

Tango therapy health support program for patients with Parkinson's disease

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Abstract

BACKGROUND : Parkinson's disease is a neurodegenerative disorder that causes persistent postural, balance, and gait deficits and reduced quality of life despite optimal medical therapy.

OBJECTIVE : We developed a health support program using tango therapy to improve the motor function and quality of life.

METHODS : A total of seven patients with Parkinson's disease (five women and two men) were included. The tango therapy program was designed using a motor skills instructional strategy based on Gagné's nine events of instructions. The program held one 90-minute intervention in one day. It consisted of three sessions of 30 minutes each, for a total of 90 minutes.

RESULTS : In a pre-post, the results showed that in Timed Up and Go, post was faster. Also, in stride length, post was wider. The effect size in the overall Parkinson's Disease Questionnaire39 score was calculated to be large effect size ($d = 0.80$).

CONCLUSION : Tango therapy program in this study revealed an improvement in physical activity and quality of life. These indicate that tango therapy may be an effective health support program for patients with Parkinson's disease.

Language: ja

Keywords: exercise therapy; gait improvement; instructional design; motor function; QOL; インストラクショナルデザイン; 歩行改善; 運動機能; 運動療法

Prevalence and risk factors for falls among older adults in a primary care facility in Ghana

Adanusa M, Pobee SK, Zaabaar E, Mawuko V, Asiedu K, Amuzu SK, Adubofour W, Bazayeya C, Senaya EEY, Ofori DC, Kyei S. *Malawi Med. J.* 2022; 34(4): 225-230.

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Abstract

BACKGROUND: Falls are a serious problem and are among the leading causes of morbidity, functional dependency, and death in older adults. Falls have become a social and global public health concern due to the current aging population in Africa and across the globe. However, their prevalence and risk factors have received little attention in Africa.

PURPOSE: Thus, this study aimed to provide a baseline survey to determine the prevalence and associated risk factors for falls among older adults attending a primary care facility in Cape Coast, Ghana.

RESULTS: Participants (n = 244) were patients aged 60 years and older who visited the University of Cape Coast Hospital. The prevalence of falls identified in this hospital-based study was 40.2%. The following independent variables were found to be statistically significant predictors of risk of falls among the participants when compared with their respective reference categories; age 80 years and above [OR = 3.707, 95% CI = 1.738 - 7.907, p = 0.001], participants who had a history of falls [OR = 2.234, 95% CI = 1.326 - 3.765, p = 0.003], participants with three or more co-morbidities [OR = 16.456, 95% CI = 2.099 - 129.020, p = 0.008] and obesity [OR = 2.211, 95% CI = 1.151 - 4.250, p = 0.017].

CONCLUSION: The prevalence of falls among older adults is high. Thus, clinicians in the primary care setting should screen for, give fall prevention education, and prescribe appropriate interventions to at-risk patients.

Language: en

Keywords: Aged; Humans; Middle Aged; Risk Factors; Aged, 80 and over; Prevalence; Falls; older adults; primary care; *Primary Health Care; Ghana/epidemiology; timed up and go

A conceptional framework for integration of architecture and gerontology to create elderly-friendly home environments in Egypt

Ahmed MN, M Hassan N, Morghany E. J. Eng. Sci. (Assiut) 2023; 51(6): 468-500.

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Abstract

The global aging population is rising rapidly leading to significant impacts on the built environment. Egypt is expected to witness a notable increase in its elderly population, prompting a need for proactive measures to address the challenges and opportunities arising from this demographic shift. Architecture and gerontology are critical fields when understanding the person-environment relationship in later life. However, it is notable that all studies, laws, and research related to the elderly in Egypt have been approached from demographic, social, economic, political, and health, and have predominantly overlooked the significance of the built environment, particularly the relationship between the elderly and their home environment. Therefore, this research paper seeks to bridge this knowledge gap and aims to formulate a conceptual framework that establishes a theoretical basis for creating elderly-friendly home environments in Egypt. This framework is based on the idea of integration between architecture and gerontology through a human-centered design approach that places older adults at the core of attention. the research follows a descriptive-analytical methodology and an inductive approach, by conducting a comprehensive literature review in three main axes: gerontology, architecture, and human-centered design. Through the adoption of this proposed conceptual framework, the body of knowledge on creating elderly-friendly home environments in Egypt stands to be enriched. it can also empower architects, planners, policymakers, and other stakeholders to develop an elderly-friendly home environment; this environment is inclusive, accessible, and usable, supporting the elderly and promoting their health, and well-being, and allowing them "aging in place" independently and safely.

