Central Lancashire Online Knowledge (CLoK)

Title	Fall prevention programmes for older adults in the community: impact on rate of falls
Type	Article
URL	https://clok.uclan.ac.uk/39853/
DOI	10.12968/bjcn.2021.26.11.540
Date	2021
Citation	Harrison, Joanna, Phoong, Kar Yen and Hill, James Edward (2021) Fall prevention programmes for older adults in the community: impact on rate of falls. British Journal of Community Nursing, 26 (11). pp. 540-543. ISSN 1462-4753
Creators	Harrison, Joanna, Phoong, Kar Yen and Hill, James Edward

It is advisable to refer to the publisher's version if you intend to cite from the work.
10.12968/bjcn.2021.26.11.540

For information about Research at UCLan please go to http://www.uclan.ac.uk/research/

Fall prevention programmes for older adults in the community: impact on rate of falls

A commentary on:

Sherrington C, Fairhall N, Kwok W, Wallbank G, Tiedemann A, Michaleff ZA, et al. Evidence on physical activity and falls prevention for people aged 65+ years: systematic review to inform the WHO guidelines on physical activity and sedentary behaviour. Int J Behav Nutr Phys Act. 2020; 17(1):144.

Author Details:

Joanna Harrison, Research Fellow [1]
Kar Yen Phoong[2]
James Hill, Senior Research Fellow [1]

[1]Synthesis, Economic Evaluation and Decision Science Group (SEEDS), University of Central Lancashire, Preston. [2]Medical student, University of Manchester

Corresponding author: Joanna Harrison, jharrison12@uclan.ac.uk

Key points:

- Falls prevention programmes reduce the rate of falls in older adults by 23%
- Balance and functional resistance exercises are recommended
- Exercises should be carried out at least three or more days a week

Introduction

Falls are common in the elderly population (Al-Aama 2011) and occur in 30% of all people over the age of 65 every year (Lord et al. 2007). This contributes to 4,290 falls per 100,000 people in the United Kingdom per year (James et al. 2020). Falls can affect all aspects of an individual's life, resulting in an increased chance of depression (Biderman et al. 2002), anxiety (Lavedán et al. 2018), reduced social participation (Pin & Spini 2016) increased morbidity and mortality (Berková & Berka 2018). The causes of falls in the community can be due to multiple factors such as a previous history of falls, gait problems, vertigo, and medication (Deandrea et al. 2010). A Cochrane review has demonstrated that physical activity can help to reduce the number and rate of falls (Sherrington et al. 2019). This review has since been updated to reassess the effectiveness of physical activity on reducing fall rates in older people and update World Health Organisation (WHO) guidelines (Sherrington et al. 2020).

Methods:

This systematic review performed a vigorous search of nine databases from the date of inception to 7th November 2019. This included searches for ongoing and recently completed trials. Only randomised controlled trials (RCTs) which evaluated the effects of physical activity interventions on falls were included. Other inclusion criteria were: 1) Population: people aged 60 years and over, living in the community. Studies including younger patients were included

if the mean age minus one standard deviation was more than 60 years old, 2) Intervention: any physical activity as a single intervention where the main aim was to investigate the role of exercise, 3) Outcome: studies that reported the rate of falls per person-year. Studies with participants living in places of residence that provide health related care or those with health conditions that increase the risk of falls such as stroke were excluded.

The inclusion of trials was assessed independently by two reviewers and disagreement was resolved by a third party. Risk of bias was assessed using the Cochrane's risk of bias tool. The Grading of Recommendation Assessment, Development and Evaluation (GRADE) framework was used to evaluate the certainty of the evidence using the categories of high, moderate, low and very low confidence. The effectiveness of interventions for reducing the rate of falls was reported using rate ratios (RaRs) with 95% CIs. Heterogeneity was assessed by forest plots and chi^2 test. Subgroup analyses, sensitivity analysis and meta-regressions were undertaken.

Results:

The database and registry search identified 2396 studies. After screening, 9 studies were eligible for inclusion and added to the original list of 108 studies from the 2019 Cochrane Review. After removal of one feasibility study which was replaced with the recently published full trial, 116 RCTs were included of which 10 were cluster randomised. A total of 25,160 participants were included from 29 countries, of which 74% were women. A high risk of bias in included studies was identified most frequently for selective reporting of outcomes (45% of studies), incomplete outcome data (28%) and sampling bias (26%). Significant heterogeneity of included studies ranged from minimal to substantial, likely to represent differences between study populations and exercise programs such as dose or intensity.

