Awareness about fall risk and measures of fall prevention among older adults in Buraidah, Saudi Arabia

Almesned RA, Jahan S. Cureus 2024; 16(6): e63328.

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Abstract

Background Falls, particularly common among the elderly, pose significant health risks and mortality rates worldwide. Factors such as decline related to old age, gender, medical conditions, and environmental hazards contribute to falls. Prevention strategies focus on environmental modifications, exercise programs, medication reviews, and vitamin D supplementation to reduce fall risks and improve outcomes. This study aims to investigate the awareness of fall risk and measures of fall prevention among older adults in Buraidah, Qassim, Saudi Arabia, and examines the relationship between the level of awareness and various sociodemographic factors.

METHODology This cross-sectional study was conducted among elderly patients at primary healthcare centers in Buraidah, Qassim province, Saudi Arabia. Data were collected via an interviewer-administered questionnaire assessing awareness and prevention of falls. Data were cleaned in Excel (Microsoft Corp., Redmond, WA, USA) and analyzed using SPSS version 29 (IBM Corp., Armonk, NY, USA). A linear regression model was used to determine the association. Statistical significance was established at a p-value of 0.05 or lower.

RESULTS Our study included 280 elderly participants, of whom 58.2% were female. The mean age was 63.7 years (SD = 4.9), and 34.6% had a bachelor's degree. Regarding fall awareness, 81.4% acknowledged preventability. Notable preventive measures included medication reviews (64.6%), eye examinations (85.7%), physical activity (82.2%), vitamin D supplementation (76.8%), and home safety devices (97.5%). Regarding fall prevention, 61.8% underwent medical examinations annually, and 65.4% had vision checkups. Higher awareness about fall risks was associated with female gender ($\beta = 1.394$, 95% confidence interval (CI) = 0.199 to 2.589, $p = 0.022$), higher education ($\beta = 0.931$, 95% CI = 0.549 to 1.314, $p < 0.001$), and chronic diseases ($\beta = -1.935$, 95% CI = -3.313 to -0.556, $p = 0.006$).

CONCLUSIONS Our study demonstrates significant awareness among elderly participants regarding fall preventability and measures. Females and those with higher education levels had higher levels of awareness. These findings highlight the importance of targeted interventions to increase awareness and preventive measures among elderly populations.

Language: en

Keywords: prevention; elderly; falls; awareness; saudi arabia

Validation of an IMU-based gait analysis method for assessment of fall risk against traditional methods

García-de-Villa S, Ruiz LR, Neira GGV, Álvarez MN, Huertas-Hoyas E, Del-Ama AJ, Rodriguez-Sanchez MC, Seco F, Jiménez AR. IEEE J. Biomed. Health Inform. 2024; ePub(ePub): ePub.

DOI: 10.1109/JBHI.2024.3434973 **PMID:** 39074006

Abstract

Falls are a severe problem in older adults, often resulting in severe consequences such as injuries or loss of consciousness. It is crucial to screen fall risk in order to prescribe appropriate therapies that can potentially prevent falls. Identifying individuals who have experienced falls in the past, commonly known as fallers, is used to evaluate fall risk, as a prior fall indicates a higher likelihood of future falls. The methods that have the most support from evidence are Gait Speed (GS) and Time Up and Go (TUG), which use specific cut-off values to evaluate the fall risk. There have been proposals for alternative methods that use wearable sensor technology to improve fall risk assessment. Although these technological alternatives are promising, further research is necessary to validate their use in clinical settings. In this study, we propose a method for identifying fallers based on a Support Vector Machine (SVM) classifier. The inputs for the classifier are the gait parameters obtained from a 30-minute walk recorded using an Inertial Measurement Unit (IMU) placed at the foot of patients. We validated our proposed method using a sample of 157 patients aged over 70 years. Our findings indicate significant differences ($p< 0.05$) in stride speed, clearance, angular velocity, acceleration, and coefficient of variability among steps between fallers and non-fallers. The proposed method demonstrates the its potential to classify fallers with an accuracy of [79.6]%, slightly outperforming the GS method which provides an accuracy of [77.0]%, and also overcomes its dependency on the cut-off speed to determine fallers. This method could be valuable in detecting fallers during long-term monitoring that does not require periodic evaluations in a clinical setting.