Language: en

The changing incidence and prevalence of falls and its disability burden among the geriatric population in Saudi Arabia from 1990 to 2019: a longitudinal analysis using Global Burden of Disease Study data

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Abstract

BACKGROUND: Falls represent a significant and growing public health issue among older adults worldwide. This study provides a comprehensive analysis of the trends in the incidence, prevalence, and disability burden of falls among older adults in Saudi Arabia over 29 years, with a focus on gender disparities.

METHODS: Utilizing the Global Burden of Disease (GBD) Study data, this observational analysis tracked the epidemiology of falls from 1990 to 2019. The study employed ICD-9 and ICD-10 codes to identify falls, analyzing incidence, prevalence, disability-adjusted life years (DALYs), and years lived with disability (YLDs), stratified by gender and reported with 95% uncertainty intervals (UIs).

RESULTS: The incidence and prevalence of falls increased for both genders from 1990 to 2019, with males showing a higher relative increase in prevalence rates (57% for males vs. 26% for females). The disability burden, indicated by DALYs, increased by 4% for males and decreased by 10% for females, whereas YLDs saw an increase of 38% for males and 8% for females. The analysis highlights a notable rise in both the frequency of falls and their associated disability, with gender-specific variations emphasizing greater impacts on males.

CONCLUSIONS: The findings illustrate a significant increase in fall-related incidents and associated disabilities among older adults in Saudi Arabia, with distinct gender differences. These trends call for targeted public health interventions and further research into the underlying causes of falls, risk factors, and effective prevention strategies. Such measures are essential to mitigate the impact of falls, improve health outcomes, and enhance the quality of life for the aging population.

Language: en

Keywords: incidence; older adults; falls; prevalence; saudi arabia; disability burden; fall prevention; gender disparities

Short-term effects of manual therapy on balance: a multicenter, randomized, double-blind controlled trial

Espí-López GV, Pavlu D, Arnal-Gómez A, Muñoz-Gómez E, Martínez-Millana A, Marqués-Sulé E. J. Manipulative Physiol. Ther. 2023; ePub(ePub): ePub.

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Abstract

OBJECTIVE: The purpose of this study was to analyze short-term changes in dynamic and static balance after a manual therapy protocol in healthy participants and analyze any repercussions on mood and perception of change after applying articulatory techniques.

METHODS: A single-blind, randomized, multicenter clinical trial was conducted. Participants were allocated to either a manual therapy group (MTG) ($n = 101$) or a control group (CG) without intervention ($n = 99$), and measures were taken before treatment, after the intervention, and 1 week after treatment. Assessments included the Star Excursion Balance Test, Unipedal Stance Test (UPST), Profile of Mood States (POMS), and Patient Global Impression of Change (PGIC) scale.

RESULTS: Two hundred healthy participants completed the study (mean age, 22 [SD = 2.67]). There was a statistically significant interaction between groups and time measurements in the right leg for anterior ($P = .003$), posteromedial ($P < .001$), and posterolateral ($P = .001$) directions in favor of the MTG, as well as in the left leg for anterior ($P < .001$), posteromedial ($P < .001$), and posterolateral ($P = .012$) directions. The analysis failed to show statistically significant interactions between any of the factors for the UPST and POMS ($P > .05$). The MTG showed a significant improvement compared to the CG after treatment ($P = .003$) and at 1-week follow-up ($P < .001$) on the PGIC scale.

CONCLUSION: The results suggest the MT intervention was effective on dynamic balance in post-intervention in healthy participants, and some of the directions maintained the results at 1-week follow-up. Perception of change in post-treatment and 1-week follow-up also significantly improved. The protocol did not seem to produce changes in static balance and mood states. Positive changes after manual therapy were maintained in the short term.