Sixty-four of the included trials reported the rate of falls and were included in the meta-analysis. The duration of exercise programmes included in the analysis was between 5 weeks and 2.5 years and total hours of exercise ranged from 6 to 312 hours. There was statistically significant evidence that all types of exercise reduced the rate of fall by 23% compared with control (RaR 0.77, 95% CI 0.71 to 0.83) based on high-certainty evidence. Further sub-group analysis was performed and showed no difference in the rate of falls for participants who were 75 or older compared to those aged 60-74. Similarly, there were no differences for those participants at an increased risk of falling as an inclusion-criteria versus general recruitment, group versus individual exercise or intervention delivered by a health professional versus a trained exercise leader.

A sub-group analysis was undertaken on the different types of exercise. Balance and functional exercise reduced the rate of falls by 24% compared to control groups (RaR 0.76, 95% CI 0.70 to 0.82), based on 39 studies of high-certainty evidence. Multiple type exercises (commonly balance and function plus resistance exercises) showed a 28% reduction (RaR 0.72, 95% CI 0.56 to 0.93), based on 15 studies of moderate-certainty evidence. Tai Chi exercise showed a 23% reduction (RaR 0.77, 95% CI 0.61 to 0.97), based on 9 studies of moderate-certainty evidence. The effectiveness of dancing and walking programs was uncertain based on a low number of studies with very low certainty evidence.

Meta-regression identified a dose-response relationship between the duration of exercise and the reduction in the rate of falls, although not statistically significant. Balance and

functional exercise programmes with a dose of 3 hours plus per week were particularly notable in reducing the risk of falls by 42% (Incidence Rate Ratio 0.58, 95% CI 0.45 to 0.76).

Commentary

The process of the systematic review was evaluated using the Amstar 2 critical appraisal tool and scored 12/16. The unfulfilled criteria referred to elements of the included studies that were not clearly reported in the review such as the types of control group, sources of funding and the impact of reported bias. However, these elements were reported in the 2019 Cochrane review, prior to the update provided from the nine new studies. Further limitations acknowledged by the review authors include potential omission of non-English studies and issues of reviewer subjectivity in the classification of exercise. Overall, the review was deemed of high quality, providing an accurate and comprehensive summary of the results of the available studies that address the question of interest.

All forms of exercise programmes identified in the review reduced the rate of falls by nearly a quarter in adults over 60. Based on the findings, effective exercise programs for fall prevention should aim to include balance and functional resistance exercises. These factors could also be combined to take the form of a Tai Chi class. Additionally, exercise programs should aim to be carried out at moderate or greater intensity at least three or more days a week according to the updated WHO guidelines (Bull et al. 2020). When encouraging patient participation, it is also recommended that healthcare professionals promote activity change where possible and address potential barriers such as low self-belief and fear of falling (NICE Pathways 2021). It is currently unclear which age group and level of risk of falling would benefit the most from an exercise program. Therefore, no triage recommendations based on these two criteria can be made at the moment.

The delivery of exercise programmes for falls prevention can be flexible in terms of who delivers them and whether they are completed on an individual or group basis. It is not clear however which settings would be the most beneficial given that exercises can be completed at home, with the additional option of technology-based interventions. Current evidence has indicated that a home-based exercise programme to prevent falls in older adults (using an exercise manual and supervision) showed a significant reduction in the rate of falls compared with usual care (Lui-Ambrose 2019). An economic evaluation has also recommended that home-based exercise programmes targeting effective falls strategies in high-risk groups are value for money and make an economically valid choice (Davis et al. 2010). Technology-based interventions such as gaming exercise have also been shown to improve physical or cognitive functions in older adults such as balance, mobility, self-confidence and reaction time compared to usual or no care (Choi et al. 2017). Further reviews of the evidence for different types of environment are needed to establish which are the most effective.

Patient factors for participation should also be considered if falls prevention programmes are to be successfully implemented. Reported barriers for undertaking physical activity in older people include environmental context and resources (affordability of programmes, safety, accessibility and time), beliefs about capabilities and social influences including cultural barriers and the influence of family and friends (Spiteri et al. 2019). To overcome such barriers and support patient participation, the NICE pathway (2021) recommends a flexible approach to accommodate different needs and preferences, provision of relevant information and discussions with patients to consider the changes a person is willing to make.

CPD Reflective questions

- What factors are important when establishing a falls prevention class?

- What are the main limitations of the systematic review?

- If applicable what other factors would you need to take consideration within your own practice to adopt these strategies?