Language: en

Automated identification of fall-related injuries in unstructured clinical notes

Ge W, Coelho LMG, Donahue MA, Rice HJ, Blacker D, Hsu J, Newhouse JP, Hernández-Díaz S, Haneuse S, Westover MB, Moura LMVR. Am. J. Epidemiol. 2024; ePub(ePub): ePub.

DOI: 10.1093/aje/kwae240 **PMID:** 39060160

Abstract

Fall-related injuries (FRIs) are a major cause of hospitalizations among older patients, but identifying them in unstructured clinical notes poses challenges for large-scale research. In this study, we developed and evaluated Natural Language Processing (NLP) models to address this issue. We utilized all available clinical notes from the Mass General Brigham for 2,100 older adults, identifying 154,949 paragraphs of interest through automatic scanning for FRI-related keywords. Two clinical experts directly labeled 5,000 paragraphs to generate benchmark-standard labels, while 3,689 validated patterns were annotated, indirectly labeling 93,157 paragraphs as validated-standard labels. Five NLP models, including vanilla BERT, RoBERTa, Clinical-BERT, Distil-BERT, and SVM, were trained using 2,000 benchmark paragraphs and all validated paragraphs. BERT-based models were trained in three stages: Masked Language Modeling, General Boolean Question Answering (QA), and QA for FRI. For validation, 500 benchmark paragraphs were used, and the remaining 2,500 for testing. Performance metrics (precision, recall, F1 scores, Area Under ROC [AUROC] or Precision-Recall [AUPR] curves) were employed by comparison, with RoBERTa showing the best performance. Precision was 0.90 [0.88-0.91], recall [0.90-0.93], F1 score 0.90 [0.89-0.92], AUROC and AUPR curves of 0.96 [0.95-0.97]. These NLP models accurately identify FRIs from unstructured clinical notes, potentially enhancing clinical notes-based research efficiency.

Language: en

Keywords: Medicare; Natural Language Processing; BERT; Fall-related injuries; Machine-Learning

Association between frailty status and falling in older adults with hip fracture: a cross-sectional study

Jiang L, Yang L, Hong Z, Yao X. Postgrad. Med. 2024; ePub(ePub): ePub.

DOI: 10.1080/00325481.2024.2384827 **PMID:** 39046320

Abstract

OBJECTIVES: There is limited research on the relationship between frailty status and falls in hip fractures in older participants. This study aimed to investigate the relationship between frailty and falls in older adults who had experienced a hip fracture.

METHODS: From June 2023 to January 2024, the study population comprised 253 hip fracture patients aged 60 years and over. They were admitted to the orthopedic department of a tertiary care hospital. We excluded participants with incomplete information. The 5-item FRAIL scale (Fatigue, Resistance, Ambulation, Illnesses, and Loss of Weight) was used to assess frailty status and the patient's self-reported falls. We analyzed the relationship between frailty and falls in older hip fracture patients using logistic regression models, subgroup analyses, and stratified analyses.

RESULTS: Finally, 174 older participants with hip fractures were identified in this study, where 155 (89.1%) had falls. Among 155 falls, 39 (78.0%) were in the robust group, 65 (91.5%) were in the pre-frail group, and 51 (96.2%) were in the frail group. An analysis revealed that among more than 60 years old hip fracture patients, each additional point in frailty score was significantly linked to a higher likelihood of experiencing a fall (OR: 1.97, 95%CI: 1.10-3.52, $p < 0.05$). While frailty appeared as a categorical variable, this association was stronger with an OR of 2.68 (95% CI: 0.71-10.21) in the pre-frailty group and 7.95 (95% CI: 1.11-57.08), compared to the robust group (p for trend < 0.005). In subgroup analyses, an interaction was observed between frailty and falling according to sex. In stratified analyses, the relationship between frailty status and fall significantly differed between the male and female groups (male OR: 1.49, 95% CI: 0.71 t-3.13; female OR: 7.54, 95% CI: 1.13 to 50.32, p for interaction = 0.043).

CONCLUSIONS: The study revealed a notable correlation between frailty and falls, with gender and frailty showing an interaction impact on the increased occurrence of falls. Therefore, further research across diverse disease populations is needed to explore the link between frailty status and falls. Large-scale prospective studies are necessary to clarify the causality of this relationship. CLINICAL TRIAL REGISTRATION: Chinese Clinical Trial Registry (ChiCTR2300073031).

