



Reading Beyond the Conclusions: Case Study on Falls

Tom Edmondson, MD, CMD-R



JAMDA

journal homepage: www.jamda.com

Review Article

Efficacy and Generalizability of Falls Prevention Interventions in Nursing Homes: A Systematic Review and Meta-analysis



Heidi J. Gulka BSc^a, Vaidehi Patel BSc^a, Twinkle Arora MA^a,
Caitlin McArthur MScPT, PhD^b, Andrea Iaboni MD, DPhil^{a,c,*}

^a Toronto Rehabilitation Institute, University Health Network, Toronto, Ontario, Canada

^b Department of Medicine, Faculty of Health Sciences, McMaster University, Hamilton, Ontario, Canada

^c Department of Psychiatry, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada

ABSTRACT

Keywords:

Nursing homes
long-term care
dementia
cognitive impairment
fall prevention
falls

Objectives: To determine the efficacy of fall intervention programs in nursing homes (NHs) and the generalizability of these interventions to people living with cognitive impairment and dementia.

Design: Systematic review and meta-analysis.

Setting and Participants: NH residents ($n = 30,057$) living in NHs defined as residential facilities that provide 24-hours-a-day surveillance, personal care, and some clinical care for persons who are typically aged ≥ 65 years with multiple complex chronic health conditions.

Methods: Meta-analysis of falls prevention interventions on number of falls, fallers, and recurrent fallers.

Results: Thirty-six studies met inclusion criteria for the systematic review. Overall, fall prevention interventions reduced the number of falls [risk ratio (RR) = 0.73, 95% confidence interval (CI) = 0.60–0.88], fallers (RR = 0.80, 95% CI = 0.72–0.89), and recurrent fallers (RR = 0.70, 95% CI = 0.60–0.81). Subanalyses revealed that single interventions have a significant effect on reducing fallers (RR = 0.78, 95% CI = 0.69–0.89) and recurrent fallers (RR = 0.60, 95% CI = 0.52–0.70), whereas multiple interventions reduce fallers (RR = 0.69, 95% CI = 0.39–0.97) and multifactorial interventions reduce number of falls (RR = 0.65, 95% CI = 0.45–0.94).

Conclusions and Implications: Exercise as a single intervention reduced the number of fallers and recurrent fallers by 36% and 41%, respectively, in people living in NHs. Other effective interventions included staff education and multiple and multifactorial interventions. However, more research on exercise including people with cognitive impairment and dementia is needed to improve the generalizability of these interventions to the typical NH resident.

© 2019 AMDA – The Society for Post-Acute and Long-Term Care Medicine.

Objectives



- ✓ Debate evidence-based manuscripts that are controversial and/or may affect the direction of research in the care of older adults.
- ✓ Discuss the recent evidence relevant to PALTC populations.
- ✓ Describe techniques for critiquing publications and how to incorporate the recommendations into your clinical practice.

Based on the abstract, why choose this article?

Published in JAMDA

- Likely relevant to my practice

Eye-catching title: “Efficacy and Generalizability of Falls Prevention Interventions in Nursing Homes: A Systematic Review and Meta-analysis”

- Seems relevant to my practice and likely helpful to me

Methods: “Meta-analysis of falls prevention interventions on number of falls, fallers, and recurrent fallers.”

- Understandable and appropriate to address the clinical issue of falls

Conclusions: “Exercise as a single intervention reduced the number of fallers and recurrent fallers by 36% and 41%, respectively, in people living in NHs.”

- Impressive conclusions and seemingly meaningful to my practice, residents, and patients

What is a systematic review?*



To provide an unbiased summary of all the studies addressing a single clinical question



Questions to ask when reviewing an article?

Is a clinically relevant and well-defined question being asked?

Were the search methods described exhaustive?

How was the quality of the primary studies assessed? Was there a weighting system/rejection of poor quality studies?

