motor deficits. **LEVEL OF EVIDENCE:** 2.

Language: en

## **Examining fall risk among formerly homeless older adults living in permanent supportive housing**

Henwood BF, Rhoades H, Lahey J, Pynoos J, Pitts DB, Brown RT. Health Soc. Care Community 2019; ePub(ePub): ePub.

### **Affiliation**

Division of Geriatric Medicine, Perelman School of Medicine of the University of Pennsylvania, Philadelphia, PA, USA.

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**PMID** 31815341

### **Abstract**

Although permanent supportive housing (PSH) has been credited with a decline in the number of chronically homeless adults in the United States since 2007, the extent to which PSH can accommodate the needs of a prematurely aging population, including reducing the likelihood of falls, is unclear. The objective of this study is to examine the prevalence and correlates of falls with a sample of 237 tenants (45- to 80-year olds) from two PSH programmes in Los Angeles from 1 January 2017 to 10 August 2017. We also explore the location and severity of fall-related injury using a subsample of 66 tenants. Standard surveys queried demographics, health status, history of homelessness and falls. Multivariable logistic regression assessed the correlates of falling in the past year. More than half of the sample had fallen and more than 40% had multiple falls in the past year. Functional impairment, frailty and persistent pain were all associated with increased fall risk. For the 66 tenants who provided more detailed fall information, more than 40% fell at home and of those nearly half fell in their bathroom. Fall-related injuries were common, with more than one-third of the subsample experiencing serious injury. These findings suggest that fall prevention is needed in PSH but that more research is needed to understand the degree to which individual and environmental risk factors are contributing to falls.

Language: en

### **Keywords**

aging in place; geriatric syndromes; homelessness; housing first

## Falling among people with Parkinson's disease: motor, non-motor, or both?

Silva de Lima AL, Borm C, Vries NM, Bloem BR. *Arq. Neuropsiquiatr.* 2019; 77(11): 759-760.

### Affiliation

Radboud University Medical Center, Donders Institute for Brain, Cognition and Behavior, Center of Expertise for Parkinson & Movement Disorders; Department of Neurology, Nijmegen, The Netherlands.

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DOI 10.1590/0004-282X20190164 PMID 31826130

### Abstract

Falling is common among people with Parkinson's disease (PD). Because of a common amnesia for falls, capturing falls in real-life is challenging. Despite this challenge, we estimate that about 70% of PD patients experience at least one fall per year, which - according to objective measurements using wearable falls detectors - is about 1.8 times more often than age matched controls. Established risk factors for falling in PD include particularly motor features, such as freezing of gait or balance impairment. The contribution of non-motor symptoms, such as autonomic failure, ophthalmological problems or depression, can be suspected, but is to date much less clear.

In this current edition, Alvarado-Bolaños and colleagues report on the association between non-motor symptoms and fall risk in people with PD. Using a cross-sectional design, they collected retrospective data from a convenience sample of 179 people with PD attending a Movement Disorders clinic in Mexico City. Thirty of these were self-reported fallers (16 of whom were recurrent fallers), and their profile was fairly representative (19 men; mean age 66.7 years), although 13 were surprisingly mildly affected (Hoehn & Yahr stage 1 or 2). Baseline data included presence and severity of motor symptoms (Movement Disorder Society – Unified Parkinson's Disease Rating Scale - MDS-UPDRS) and non-motor symptoms (non-motor symptoms scale - NMSS; and relevant sections of the UPDRS). Bivariate analyses showed that fallers had more non-motor symptoms (mainly in the urinary and miscellaneous domains of the NMSS) compared to non-fallers. However, in a multivariate analysis, non-motor symptoms were no longer predictive of falling; only disease duration and the Postural Imbalance and Gait Disorder (PIGD) type of PD persisted as predictors of falls ...

Language: en

## Falls in persons with Parkinson's disease: do non-motor symptoms matter as much as motor symptoms?

Alvarado-Bolaños A, Cervantes-Arriaga A, Arredondo-Blanco K, Salinas-Barboza K, Isais-Millán S, Rodríguez-Violante M. *Arq. Neuropsiquiatr.* 2019; 77(11): 761-767.

### Affiliation

Instituto Nacional de Neurología y Neurocirugía, Clínica de Trastornos del Movimiento, Mexico City, Mexico.