Language: en

Keywords: Mood Disorders; Healthy People Programs; Musculoskeletal Manipulations; Postural Balance

Reducing fall injuries with better data

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Abstract

BACKGROUND: Fall deaths in the USA almost tripled in the twenty-first century. While various interventions have been effective in reducing fall deaths, they have failed to make a substantial impact at a population level.

MAIN BODY: An overarching factor that has been relatively neglected in fall injury prevention is the need for more and better data. We need better data on the causes and circumstances of older adult fall deaths. While there are excellent national surveillance systems on the circumstances of other injury deaths (e.g., motor vehicle crashes, suicides, and homicides), such a system is lacking for fall deaths. These other data systems have been instrumental in indicating and evaluating policies that will reduce injury. It is also important to provide consumers with better information concerning the many products that affect the likelihood of fall injury (e.g., flooring, hip protectors, footwear). Automotive buyers are provided with relevant up-to-date make-model safety information from crash tests and real-world performance. Such information not only helps protect buyers from purchasing dangerous products, but it provides producers with the incentive to make ever safer products over time.

CONCLUSION: We believe that creation of a national surveillance system on the circumstances of fall deaths, and increased testing/certifying of fall-related products, are two steps that would help create the conditions for continuous reductions in fall fatalities. Fall prevention should apply some of the same basic strategies that have proved effective in addressing other injuries.

Language: en

Keywords: Falls; Standards; Certification; Data systems; Fall deaths; Fall injuries; Surveillance systems

Alcohol consumption and illicit drug use: associations with fall, fracture, and acute healthcare utilization among people with HIV infection

Kim TW, Bertholet N, Magane KM, Lloyd-Travaglini C, Winter MR, Samet JH, Erlandson KM, Stein MD, Bryant KJ, Saitz R, Heeren TC. J. Acquir. Immune Defic. Syndr. (LWW) 2023; ePub(ePub): ePub.

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Abstract

BACKGROUND: Given alcohol and/or other drug (AOD) use occurs among people with HIV (PWH), we examined its association with falls and fall-related outcomes and if frailty moderates the association. **SETTING:** Northeastern US city.

METHODS: We analyzed an observational cohort of PWH with current or past AOD use. Alcohol measures were any past 14-day heavy use, average alcohol/day, and days with heavy use. Drug use measures were past 30-day illicit use of cocaine, opioids, and sedatives. Repeated cross-sectional associations were estimated with separate multivariable GEE regression models for each fall-related outcome.

RESULTS: Among PWH (n=251; mean age 52 [standard deviation=10]), 35% reported heavy alcohol use, 24% cocaine, 16% illicit opioids, 13% illicit sedatives, 35% any fall; 27% were frail. Heavy alcohol use was associated with a fall (AOR=1.49, 95%CI: 1.08, 2.07), multiple falls (AOR=1.55 95%CI: 1.10, 2.19), and fall/fracture-related emergency department (ED) visit or hospitalization (AOR=1.81, 95%CI: 1.10, 2.97). Higher average alcohol/day and more heavy drinking days were associated with multiple falls. Illicit sedative use was associated with a fall, multiple falls, and ED/hospitalization and opioid use with fracture. Frailty moderated the association of heavy alcohol use and a fall (AOR=2.26, 95%CI 1.28, 4.01 in those frail) but not in those not frail.

CONCLUSION: The effect of AOD use on falls and fall-related outcomes was most pronounced with alcohol, particularly among frail PWH. Heavy alcohol, illicit sedative, and illicit opioid use are high-priority targets for preventing falls and fall-related consequences for PWH.

Language: en

Reliability, validity, and identification ability of a commercialized waist-attached inertial measurement unit (IMU) sensor-based system in fall risk assessment of older people

Li KJ, Wong NLY, Law MC, Lam FMH, Wong HC, Chan TO, Wong KN, Zheng YP, Huang QY, Wong AYL, Kwok TCY, Ma CZH. *Biosensors (Basel)* 2023; 13(12).

