**Search Tracker**

**PICOT Question Organizer**

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| **PICOT** |  |  |
| **P** | **Population** | For adults >65 years of age in the retirement community |
| **I** | **Intervention or Issue of interest** | Does an exercise program |
| **C** | **Comparison** | Compared to no exercise program |
| **O** | **Outcome** | Decrease fall rates  |
| **T** | **Time frame** | Within one year |

**Search Tracker**

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| **Search #** | **Initial Search Terms** | **Database** | **AND/OR?** | **Added Search Terms** | **Title (Ti) Anywhere, etc.** | **Number of Articles Found** |
| 1 | Older adult, fall rate | EBSCO | && | Exercise  | Exercise reduces the fall rate in older adults | 289 |
| 2 | Older adult, fall rate | Science Direct | && | Exercise intervention | Exercise programs tend to reduce the fall rates in older adult patients | 351 |
| 3 | Older adult, fall rate | NCBI | && | Exercise, retirement | Exercise program reduces the fall rate in older adult, retired patients | 297 |

**References**

Lord, S. R., Castell, S., Corcoran, J., Dayhew, J., Matters, B., Shan, A., & Williams, P. (2003). The effect of group exercise on physical functioning and falls in frail older people living in retirement villages: a randomized, controlled trial. *Journal of the American Geriatrics Society*, *51*(12), 1685-1692.

**Level of Evidence:** Primary

**Abstract**

**Objectives:**To determine whether a 12‐month program of group exercise can improve physical functioning and reduce the rate of falling in frail older people.

**Design:**Cluster randomized, controlled trial of 12 months duration.

**Setting:**Retirement villages in Sydney and Wollongong, Australia.

**Participants:**Five hundred fifty‐one people aged 62 to 95 (mean±standard deviation=79.5±6.4) who were living in self‐ and intermediate‐care retirement villages.

**Measurements:**Accidental falls, choice stepping reaction time, 6‐minute walk distance postural sway, leaning balance, simple reaction time, and lower‐limb muscle strength.

**Results:**Two hundred eighty subjects were randomized to the weight‐bearing group exercise (GE) intervention that was designed to improve the ability of subjects to undertake activities for daily living. Subjects randomized to the control arm (n=271) attended flexibility and relaxation (FR) classes (n=90) or did not participate in a group activity (n=181). In spite of the reduced precision of cluster randomization, there were few differences in the baseline characteristics of the GE and combined control (CC) subjects, although the mean age of the GE group was higher than that of the CC group, and there were fewer men in the GE group. The mean number of classes attended was 39.4±28.7 for the GE subjects and 31.5±25.2 for the FR subjects. After adjusting for age and sex, there were 22% fewer falls during the trial in the GE group than in the CC group (incident rate ratio=0.78, 95% confidence interval (CI)=0.62–0.99), and 31% fewer falls in the 173 subjects who had fallen in the past year (incident rate ratio=0.69, 95% CI=0.48–0.99). At 6‐month retest, the GE group performed significantly better than the CC group in tests of choice stepping reaction time, 6‐minute walking distance, and simple reaction time requiring a hand press. The groups did not differ at retest in tests of strength, sway, or leaning balance.

**Conclusion:**These findings show that group exercise can prevent falls and maintain physical functioning in frail older people.

Öhman, H., Savikko, N., Strandberg, T., Kautiainen, H., Raivio, M., Laakkonen, M. L., ... & Pitkälä, K. H. (2016). Effects of exercise on functional performance and fall rate in subjects with mild or advanced Alzheimer's disease: secondary analyses of a randomized controlled study. *Dementia and geriatric cognitive disorders*, *41*(3-4), 233-241.

**Level of Evidence:** Primary

**Abstract**

***Background:*** Exercise improves functional performance in subjects with dementia. However, whether the benefits of exercise are evident in all stages of dementia remains uncertain. This study examines how people in different stages of Alzheimer's disease (AD) benefit from exercise intervention in their physical functioning and risk of falling. ***Methods:*** The present study is a subanalysis of a randomized controlled trial examining the effects of exercise intervention (twice a week for 12 months) in AD patients (n = 194). We studied the effects separately in participants with mild dementia and in participants with advanced dementia. ***Results:*** In subjects with mild dementia, the deterioration in physical functioning was slower in the intervention group than in the controls. Changes in Functional Independence Measure at 12 months were -2.7 (95% CI -0.5 to -4.9) in the intervention group and -10.1 (95% CI -7.0 to -13.3) in the control group (p < 0.001). The exercise intervention proved effective in preventing falls among patients with advanced AD, with an incidence rate ratio of 0.47 (95% CI 0.37-0.60; p < 0.001). ***Conclusions:*** Regular exercise may slow the rate of functional deterioration in mild AD and reduce falls in patients suffering from advanced AD.