Language: en

Keywords: Cross-sectional study; Fall; Frailty; Hip fracture

Walking and balance in older adults with age-related hearing loss: a cross-sectional study of cases and matched controls

Kolasa S, Magnussen LH, Nilsen RM, Wilhelmsen KT, Goplen FK, Nordahl SHG, Meldrum D, Berge JE, Hernes SS, Steihaug OM, Bogen B. Gait Posture 2024; 113: 398-406.

DOI: 10.1016/j.gaitpost.2024.07.301 **PMID:** 39088930

Abstract

BACKGROUND: Hearing loss (HL) is prevalent in older individuals. It is suggested that there is an association between age-related HL, walking and balance, leading to poorer function and increased risk of falls in older individuals. RESEARCH QUESTION: Is HL associated with physical performance, gait variability, and postural sway in older adults, and will additional dizziness moderate the effect of HL on balance? METHODS: In this cross-sectional study we examined 100 older individuals (age ≥70 years, 60 % females), divided in two groups, with or without age-related HL. Physical function and balance were evaluated by the Short Physical Performance Battery (SPPB), postural sway measured on a force platform (posturography), and balance in walking (gait variability) measured with a body-worn sensor. Multiple linear regression was used to examine the relationships between the variables, with physical function and balance as outcomes and HL as a dichotomous exposure (>30 dB). For all analyses, we further tested if associations were modified by self-reported dizziness.

RESULTS: Multiple regression analysis with HL, age, sex, education, diabetes, and cardiovascular disease revealed a significant association between reduced SPPB and HL. Multiple linear regression analysis also showed that HL was associated with increased postural sway on firm surface with eyes open and closed after adjusting for age, sex, education, diabetes, and cardiovascular disease. There was significant association between HL and increased gait variability during dual task walking in all directions after adjusting for age, sex, education, diabetes, and cardiovascular disease. Further, we found that the association between HL and SPPB was significantly stronger in those with dizziness compared with those without dizziness. Dizziness also modified the association of HL with the other SPPB sub-scores but not for the other outcomes of postural sway or gait variability. SIGNIFICANCE: In this study, age-related HL was associated with worse physical performance as measured by SPPB, postural sway, and gait variability. This relationship illustrates the importance of assessing physical performance in people with HL to prevent risk of falls and disability.

Language: en

Keywords: Hearing loss; Balance; Gait; Older individuals; Physical function

Imbalance and falls in patients with Parkinson's disease: causes and recent developments in training and sensor-based assessment

Mylius V, Zenev E, Brook CS, Brugger F, Maetzler W, Gonzenbach R, Paraschiv-Ionescu A. Brain Sci. 2024; 14(7).

DOI: 10.3390/brainsci14070625 **PMID:** 39061366 **PMCID:** PMC11274436

Abstract

Imbalance and falls in patients with Parkinson's disease (PD) do not only reduce their quality of life but also their life expectancy. Aging-related symptoms as well as disease-specific motor and non-motor symptoms contribute to these conditions and should be treated when appropriate. In addition to an active lifestyle, advanced exercise training is useful and effective, especially for less medically responsive symptoms such as freezing of gait and postural instability at advanced stages. As treadmill training in non-immersive virtual reality, including dual tasks, significantly reduced the number of falls in PD patients, the mechanism(s) explaining this effect should be further investigated. Such research could help to select the most suitable patients and develop the most effective training protocols based on this novel technology. Real-life digital surrogate markers of mobility, such as those describing aspects of endurance, performance, and the complexity of specific movements, can further improve the quality of mobility assessment using wearables.

Language: en

Keywords: technology; clinical research; falls; imbalance; Parkinson’s disease

Body composition, falls, and freezing of gait in Parkinson's disease: gender-specific effects

Pongmala C, Stonsaovapak C, van Emde Boas M, Bhanderi H, Luker A, Michalakis F, Kanel P, Albin RL, Haus JM, Bohnen NI. J. Fraility Aging 2024; 13(3): 293-299.

DOI: 10.14283/jfa.2024.31 **PMID:** 39082775 **PMCID:** PMC11292035

Abstract

BACKGROUND: Postural instability and gait difficulties (PIGD) are a significant cause of mobility loss and lower quality of life in Parkinson's disease (PD). When PD progresses, patients may experience falls and freezing of gait (FoG) resulting in fear of falling and increasing sedentariness. Sedentary behavior results in sarcopenia associated with other changes in body composition, especially in older patients becoming frail. Previous studies have shown gender-specific changes in body composition with aging as well as gender disparities in symptoms and progression of PD, yet the association between gender-specific body composition and PIGD symptoms such as FoG along with falls, remains unexplored. OBECTIVE: This study aimed to investigate the association between gender-specific changes in body composition, FoG and falls assessment.