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Abstract

Falls are a prevalent cause of injury among older people. While some wearable inertial measurement unit (IMU) sensor-based systems have been widely investigated for fall risk assessment, their reliability, validity, and identification ability in community-dwelling older people remain unclear. Therefore, this study evaluated the performance of a commercially available IMU sensor-based fall risk assessment system among 20 community-dwelling older recurrent fallers (with a history of ≥ 2 falls in the past 12 months) and 20 community-dwelling older non-fallers (no history of falls in the past 12 months), together with applying the clinical scale of the Mini-Balance Evaluation Systems Test (Mini-BESTest). The results show that the IMU sensor-based system exhibited a significant moderate to excellent test-retest reliability ($ICC = 0.838$, $p < 0.001$), an acceptable level of internal consistency reliability (Spearman's $\rho = 0.471$, $p = 0.002$), an acceptable convergent validity (Cronbach's $\alpha = 0.712$), and an area under the curve (AUC) value of 0.590 for the IMU sensor-based receiver-operating characteristic (ROC) curve. The findings suggest that while the evaluated IMU sensor-based system exhibited good reliability and acceptable validity, it might not be able to fully identify the recurrent fallers and non-fallers in a community-dwelling older population. Further system optimization is still needed.

Language: en

Keywords: community-dwelling older people; fall risk assessment; inertial measurement unit (IMU) sensor; the Mini-Balance Evaluation Systems Test (Mini-BESTest); wearable system

Preoperative frailty predicts postoperative falls in older patients with cancer

Meckstroth S, Tin AL, Downey RJ, Korc-Grodzicki B, Vickers AJ, Shahrokni A. J. Geriatr. Oncol. 2023; 15(2): e101688.

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Abstract

INTRODUCTION: Patient falls in the hospital lead to adverse outcomes and impaired quality of life. Older adults with cancer who are frail may be at heightened risk of falls in the postoperative period. We sought to evaluate the association between degree of preoperative frailty and risk of inpatient postoperative falls and other outcomes among older adults with cancer.

MATERIALS AND METHODS: We identified 7,661 patients aged 65 years or older who underwent elective cancer surgery from 2014 to 2020, had a hospital stay of ≥ 1 day, and had Memorial Sloan Kettering-Frailty Index (MSK-FI) data to allow assessment of frailty. Univariable logistic regression analysis was performed to evaluate the association between frailty and falls. Multivariable logistic regression analysis was performed to evaluate the composite outcome of 30-day readmission or 90-day death, with frailty, falls, and the interaction between frailty and falls as predictors; the analysis was adjusted for age, sex, race, and preoperative albumin level.

RESULTS: In total, 7,661 patients were included in the analysis. Seventy-one (0.9%) had a fall, of whom eight (11%) were readmitted to the hospital within 30 days and seven (10%) died within 90 days. Higher MSK-FI score was associated with higher risk of falls (odds ratio [OR], 1.40 [95% confidence interval [CI], 1.21-1.59]). The risk of falls for a patient with an MSK-FI score of 1 was 0.6%, compared with 1.7% for a patient with an MSK-FI score of 4. Poor outcome was associated with frailty (OR, 1.07 [95% CI, 1.02-1.13]) but not with falls (OR, 1.17 [95% CI, 0.57-2.22]).

DISCUSSION: Preoperative frailty is associated with risk of inpatient postoperative falls and with other adverse outcomes after surgery among older adults with cancer. Screening for frailty in the preoperative setting would enable healthcare institutions to implement interventions aimed at reducing the incidence of inpatient postoperative falls to reduce fall-related adverse events.

Language: en

Keywords: Older adults; Cancer; Frailty; Geriatric assessment; Perioperative falls

Association between alcohol use and frailty among elder adults in three Chinese cities

Nie X, Williams G, Verma A, Zhu Y, Fu H, Jia Y, Dai J, Gao J. J. Public Health (Oxford) 2023; 45(Suppl 1): i28-i34.

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Abstract

BACKGROUND: Frailty is often described as a condition of the elderly and alcohol use is associated with frailty. The aim of this study is to examine the associations between alcohol use and frailty in three cities in elder adults.

METHODS: A cross-sectional study was conducted in three cities in China from June 2017 to October 2018. In total, 2888 residents aged ≥ 65 years old were selected by using a multi-level stage sampling procedure. Alcohol use was assessed by Focusing on Cutting down, Annoyance by criticism, Guilty feeling, and Eye-openers (CAGE) four-item questionnaire. Frailty was measured by a validated Chinese version of the Fatigue, Resistance, Ambulation, Illness, and Loss of weight (FRAIL) scale. Multinomial logistic regressions were used to examine the association of alcohol use with pre-frailty and frailty after controlling for varied covariates.