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DOI 10.1590/0004-282X20190148 PMID 31826131

### Abstract

**INTRODUCTION:** Falls are common among persons with Parkinson's disease (PD). On the other hand, predicting falls is complex as there are both generic and PD-specific contributors. In particular, the role of non-motor symptoms has been less studied.

**OBJECTIVE:** The objective of this study was to identify the role of non-motor predictors of falling in persons with PD (PwP).

**METHODS:** A cross-sectional study was carried out in PwP recruited from a movement disorders clinic. Clinical and demographical data were collected. All PwP were assessed using the Movement Disorders Society Unified Parkinson's Disease Rating Scale (MDS-UPDRS) and the Non-Motor Symptoms Scale (NMSS). Variables were assessed at the bivariate level. Significant variables were put into a logistic regression model.

**RESULTS:** A total of 179 PwP were included. Overall, 16.8% of PwP had fallen in the past 12 months, with 53.3% of them being recurrent fallers. The mean number of monthly falls was  $2.5 \pm 3.3$ . Factors associated with falling in the bivariate analysis included the disease duration, Hoehn and Yahr stage, MDS-UPDRS part I and II, postural instability/gait disturbance (PIGD) subtype, NMSS urinary domain, NMSS miscellaneous domain, and non-motor severity burden (all p-values < 0.05). After multivariate analysis, only the disease duration (p = 0.03) and PIGD (p = 0.03) remained as independent risk factors.

**CONCLUSION:** Disease duration and the PIGD subtype were identified as relevant risk factors for falls in PwP. Non-motor symptoms appear to have a less important role as risk factors for falls.

Language: en

## **Fear of falling assessment and interventions in community-dwelling older adults: a mixed methods case-series**

Cappleman AS, Thiamwong L. Clin. Gerontol. 2019; ePub(ePub): ePub.

### **Affiliation**

Disability, Aging and Technology Research Cluster, University of Central Florida, Orlando, FL, USA.

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**DOI** 10.1080/07317115.2019.1701169

**PMID** 31805830

### **Abstract**

**Objectives:** (1) assess fear of falling (FOF) in community-dwelling older adults using subjective and objective measures and, (2) explore older adults' perceptions of FOF assessments and interventions. **Methods:** A mixed methods case-series was utilized. It consisted of quantitative data collection by objective measures including the BTrackSTM Balance Test (BBT) and a dynamometer to assess physiological fall risk, and in-depth interviews from four older adults in Orlando, Florida. A single Fear of Falling Scale and Falls Efficacy Scale-International (FES-I) were used to assess FOF. To combine quantitative and qualitative data, a case-specific analysis was used and followed by a cross-case analysis to gain a more comprehensive understanding of FOF. **Results:** We found an incongruent fear of falling with physiological fall risk. Four themes emerged: (1) Fluctuating definitions of "fear" contribute to difficulty in assessments and interventions, (2) Fundamental assessments for fear of falling are missing, (3) Feedback from an objective measure is valuable, and (4) Family experiences with fear of falling drive personal interventions. **Conclusions:** The integrated viewpoints from quantitative and qualitative data suggest a need for FOF assessment based on older adults' perceptive and physiological measures. **Clinical Implications:** Healthcare providers should assess FOF using subjective and objective measures.

Language: en

### **Keywords**

Assessment; case series; community; fear of falling; intervention; older adults



**Multiple turns: potential risk factor for falls on the way to the toilet**

Son BK, Akishita M, Uchiyama E, Imaeda S, Taniguchi S, Sumikawa Y, Unyaporn S, Matsubara T, Tanaka S, Tanaka T, Otsuki T, Okata J, Iijima K. *Geriatr. Gerontol. Int.* 2019; 19(12): 1293-1295.

**Affiliation**

Institute of Gerontology, The University of Tokyo, Tokyo, Japan.

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**DOI** 10.1111/ggi.13806

**PMID** 31823495

**Abstract**

No abstract available

Language: en

## **Relationship between fear of falling and balance factors in healthy elderly women: a confirmatory analysis**

Monteiro AM, Forte P, Carvalho J, Barbosa TM, Morais JE. J. Women Aging. 2019; ePub(ePub): ePub.

### **Affiliation**

Research Centre in Sports, Health and Human Development (CIDESD), University of Trás-os-Montes and Alto Douro, Vila Real, Portugal.