METHODS: 136 PD subjects underwent detailed clinical test batteries and had whole-body composition assessed using dual-energy X-ray absorptiometry (DXA). Multivariate logistic forward stepwise regression was performed to define body composition associations for FoG and falls.

RESULTS: Multivariate regression analysis revealed that in males with PD, lower leg lean mass was significantly associated with the presence of FoG (OR, 0.429; 95% CI, 0.219-0.839; p=0.013) but not with falls. In females with PD, higher leg adipose mass was significantly associated with falls (OR, 4.780; 95% CI, 1.506-15.174; p=0.008) but not with FoG.

CONCLUSION: These observations suggest gender specific associations between body composition and FoG vs. falls in PD. Future research should explore the impact of interventions on body composition in individuals with PD by paying specific attention to gender differences.

Language: en

Keywords: Humans; Aged; Female; Male; Middle Aged; gender differences; risk factors; Sex Factors; Aged, 80 and over; *Accidental Falls/statistics & numerical data/prevention & control; *Body Composition; *Gait Disorders, Neurologic/epidemiology/physiopathology; *Parkinson Disease/complications/physiopathology; Absorptiometry, Photon; ALMI; Fat mass; muscle weakness; Postural Balance/physiology

Association between falls and social frailty in community-dwelling older Japanese adults

Sawa R, Doi T, Tsutsumimoto K, Nakakubo S, Sakimoto F, Matsuda S, Shimada H. J. Gerontol. B Psychol. Sci. Soc. Sci. 2024; ePub(ePub): ePub.

DOI: 10.1093/geronb/gbae127 **PMID:** 39076102

Abstract

OBJECTIVES: This study aimed to investigate the association between falls and social frailty and its components among older Japanese adults.

METHOD: This is a cross-sectional study. Participants were categorized into three groups based on the number of falls in the past year: no fall (none), a single fall (occasional), and more than one fall (recurrent). The participants who met two or more of the following criteria were defined as socially frail: living alone, going out less frequently compared with the previous year, rarely visiting friends, feeling unhelpful to friends or family, and not talking with someone daily.

RESULTS: A total of 4,495 older Japanese adults living in a community analyzed in this study (51.0% women). Of the participants in this study, 3,851 (85.7%) were categorized as none, 443 (9.9%) as occasional, and 201 (4.5%) as recurrent. The proportion of participants considered socially frail was 11.5% in this study. Recurrent falls were associated with social frailty, even after adjusting for covariates (odds ratio [OR], 1.49; 95% confidence interval [CI], 1.01-2.19). The experience of recurrent falls was associated with the following components: "feeling unhelpful to friends and family" (OR, 1.62; 95% CI, 1.14-2.31) and "going outside less frequently compared with last year" (OR, 1.57; 95% CI, 1.06-2.31).

DISCUSSION: Among older Japanese adults, recurrent falls were associated with social frailty and with two of its components in particular: social roles and social participation. Future longitudinal studies should be conducted to gain insight into any causal relationships between these variables.

Language: en

Keywords: Japan; Accidental falls; Social participation; Social role

Risk factors for older people re-presenting to the emergency department with falls: a case-control analysis

San Juan C, Appiah-Kubi L, Mitropoulos J, Thomson L, Demosthenous A, Kelly AM. Emerg. Med. Australas. 2024; ePub(ePub): ePub.

DOI: 10.1111/1742-6723.14471 **PMID:** 39086015

Abstract

OBJECTIVE: Falls are a leading cause for ED presentations among older adults. Existing secondary falls prevention interventions have not been shown to decrease fall-related ED re-presentation, indicating a need to better understand contributing factors. Our aim was to evaluate risk factors for fall re-presentations among the older patient population presenting to the ED.

METHODS: This is a single-centre case-control study. Cases were patients aged ≥65 years with two falls-related ED presentations within 6 months. Age- and sex-matched controls had a corresponding index, but no subsequent ED fall presentation. Data collected included falls risk factors and clinical features of the index presentation. Univariate and multivariate analyses were conducted to assess the relationship between potential exposures and fall re-presentation.