RESULTS: In general, the prevalence of pre-frailty and frailty was 38.64 and 20.26%, respectively. After controlling for covariates and interaction of age and problematic drinking, non-problematic drinkers neither had association with pre-frailty (OR: 1.15, 95%CI:0.86-1.52) nor with frailty (OR:0.90, 95%CI:0.60-1.36), and problematic drinkers neither had association with frailty (OR: 1.21, 95%CI:0.83-1.76), while problematic drinkers had high odd ratios of frailty (OR:3.28, 95%CI:2.02-5.33) compared with zero-drinker.

CONCLUSIONS: Our study found a positive association between problematic drinking and frailty, no relationship between non-problematic drinking and (pre-)frailty compared with zero-drinking among Chinese elder adults. Based on previous findings and ours, we conclude it is important for the prevention of frailty to advocate no problematic drinking among elder adults.

Language: en

Keywords: alcohol use; frailty; elder adults

Smartphone-based gait assessment for multiple sclerosis

Regev K, Eren N, Yekutieli Z, Karlinski K, Massri A, Vigiser I, Kolb H, Piura Y, Karni A. Mult. Scler. Relat. Disord. 2023; 82: e105394.

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PMID: 38141562

Abstract

INTRODUCTION: Multiple Sclerosis causes gait alteration, even in the early stages of the disease. Traditional methods to quantify gait impairment, such as performance-based measures, lab-based motion analyses, and self-report, have limited ecological relevance. The Mon4t® app is a digital tool that uses sensors embedded in standard smartphones to measure various gait parameters.

OBJECTIVES: To evaluate the use of Mon4t® technology in monitoring MS patients.

METHODS: 100 MS patients and age-matched healthy controls were evaluated using both a human rater and the Mon4t Clinic™ app. Three motor tasks were performed: 3m Timed up and go test (TUG), 10m TUG, and tandem walk. The digital markers were used to compare MS vs. HC, MS with EDSS=0 vs. HC, and MS with EDSS=0 vs. MS with EDSS>0. Within the MS EDSS>0 group, correlations between digital gait markers and the EDSS score were calculated.

RESULTS: Significant differences were found between MS patients and HC in multiple gait parameters. When comparing MS patients with minimal disability (EDSS=0) and HC: On the 3m TUG task, MS patients took longer to complete the task (mean difference 0.167seconds, $p=0.034$), took more steps (mean difference 1.32 steps, $p=0.003$), and had a weaker ML step-to-step correlation (mean difference 0.1, $p=0.001$). The combination of features from the three motor tasks allowed distinguishing a nondisabled MS patient from a HC with high confidence (AUC of 85.65 on the ROC). When comparing MS patients with minimal disability (EDSS=0) to those with higher disability (EDSS>0): On the tandem walk task, patients with EDSS>0 took significantly longer to complete 10 steps than those with EDSS=0 (mean difference 4.63 seconds, $p<0.001$), showed greater ML sway (mean difference 0.2, $p<0.001$), and had larger angular velocity in the SI axis on average (mean difference 2.31 degrees/sec, $p=0.01$). A classification model achieved 81.79 ROC AUC. In the subgroup of patients with EDSS>0, gait features significantly correlated with EDSS score in all three tasks.

CONCLUSION: The findings demonstrate the potential of digital gait assessment to augment traditional disease monitoring and support clinical decision making. The Mon4t® app provides a convenient and ecologically relevant tool for monitoring MS patients and detecting early changes in gait impairment.

Language: en

Keywords: Smartphone; Digital monitoring; Gait analysis; Multiple sclerosis

Breaking up sedentary time reduces recurrent fall risk, but not incident fracture risk in older men

Roe LS, Harrison S, Cawthon PM, Ensrud K, Gabriel KP, Kado DM, Cauley JA. JBMR Plus 2023; 7(12): e10803.