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**DOI** 10.1080/08952841.2019.1681244

**PMID** 31813340

### **Abstract**

The aim of this study was to develop a confirmatory model, using structural equation modeling, to describe and explain the fear of falling in elderly women. Forty-one participants ( $67.69 \pm 5.30$  years) were selected to test a theoretical model. The final model revealed that the fear of falling is related to impaired balance (dynamic and static). Strength has a positive effect on both dynamic and static balance. Strength depends on bone mineral density. In conclusion, more strength and bone mineral density and better body balance tend to decrease the fear of falling.

Language: en

### **Keywords**

Balance; biomechanics; dynamic; static

## Use of medications with anticholinergic properties and the long-term risk of hospitalization for falls and fractures in the EPIC-Norfolk Longitudinal Cohort Study

Tan MP, Tan GJ, Mat S, Luben RN, Wareham NJ, Khaw KT, Myint PK. *Drugs Aging* 2019; ePub(ePub): ePub.

### Affiliation

Ageing Clinical and Experimental Research (ACER) Team, Institute of Applied Health Sciences, School of Medicine, Medical Sciences and Nutrition, University of Aberdeen, Aberdeen, UK. phyo.myint@abdn.ac.uk.

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PMID 31808140

### Abstract

The consumption of medications with anticholinergic activity has been suggested to result in the adverse effects of mental confusion, visual disturbance, and muscle weakness, which may lead to falls. Existing published evidence linking anticholinergic drugs with falls, however, remains weak. This study was conducted to evaluate the relationship between anticholinergic cognitive burden (ACB) and the long-term risk of hospitalization with falls and fractures in a large population study. The dataset comprised information from 25,639 men and women (aged 40-79 years) recruited from 1993 to 1997 from Norfolk, United Kingdom into the European Prospective Investigation into Cancer (EPIC)-Norfolk study. The time to first hospital admission with a fall with or without fracture was obtained from the National Health Service hospital information system. Cox-proportional hazards analyses were conducted to adjust for confounders and competing risks. The fall hospitalization rate was 5.8% over a median follow-up of ~ 19.4 years. The unadjusted incidence rate ratio for the use of any drugs with anticholinergic properties was 1.79 (95% CI 1.66-1.93). The hazard ratios (95% CI) for ACB scores of 1, 2-3, and  $\geq 4$  compared with ACB = 0 for fall hospitalization were 1.20 (1.09-1.33), 1.42 (1.25-1.60), and 1.39 (1.21-1.60) after adjustment for age, gender, medical conditions, physical activity, and blood pressure. Medications with anticholinergic activity are associated with an increased risk of subsequent hospitalization with a fall over a 19-year follow-up period. The biological mechanisms underlying the long-term risk of hospitalization with a fall or fracture following baseline ACB exposure remains unclear and requires further evaluation.

Language: en

**Culturally safe falls prevention program for elders in Inuvik, Northwest Territories, Canada: considerations for development and implementation-ERRATUM**

Frigault JS, Giles AR. Can. J. Aging 2019; ePub(ePub): ePub.

(Copyright © 2019, Cambridge Press)

**DOI** 10.1017/S0714980819000722

**PMID** 31806055

**Abstract**

The Inuvialuit translation of the abstract was omitted from the original online version of the article by Frigault and Giles (published online 25 June 2019). It has been added to the online version and will be included in the printed version as well.

Language: en

## Evaluating audio-visual falls prevention messages with community-dwelling older people using a World Café forum approach

de Jong LD, Francis-Coad J, Wortham C, Haines TP, Skelton DA, Weselman T, Hill AM. BMC Geriatr. 2019; 19(1): e345.

### Affiliation

School of Physiotherapy and Exercise Science, Faculty of Health Sciences, Curtin University, Bentley, WA, Australia. anne-marie.hill@curtin.edu.au.

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DOI 10.1186/s12877-019-1344-3 PMID 31818252

### Abstract

**BACKGROUND:** Falls risk increases sharply with older age but many older people are unaware or underestimate their risk of falling. Increased population-based efforts to influence older people's falls prevention behavior are urgently needed. The aim of this study was to obtain a group of older people's collective perspectives on newly developed prototypes of audio-visual (AV) falls prevention messages, and evaluate changes in their falls prevention behaviour after watching and discussing these.

**METHODS:** A mixed-method study using a community World Café forum approach.

**RESULTS:** Although the forum participants (n = 38) mostly responded positively to the three AV messages and showed a significant increase in their falls prevention capability and motivation after the forum, the participants collectively felt the AV messages needed a more inspirational call to action. The forum suggested this could be achieved by means of targeting the message and increasing the personal connection. Participants further suggested several alternatives to online falls prevention information, such as printed information in places in the community, as a means to increase opportunity to seek out falls prevention information.