Acknowledgement

References

Al-Aama T. Falls in the elderly: spectrum and prevention. Canadian family physician Medecin de famille canadien. 2011; 57(7):771–776.

Berková M, Berka Z. Falls: a significant cause of morbidity and mortality in elderly people. Vnitr Lek. 2018; 64(11):1076-1083.

Biderman A, Cwikel J, Fried AV, et al. Depression and falls among community dwelling elderly people: a search for common risk factors. Journal of Epidemiology & Community Health 2002; 56:631-636. doi: 10.1136/jech.56.8.631.

Bull FC, Al-Ansari SS, Biddle S, et al. World Health Organization 2020 guidelines on physical activity and sedentary behaviour. Br J Sports Med. 2020; 54(24):1451-1462. doi:10.1136/bjsports-2020-102955

Choi SD, Guo L, Kang D, Xiong S. Exergame technology and interactive interventions for elderly fall prevention: A systematic literature review. Appl Ergon. 2017; 65:570-581. doi: 10.1016/j.apergo.2016.10.013.

Davis JC, Robertson MC, Ashe MC, Liu-Ambrose T, Khan KM, Marra CA. Does a home-based strength and balance programme in people aged > or =80 years provide the best value for money to prevent falls? A systematic review of economic evaluations of falls prevention interventions. Br J Sports Med. 2010;44 (2):80-9. doi: 10.1136/bjsm.2008.060988.

Deandrea S, Lucenteforte E, Bravi F, Foschi R, La Vecchia C, Negri E. Risk factors for falls in community-dwelling older people: a systematic review and meta-analysis. Epidemiology. 2010;21(5):658-68. doi: 10.1097/EDE.0b013e3181e89905.

James SL, Lucchesi LR, Bisignano C, Castle CD, Dingels ZV, Fox JT, et al. The global burden of falls: global, regional and national estimates of morbidity and mortality from the Global Burden of Disease Study 2017. Inj Prev. 2020;26(Supp 1):i3-i11. doi: 10.1136/injuryprev-2019-043286.

Lavedán A, Viladrosa M, Jürschik P, Botigué T, Nuín C, Masot O, et al. Fear of falling in community-dwelling older adults: A cause of falls, a consequence, or both? PLoS One. 2018; 13(3):e0194967. doi: 10.1371/journal.pone.0194967.

Liu-Ambrose T, Davis JC, Best JR, Dian L, Madden K, Cook W, et al. Effect of a Home-Based Exercise Program on Subsequent Falls Among Community-Dwelling High-Risk Older Adults After a Fall: A Randomized Clinical Trial. JAMA. 2019; 321(21):2092-2100. doi: 10.1001/jama.2019.5795.

Lord SR, Sherrington C, Menz HB (2007) Falls in older people: risk factors and strategies for prevention, 2nd edn. Cambridge University Press, Cambridge.

NICE pathways (2021). Preventing falls in older people overview. http://pathways.nice.org.uk/pathways/preventing-falls-in-older-people (accessed 21st October 2021).

Pin S, Spini D. Impact of falling on social participation and social support trajectories in a middle-aged and elderly European sample. SSM Popul Health. 2016; 2:382-389. doi:10.1016/j.ssmph.2016.05.004

Sherrington C, Fairhall NJ, Wallbank GK, Tiedemann A, Michaleff ZA, Howard K, et al. Exercise for preventing falls in older people living in the community. Cochrane Database of Systematic Reviews 2019, Issue 1. Art. No.: CD012424. DOI: 10.1002/14651858.CD012424.pub2.

Sherrington C, Fairhall N, Kwok W, Wallbank G, Tiedemann A, Michaleff ZA, et al. Evidence on physical activity and falls prevention for people aged 65+ years: systematic review to inform the WHO guidelines on physical activity and sedentary behaviour. Int J Behav Nutr Phys Act. 2020; 17(1):144. doi: 10.1186/s12966-020-01041-3.

Spiteri K, Broom D, Bekhet AH, de Caro JX, Laventure B, Grafton K. Barriers and Motivators of Physical Activity Participation in Middle-aged and Older-adults - A Systematic Review. J Aging Phys Act. 2019; 27(4):929-944. doi: 10.1123/japa.2018-0343.

Valenzuela T, Okubo Y, Woodbury A, Lord SR, Delbaere K. Adherence to Technology-Based Exercise Programs in Older Adults: A Systematic Review. J Geriatr Phys Ther. 2018; 41(1):49-61. doi: 10.1519/JPT.0000000000000095.