Josephs, S., Pratt, M. L., Meadows, E. C., Thurmond, S., & Wagner, A. (2016). The effectiveness of Pilates on balance and falls in community dwelling older adults. *Journal of bodywork and movement therapies*, *20*(4), 815-823.

**Level of Evidence:** secondary

**Abstract**

**Purpose**

The purpose of this study was to determine whether [Pilates](https://www.sciencedirect.com/topics/nursing-and-health-professions/pilates) is more effective than traditional strength and balance exercises for improving balance measures, balance confidence and reducing falls in community dwelling older adults with fall risk.

**Method**

Thirty-one participants with fall risk were randomly assigned to the Pilates group (PG) or the traditional exercise group (TG). Both groups participated in 12 weeks of exercise, 2 times/week for 1 h.

**Results**

There was significant improvement in the Fullerton Advanced Balance Scale for both the PG (mean difference = 6.31, p < .05) and the TG (mean difference = 7.45, p = .01). The PG also showed significant improvement in the Activities-Specific Balance Confidence Scale (mean difference = 10.57, p = .008).

**Conclusion**

Both Pilates and traditional balance programs are effective at improving balance measures in community dwelling older adults with fall risk, with the Pilates group showing improved balance confidence.

Li, F., Harmer, P., Fitzgerald, K., Eckstrom, E., Akers, L., Chou, L. S., ... & Winters-Stone, K. (2018). Effectiveness of a therapeutic Tai Ji Quan intervention vs a multimodal exercise intervention to prevent falls among older adults at high risk of falling: a randomized clinical trial. *JAMA internal medicine*, *178*(10), 1301-1310.

**Level of Evidence:** Primary

**Abstract**

**Importance**  Falls in older adults are a serious public health problem associated with irreversible health consequences and responsible for a substantial economic burden on health care systems. However, identifying optimal choices from among evidence-based fall prevention interventions is challenging as few comparative data for effectiveness are available.

**Objective**  To determine the effectiveness of a therapeutically tailored *tai ji quan* intervention, *Tai Ji Quan*: Moving for Better Balance (TJQMBB), developed on the classic concept of *tai ji* (also known as tai chi), and a multimodal exercise (MME) program relative to stretching exercise in reducing falls among older adults at high risk of falling.

**Design, Setting, and Participants**  A single-blind, 3-arm, parallel design, randomized clinical trial (February 20, 2015, to January 30, 2018), in 7 urban and suburban cities in Oregon. From 1147 community-dwelling adults 70 years or older screened for eligibility, 670 who had fallen in the preceding year or had impaired mobility consented and were enrolled. All analyses used intention-to-treat assignment.

**Interventions**  One of 3 exercise interventions: two 60-minute classes weekly for 24 weeks of TJQMBB, entailing modified forms and therapeutic movement exercises; MME, integrating balance, aerobics, strength, and flexibility activities; or stretching exercises.

**Main Outcomes and Measures**  The primary measure at 6 months was incidence of falls.

**Results**  Among 670 participants randomized, mean (SD) age was 77.7 (5.6) years, 436 (65%) were women, 617 (92.1%) were white, 31 (4.6%) were African American. During the trial, there were 152 falls (85 individuals) in the TJQMBB group, 218 (112 individuals) in the MME group, and 363 (127 individuals) in the stretching exercise group. At 6 months, the incidence rate ratio (IRR) was significantly lower in the TJQMBB (IRR, 0.42; 95% CI, 0.31-0.56; *P* < .001) and MME groups (IRR, 0.60; 95% CI, 0.45-0.80; *P* = .001) compared with the stretching group. Falls were reduced by 31% for the TJQMBB group compared with the MME group (IRR, 0.69; 95% CI, 0.52-0.94; *P* = .01).

**Conclusions and Relevance**  Among community-dwelling older adults at high risk for falls, a therapeutically tailored *tai ji quan* balance training intervention was more effective than conventional exercise approaches for reducing the incidence of falls.

Morris, J. N., Howard, E. P., Steel, K., Berg, K., Tchalla, A., Munankarmi, A., & David, D. (2016). Strategies to reduce the risk of falling: Cohort study analysis with 1-year follow-up in community dwelling older adults. *BMC geriatrics*, *16*(1), 92.

**Level of Evidence:** tertiary

**Abstract**

**Background**

According to the CDC, falls rank among the leading causes of accidental death in the United States, resulting in significant health care costs annually. In this paper we present information about everyday lifestyle decisions of the older adult that may help reduce the risk of falling. We pursued two lines of inquiry: first, we identify and then test known mutable fall risk factors and ask how the resolution of such problems correlates with changes in fall rates. Second, we identify a series of everyday lifestyle options that persons may follow and then ask, does such engagement (e.g., engagement in exercise programs) lessen the older adult’s risk of falling and if it does, will the relationship hold as the count of risk factors increases?