**CONCLUSIONS:** Falls prevention promotion messages need to be carefully tailored if they are to be more motivating to older people to take action to do something about their falls risk. A wider variety of revised and tailored AV messages, as one component of a community-wide falls prevention campaign, could be considered in an effort to persuade older people to take decisive action to do something about their falls risk. **TRIAL REGISTRATION:** This study was registered prospectively: NCT03154788. Registered 11 May 2017.

Language: en

### Keywords

Accidental falls; Community-based participatory research; Consumer health information; Health behavior; Qualitative research



## Investigating multisite pain as a predictor of self-reported falls and falls requiring health care use in an older population: a prospective cohort study

Welsh VK, Mallen CD, Ogollah R, Wilkie R, McBeth J. PLoS One 2019; 14(12): e0226268.

### Affiliation

Arthritis Research UK Centre for Epidemiology, Faculty of Biology, Medicine and Health, The University of Manchester, Manchester, United Kingdom.

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### DOI

10.1371/journal.pone.0226268

### PMID

31826023

### Abstract

Older people are continuing to fall despite fall prevention guidelines targeting known falls' risk factors. Multisite pain is a potential novel falls' risk factor requiring further exploration. This study hypothesises that: (1) an increasing number of pain sites and widespread pain predicts self-reported falls and falls recorded in primary and secondary healthcare records; (2) those relationships are independent of known falls' risk factors and putative confounders. This prospective cohort study linked data from self-completed questionnaires, primary care electronic health records, secondary care admission statistics and national mortality data. Between 2002-2005, self-completion questionnaires were mailed to community-dwelling individuals aged 50 years and older registered with one of eight general practices in North Staffordshire, UK (n = 26,129) yielding 18,497 respondents. 11,375 respondents entered the study; 4386 completed six year follow-up. Self-reported falls were extracted from three and six year follow-up questionnaires. Falls requiring healthcare were extracted from routinely collected primary and secondary healthcare data. Increasing number of pain sites increased odds of future 3 year (odds ratio 1.12 (95% confidence interval: 1.01-1.24)) and 6 year self-reported fall (odds ratio 1.02 (1.00-1.03)) and increased hazard of future fall requiring primary healthcare (hazard ratio 1.01 (1.00-1.03)). The presence of widespread pain increased odds of future 3 year (odds ratio 1.27 (0.92-1.75)) and 6 year fall (odds ratio 1.43(1.06-1.95)) and increased hazard of future fall requiring primary healthcare (hazard ratio 1.27(0.98-1.65)). Multisite pain was not associated with future fall requiring secondary care admission. Multisite pain must be included as a falls' risk factor in guidelines to ensure clinicians identify their older patients at risk of falls and employ timely implementation of current falls prevention strategies.

Language: en

## Slip and fall incidents at work: a visual analytics analysis of the research domain

Li J, Goerlandt F, Li KW. *Int. J. Environ. Res. Public Health* 2019; 16(24): e16244972.

### Affiliation

Department of Industrial Management, Chung Hua University, Hsin-Chu 30012, Taiwan.

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PMID 31817818

### Abstract

Slip and fall incidents at work remain an important class of injury and fatality causing mechanisms. An extensive body of safety research has accumulated on this topic. This article presents an analysis of this research domain. Two bibliometric visualization tools are applied: VOSviewer and HistCite. Samples of 618 slip and fall related articles are obtained from the Web of Science database. Networks of institutions, authors, terms, and chronological citation relationships are established. Collaboration and research activities of the slip and fall research community show that most contributors are from the United States, with the (now closed) Liberty Mutual Research Institute for Safety the most influential research organization. The results of a term clustering analysis show that the slip and fall research can be grouped into three sub-domains: epidemiology, gait/biomechanics, and tribology. Of these, early research focused mainly on tribology, whereas research on gait/biomechanics and epidemiological studies are relatively more recent. Psychological aspects of slip and fall incident occurrence represent a relatively under-investigated research topic, in which future contributions may provide new insights and safety improvements. Better linking of this research domain with other principles and methods in safety science, such as safety management and resilience, may also present valuable future development paths.

Language: en

### Keywords

HistCite; VOSviewer; bibliometric analysis; citation network; knowledge mapping; slip and fall