RESULTS: A total of 300 patients (mean age 83.8 years) were studied. On univariate analysis, factors significantly associated with ED fall re-presentation included increasing multimorbidity ($P < 0.0001$), increasing number of medications ($P < 0.0001$) and residing in residential aged care facility (RACF) (odds ratio [OR] 3.06, $P < 0.001$). No factors remained significant on multivariate analysis. Post-hoc analyses for the RACF subgroup showed that psychotropic medication use (OR 1.65, $P = 0.04$) and prior fall within 12 months (OR 2.68, $P < 0.001$) were significantly associated with re-presentation. Initial presentation with serious musculoskeletal injury was a significant protective factor (OR 0.21, $P = 0.02$).

CONCLUSION: The present study failed to identify factors independently associated with ED fall re-presentation, suggesting that the factors are complex and inter-related. Two high-risk populations were identified - those from RACF and those initially presenting with falls not resulting in serious injury.

Language: en

Keywords: elderly; emergency department; fall; re-presentation

Effect of 10-week whole-body vibration training on falls and physical performance in older adults: a blinded, randomized, controlled clinical trial with 1-year follow-up

Sievänen H, Piirtola M, Tokola K, Kulmala T, Tiirikainen E, Kannus P, Kiiski J, Uusi-Rasi K, Karinkanta S. Int. J. Environ. Res. Public Health 2024; 21(7).

DOI: 10.3390/ijerph21070866 **PMID:** 39063443 **PMCID:** PMC11276669

Abstract

Whole-body vibration training (WBV) training has shown positive effects on bone strength, muscle strength, and balance, but the evidence on fall prevention is not yet persuasive. This study aimed to evaluate the effectiveness of WBV training in preventing falls and improving physical performance among older adults at fall risk. The study was an assessor- and participant-blinded, randomized, and controlled 10-week training trial with a 10-month follow-up. One hundred and thirty older adults (mean age 78.5 years, 75% women) were randomly allocated into the WBV group (n = 68) and the low-intensity wellness group (n = 62). Falls were prospectively collected using monthly returned and verified diaries. Physical performance was evaluated at baseline before randomization, after the intervention, and follow-up with established methods. The data were analyzed on an intention-to-treat basis. Negative binomial regression was used to estimate the incidence rate ratios for falls, and Cox regression models were used to calculate the hazard ratios for fallers. Between-group differences in physical performance were estimated by generalized linear mixed models. The retention rate was 93%, and the mean adherence to the WBV training was 88% and 86% to the wellness training. Sixty-eight participants fell at least once, and there were 156 falls in total. In the WBV group, the incidence rate of falls was 1.5 (95% confidence interval 0.9 to 2.5) compared to the wellness group (p = 0.11). The hazard ratio for fallers in the WBV group was 1.29 (0.78 to 2.15) (p = 0.32). There was no between-group difference in physical performance after the training period, but by the end of the follow-up, WBV-related benefits appeared. The chair-rising capacity was maintained in the WBV group, while the benefit disappeared in the wellness group (p = 0.004). Also, the 0.5-point difference in short physical performance battery (SPPB) score favored WBV training (p = 0.009). In conclusion, progressive side-alternating WBV training was feasible and well-tolerated among fall-prone older adults. During the one-year follow-up, WBV training was associated with improved physical performance but did not prevent falls compared to chair-based group exercises.

Language: en

Keywords: Humans; Aged; Female; Male; prevention; Aged, 80 and over; Follow-Up Studies; *Accidental Falls/prevention & control; *Physical Functional Performance; *Vibration/therapeutic use; exercise; fall risk; fractures; muscle strength; physical functioning; Postural Balance

Associations between components of self-management theory and falls among older adults

Sima C, Taani MH, Apchemengich I, Andargeery SY. J. Gerontol. Nurs. 2024; 50(8): 19-28.

DOI: 10.3928/00989134-20240703-02 **PMID:** 39088049

Abstract

PURPOSE: To examine the relationship of key individual and family self-management theory (IFSMT) components, including self-management process variables on proximal (self-management behaviors) and distal (falls) outcomes in older adults.

METHOD: A secondary data analysis was conducted using data of 99 older adults living in continuing care retirement communities in the U.S. Midwest. Descriptive statistics, multiple regression, and logistic regression were performed to analyze the data.

RESULTS: The multiple regression model demonstrated a positive association between self-efficacy for physical activity and steps per day. The logistic regression model showed that high expectations regarding aging are associated with reduced likelihood of meeting daily protein intake.