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Abstract

Apart from physical activity volume, frequent breaks from sedentary bouts and active bouts may differentially reduce fall and fracture risk. We assessed the longitudinal relationship between frequency of breaks from time spent sedentary and frequency of active bouts with recurrent falls and fractures. The sample included 2918 men aged 79.0 ± 5.1 years with free-living activity (SenseWear Armband) at the Osteoporotic Fractures in Men Study (MrOS) year 7 (2007-2009) visit. Men were divided into quartiles by the number of breaks from sedentary bouts (sedentary bout: 5+ minutes sedentary; <1.5 metabolic equivalents of task [METs]) and separately by active bout frequency (active bout: 5+ minutes of activity; ≥ 1.5 METs). Recurrent falls (2+ falls/year) and fractures were ascertained by self-report; fractures were radiographically confirmed. Generalized estimating equations estimated the recurrent fall odds, with restricted cubic splines applied to assess nonlinear relationships. Cox proportional hazards models estimated fracture risk. Over 4 years of follow-up after year 7, 1025 (35.1%) men were fallers. Over 8.40 ± 4.10 years of follow-up, 640 (21.9%) men experienced a fracture. There was a significant nonlinear U-shaped relationship between number of breaks from sedentary bouts and recurrent falls ($p < 0.001$); compared with men with few breaks from sedentary bouts (1.4- <13.6), the odds of recurrent falls were lower with a moderate number (13.6- <17.0 , odds ratio [OR] = 0.82, 95% confidence interval [CI] 0.66, 1.01; 17.0- <20.4 , OR = 0.79, 95% CI 0.64, 0.99), but not with the highest number of breaks from sedentary bouts (20.4-34.6, OR = 1.01, 95% CI 0.81, 1.27).

RESULTS remained borderline significant after adjusting for total sedentary time. Men with the highest compared with the lowest number of breaks from sedentary bouts had a lower fracture risk, but the association was attenuated after adjustment for total sedentary time. No associations were observed for active bout frequency. In conclusion, breaking up extended periods of sedentary time reduces fall risk regardless of total sedentary time. © 2023 The Authors. JBMR Plus published by Wiley Periodicals LLC. on behalf of American Society for Bone and Mineral Research.

Language: en

Keywords: EPIDEMIOLOGY; AGING; EXERCISE; FALLS; FRACTURES; PHYSICAL ACTIVITY

Classification of fracture risk in fallers using dual-energy X-ray absorptiometry (DXA) images and deep learning-based feature extraction

Senanayake D, Seneviratne S, Imani M, Harijanto C, Sales M, Lee P, Duque G, Ackland DC. JBMR Plus 2023; 7(12): e10828.

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Abstract

Dual-energy X-ray absorptiometry (DXA) scans are one of the most frequently used imaging techniques for calculating bone mineral density, yet calculating fracture risk using DXA image features is rarely performed. The objective of this study was to combine deep neural networks, together with DXA images and patient clinical information, to evaluate fracture risk in a cohort of adults with at least one known fall and age-matched healthy controls. DXA images of the entire body as, well as isolated images of the hip, forearm, and spine (1488 total), were obtained from 478 fallers and 48 non-faller controls. A modeling pipeline was developed for fracture risk prediction using the DXA images and clinical data. First, self-supervised pretraining of feature extractors was performed using a small vision transformer (ViT-S) and a convolutional neural network model (VGG-16 and Resnet-50). After pretraining, the feature extractors were then paired with a multilayer perceptron model, which was used for fracture risk classification. Classification was achieved with an average area under the receiver-operating characteristic curve (AUROC) score of 74.3%. This study demonstrates ViT-S as a promising neural network technique for fracture risk classification using DXA scans. The findings have future application as a fracture risk screening tool for older adults at risk of falls. © 2023 The Authors. JBMR Plus published by Wiley Periodicals LLC on behalf of American Society for Bone and Mineral Research.

Language: en

Keywords: AGING; ANALYSIS/QUANTITATION OF BONE; BIOENGINEERING; DXA; FRACTURE RISK ASSESSMENT; ORTHOPAEDICS; PRACTICE/POLICYRELATED ISSUES

Assessing gait & balance in adults with mild balance impairment: G&B app reliability and validity

Shafi H, Awan WA, Olsen S, Siddiqi FA, Tassadaq N, Rashid U, Niazi IK. *Sensors* (Basel) 2023; 23(24): e9718.