**Methods**

Using a secondary analysis of lifestyle choices and risk changes that may explain fall rates over one year, we drew on a data set of 13,623 community residing elders in independent housing sites from 24 US states. All older adults were assessed at baseline, and a subset assessed one year later (*n* = 4,563) using two interRAI tools: the interRAI Community Health Assessment and interRAI Wellness Assessment.

**Results**

For the vast majority of risk measures, problem resolution is followed by lower rate of falls. This is true for physical measures such as doing housework, meal preparation, unsteady gait, transferring, and dressing the lower body. Similarly, this pattern is observed for clinical measures such as depression, memory, vision, dizziness, and fatigue. Among the older adults who had a falls risk at the baseline assessment, about 20 % improve, that is, they had a decreased falls rate when the problem risk improved. This outcome suggests that improvement of physical or clinical states potentially may result in a decreased falls rate. Additionally, physical exercise and cognitive activities are associated with a lower rate of falls.

**Conclusions**

The resolution of risk problems and physical and cognitive lifestyle choices are related to lower fall rates in elders in the community. The results presented here point to specific areas, that when targeted, may reduce the risk of falls. In addition, when there is problem resolution for specific clinical conditions, a decreased risk for falls also may occur.

Yeşilyaprak, S. S., Yıldırım, M. Ş., Tomruk, M., Ertekin, Ö., & Algun, Z. C. (2016). Comparison of the effects of virtual reality-based balance exercises and conventional exercises on balance and fall risk in older adults living in nursing homes in Turkey. *Physiotherapy theory and practice*, *32*(3), 191-201.

**Level of Evidence:** Primary

**Abstract**

***Objectives***: There is limited information on effective balance training techniques including virtual reality (VR)-based balance exercises in residential settings and no studies have been designed to compare the effects of VR-based balance exercises with conventional balance exercises in older adults living in nursing homes in Turkey. The objective of our study was to investigate the effects of VR-based balance exercises on balance and fall risk in comparison to conventional balance exercises in older adults living in nursing homes. ***Methods***: A total sample of 18 subjects (65–82 years of age) with fall history who were randomly assigned to either the VR group (Group 1, *n* = 7) or the conventional exercise group (Group 2, *n* = 11) completed the exercise training. ***Results***: In both groups, Berg balance score (BBS), timed up & go duration, and left leg stance and tandem stance duration with eyes closed significantly improved with time (*p* < 0.05), but changes were similar in both groups (*p* > 0.05) after training, indicating that neither the exercise method was superior. ***Conclusion***: Similar improvements were found in balance and fall risk with VR-based balance training and conventional balance training in older adults living in the nursing home. Both exercise trainings can be preferable by health care professionals considering fall prevention. Appropriate patient selection is essential.

Vieira, E. R., Palmer, R. C., & Chaves, P. H. (2016). Prevention of falls in older people living in the community. *Bmj*, *353*, i1419.

**Level of Evidence:** Primary

**Abstract**

The number of people living into older age (≥65 years) is rising rapidly. Older people are more likely to fall and this has adverse consequences for their quality of life and that of their families. Falls also pose a substantial financial burden on healthcare systems**.** Extensive research from systematic reviews and meta-analyses has established effective approaches for reducing falls among older people, although uncertainties and controversy remain. The evidence suggests that exercise based and tailored interventions are the most effective way to reduce falls and associated healthcare costs among older people in the community. This review integrates current knowledge on assessment and management strategies to prevent falls in older people living in the community. It summarizes known risk factors for falls in this population and presents assessment strategies that can be used to assess the risk of falls. It discusses the management of risks and interventions to reduce falls among older people in the community, as well as future directions and promising approaches.

Li, F., Eckstrom, E., Harmer, P., Fitzgerald, K., Voit, J., & Cameron, K. A. (2016). Exercise and Fall Prevention: Narrowing the Research‐to‐Practice Gap and Enhancing Integration of Clinical and Community Practice. *Journal of the American Geriatrics Society*, *64*(2), 425-431.

**Level of Evidence:** Secondary

**Abstract**

Falls in older adults are a global public health crisis, but mounting evidence from randomized controlled trials shows that falls can be reduced through exercise. Public health authorities and healthcare professionals endorse the use of evidence‐based, exercise‐focused fall interventions, but there are major obstacles to translating and disseminating research findings into healthcare practice, including lack of evidence of the transferability of efficacy trial results to clinical and community settings, insufficient local expertise to roll out community exercise programs, and inadequate infrastructure to integrate evidence‐based programs into clinical and community practice. The practical solutions highlighted in this article can be used to address these evidence‐to‐practice challenges. Falls and their associated healthcare costs can be reduced by better integrating research on exercise intervention into clinical practice and community programs.