CONCLUSION: Key components of the IFSMT, such as self-efficacy, steps per day, and expectations regarding aging, are important when designing self-management interventions to prevent falls. [Journal of Gerontological Nursing, 50(8), 19-28.].

Language: en

Keywords: Humans; Aged; Female; Male; Aged, 80 and over; *Self Efficacy; *Accidental Falls/prevention & control/statistics & numerical data; *Self-Management; Self Care

Food insecurity, vision impairment, and longitudinal risk of frailty and falls in the National Health and Aging Trends Study

Wennberg AM, Ek S, Na M. J. Frailty Aging 2024; 13(3): 285-292.

DOI: 10.14283/jfa.2024.21 **PMID:** 39082774

Abstract

BACKGROUND: Both food insecurity (FI) and vision impairment (VI), which are linked, have been independently associated with frailty and falls.

OBJECTIVES: Understand how FI and VI may together contribute to frailty and fall risk could improve insight into these growing public health challenges. DESIGN, SETTING, PARTICIPANTS, MEASUREMENTS: This study included 5,963 participants aged 65 and older enrolled in the National Health and Aging Trends Study. Participants were divided into four exposure groups ("No FI or VI," "FI, no VI," "VI, no FI," and "Both") based on self-report. The Fried Frailty Index and self-reported falls were assessed annually. We used adjusted logistic and Poisson regression models to examine cross-sectional associations and generalized estimating equations to examine longitudinal associations between FI/VI status and falls and frailty outcomes.

RESULTS: Most study participants reported neither FI nor VI (n=5169, 86.7%); however, having both FI and VI (n=57, 1%) was cross-sectionally associated with higher frailty score and higher odds of falling multiple times in the last year. FI and/or VI were longitudinally associated with higher frailty score and increased frailty risk, with the strongest association for Both (RRR=1.29, 95% CI 1.23, 1.58; OR=3.18, 95% CI 1.78, 5.69), and with falling, again highest among those with Both, for one (OR=2.47, 95% CI 1.41, 3.96) and multiple (OR=2.46, 95% CI 1.50, 4.06) falls in the last year.

CONCLUSION: Clinical and public health interventions could address the intersection of FI and VI with the aim of ameliorating the impact of these risk factors and health outcomes.

Language: en

Keywords: Humans; Cross-Sectional Studies; Risk Factors; Aged; Female; Male; United States/epidemiology; Aged, 80 and over; Longitudinal Studies; Aging; Longitudinal; *Food Insecurity; Frail Elderly/statistics & numerical data; Geriatric Assessment/methods; *Accidental Falls/statistics & numerical data; *Frailty/epidemiology; *Vision Disorders/epidemiology; modifiable risk factors; nationally-representative

Effects of proprioceptive neuromuscular facilitation technique on balance function and muscle health in older adults with high fall risk

Xiong X, Zang J, Zhu C, Wei W, Wang P, Wang J, Gao Q. J. Gerontol. Nurs. 2024; 50(8): 37-44.

DOI: 10.3928/00989134-20240702-03 **PMID:** 39088051

Abstract

PURPOSE: Older adults frequently encounter health challenges, such as impaired balance and muscle health, which increase risk of falls. The current study investigated the effectiveness of the proprioceptive neuromuscular facilitation (PNF) technique in improving balance and muscle health among older adults with high fall risk.

METHOD: A total of 160 older adults with high fall risk were randomized into control and intervention groups. Over 6 months, the control group received standard interventions, while the intervention group received the same interventions and additional PNF training.

RESULTS: Both groups demonstrated improvements in balance function over time, with the intervention group exhibiting significant improvements in Berg Balance Scale scores, Timed Up and Go test times, and 30-Second Chair Stand Test counts ($p < 0.05$). Bone density significantly increased in the intervention group compared to the control group ($p < 0.05$), although no substantial differences in lower limb muscle mass were observed. Satisfaction rates were higher and fall incidents fewer in the intervention group.

CONCLUSION: The PNF technique is effective in enhancing balance function and muscle health in older adults with high fall risk, demonstrating potential in reducing fall risk and improving quality of life among older adults. [Journal of Gerontological Nursing, 50(8), 37-44.].

Language: en

Keywords: Humans; Aged; Female; Male; Aged, 80 and over; Quality of Life; *Accidental Falls/prevention & control; *Postural Balance/physiology; Muscle, Skeletal/physiology; Proprioception/physiology