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PMID: 38139564

Abstract

Smartphone applications (apps) that utilize embedded inertial sensors have the potential to provide valid and reliable estimations of different balance and gait parameters in older adults with mild balance impairment. This study aimed to assess the reliability, validity, and sensitivity of the Gait&Balance smartphone application (G&B App) for measuring gait and balance in a sample of middle- to older-aged adults with mild balance impairment in Pakistan. Community-dwelling adults over 50 years of age ($N = 83$, 50 female, range 50-75 years) with a Berg Balance Scale (BBS) score between 46/56 and 54/56 were included in the study. Data collection involved securing a smartphone to the participant's lumbosacral spine. Participants performed six standardized balance tasks, including four quiet stance tasks and two gait tasks (walking looking straight ahead and walking with head turns). The G&B App collected accelerometry data during these tasks, and the tasks were repeated twice to assess test-retest reliability. The tasks in quiet stance were also recorded with a force plate, a gold-standard technology for measuring postural sway. Additionally, participants completed three clinical measures, the BBS, the Functional Reach Test (FRT), and the Timed Up and Go Test (TUG). Test-retest reliability within the same session was determined using intraclass correlation coefficients (ICCs) and the standard error of measurement (SEM). Validity was evaluated by correlating the G&B App outcomes against both the force plate data and the clinical measures using Pearson's product-moment correlation coefficients. To assess the G&B App's sensitivity to differences in balance across tasks and repetitions, one-way repeated measures analyses of variance (ANOVAs) were conducted. During quiet stance, the app demonstrated moderate reliability for steadiness on firm ($ICC = 0.72$) and compliant surfaces ($ICC = 0.75$) with eyes closed. For gait tasks, the G&B App indicated moderate to excellent reliability when walking looking straight ahead for gait symmetry ($ICC = 0.65$), walking speed ($ICC = 0.93$), step length ($ICC = 0.94$), and step time ($ICC = 0.84$). The TUG correlated with app measures under both gait conditions for walking speed ($r = -0.70$ and 0.67), step length ($r = -0.56$ and -0.58), and step time ($r = 0.58$ and 0.50). The BBS correlated with app measures of walking speed under both gait conditions ($r = 0.55$ and 0.51) and step length when walking with head turns ($r = 0.53$). Force plate measures of total distance wandered showed adequate to excellent correlations with G&B App measures of steadiness. Notably, G&B App measures of walking speed, gait symmetry, step length, and step time, were sensitive to detecting differences in performance between standard walking and the more difficult task of walking with head turns. This study demonstrates the G&B App's potential as a reliable and valid tool for assessing some gait and balance parameters in middle-to-older age adults, with promise for application in low-income countries like Pakistan. The

app's accessibility and accuracy could enhance healthcare services and support preventive measures related to fall risk.

Language: en

Keywords: older adults; reliability; validity; smartphone; balance; accelerometer

Prevalence and risk factors of osteoporosis in a Chinese population: a cross-sectional study in Xi'an, Shaanxi Province, China

Song J, Zhao J, Liu T, Li Y, Dang X, Wang W. Med. Sci. Monit. 2023; 29: e942346.

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Abstract

BACKGROUND Osteoporosis is a systemic chronic disease characterized by bone mineral density (BMD) reduction. This study aimed to assess the prevalence of osteoporosis and fracture risks in northwestern China and investigate the related anthropometric risk factors. **MATERIAL AND METHODS** Between July 2022 and August 2022, 1429 participants (1295 females, 134 males) with measured BMD were recruited to participate in this cross-sectional study. Data on height, weight, and T score were collected. Spearman's correlation and multiple linear regression analysis were used to investigate the relationships between various demographic factors and BMD and the 10-year risk of major osteoporotic fracture (MO) and hip fracture (HP).

RESULTS The overall prevalence of osteoporosis in northwest China was 42.34%, with 44.56% in females and 20.90% in males. Age negatively affects females' T scores ($r=-0.304$, $P<0.05$), and height positively influences both sexes' T scores ($r=0.059$, $P<0.05$). Age ($r=0.148$, $P<0.05$) and height were positive predictors of MO ($r=0.027$, $P<0.05$), while weight was a negative predictor ($r=-0.035$, $P<0.05$). The conclusion for HP was consistent with that of MO, except for the T score, which was a positive predictor of HP ($r=0.014$, $P<0.05$).

CONCLUSIONS The prevalence of osteoporosis in northeast China is high. The association between anthropometric parameters and osteoporosis in adults in northwest China is different between sexes.

Language: en

Keywords: Adult; Humans; Female; Male; Risk Factors; Cross-Sectional Studies; Prevalence; China/epidemiology; *Osteoporosis/epidemiology; *Osteoporotic Fractures; Absorptiometry, Photon; Bone Density

Recruiting patients for falls prevention in the emergency department - worth the challenge

Stuckenschneider T, Schmidt L, Speckmann EM, Koschate J, Zieschang T. BMC Geriatr. 2023; 23(1): e880.

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Abstract

BACKGROUND: Severe falls escalate the risk of future falls and functional decline as indicated by recent global guidelines. To establish effective falls prevention, individuals at highest risk must be thoroughly studied and, therefore, successfully recruited.

OBJECTIVE: Recruiting from an emergency department (ED) may mitigate common selection biases, such as overrepresentation of individuals with a higher social status and healthier lifestyle. However, this approach presents unique challenges due to ED-specific conditions. Hence, we present the successes and challenges of an ED-based recruitment for an observational study.

METHODS: The SeFalled study targets older adults aged ≥ 60 years, who present to either of two hospitals in Oldenburg after a fall without subsequent admission. A study nurse addressed individuals in the EDs. Subsequently, potential participants were contacted by phone to arrange a home visit for obtaining written consent. Data of participants were compared with total admissions during the recruitment period to determine recruitment rate and compare patients' characteristics.

RESULTS: Over 1.500 individuals met the inclusion criteria. Of these, 288 participants were successfully recruited. Most patients presented to the ED outside of the study team's working hours, and some opted not to participate (main reason: too unwell (40%)). Compared to working hours, a participant was recruited every 14 h. Comparing characteristics, a trend towards better health and younger age was observed.

CONCLUSION: ED-based recruitment offers the opportunity to include more diverse individuals in falls prevention. To achieve adequate sample sizes, flexibility in working days and hours of the research team are obligatory. **TRIAL REGISTRATION:** DRKS00025949.

Language: en

Keywords: Falls; Observational study; Emergency department; Older people; Recruitment

Gait and falls in benign paroxysmal positional vertigo: a systematic review and meta-analysis: Corrigendum

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Abstract

The labeling of the axes displayed in Figure 10 was switched. The data and results are correct. The corrected figure may be viewed by following the DOI link.

Language: en

A dynamic spatiotemporal model for fall warning and protection

Xu S, Yang Z, Wang D, Tang Y, Lin J, Gu Z, Ning G. Med. Biol. Eng. Comput. 2023; ePub(ePub): ePub.

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Abstract

Early detection of falls is important for reducing fall injuries. However, existing fall detection strategies mostly focus on reducing impact injuries rather than avoiding falls. This study proposed the concept of identifying "Imbalance Point" to warn the body imbalance, allowing sufficient time to recover balance. And if falling cannot be avoided, an impact sign is released by detecting the "Fall Point" prior to the impact. To achieve this goal, motion prediction model and balance recovery model are integrated into a spatiotemporal framework to analyze dynamic and kinematic features of body motion. Eight healthy young volunteers participated in three sets of experiment: Normal trial, Recovery trial and Fall trial. The body motion in the trials was recorded using Microsoft Azure Kinect. The results show that the developed algorithm for Fall Point detection achieved 100% sensitivity and 98.6% specificity, along with an average lead time of 297 ms. Moreover, Imbalance Point was successfully detected in all Fall trials, and the average time interval between Imbalance Point and Fall Point was 315 ms, longer than reported step reaction time for elderly (approximately 270 ms). The experiment results demonstrate that the developed algorithm have great potential for fall warning and protection in the elderly.

Language: en

Keywords: Balance recovery model; Fall Point; Fall warning; Imbalance Point; Motion prediction