Was heterogeneity of effect investigated?

Do the conclusions reflect the evidence?

Are the results generalizable to your patient?

*McGovern, DPB., Valori, RM., Summerskill, WSM., & Levi, M. (2001). *Key Topics in Evidence-Based Medicine*. BIOS Scientific Publishers . <http://www.bios.co.uk>

What is a meta-analysis?*

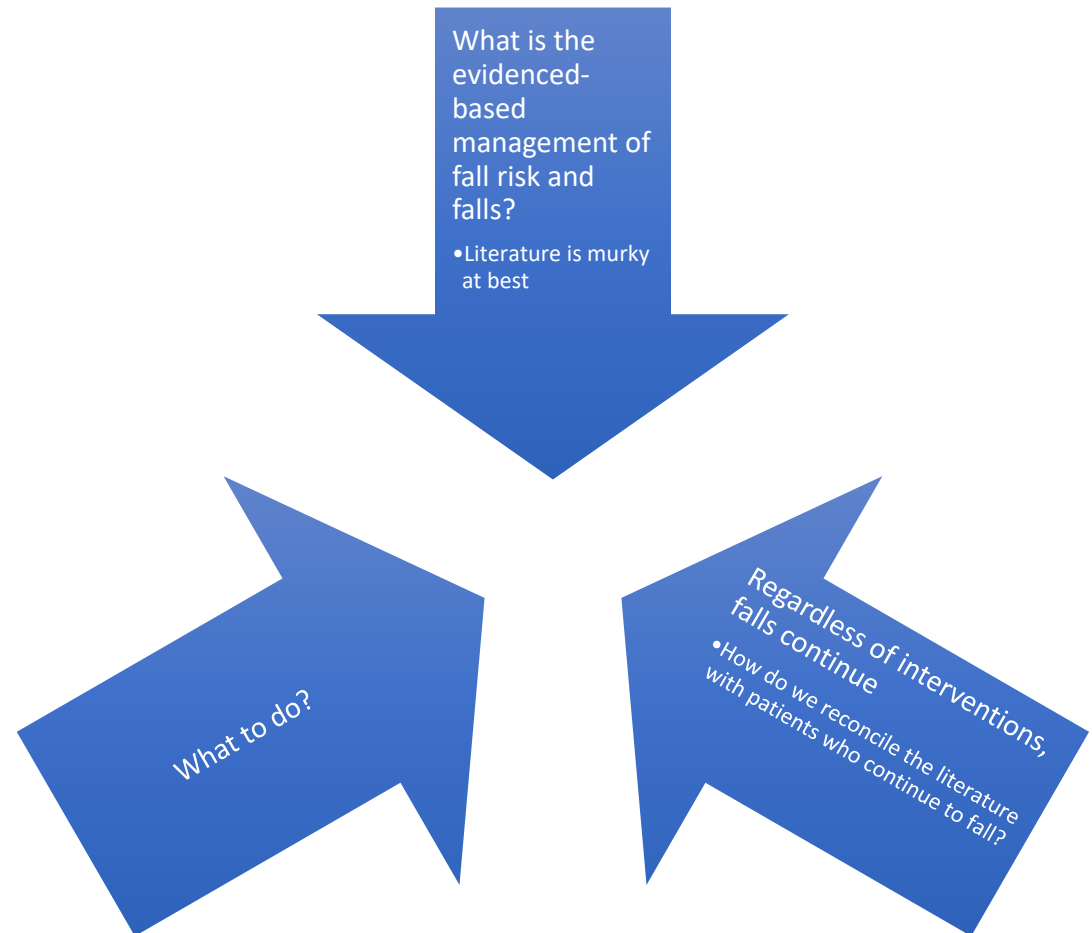


- A meta-analysis is the mathematical sum of the results of more than one primary study, all of which have *used similar methods in order to address the same question. (emphasis added by me)*
- Meta-analyses are often presented as the statistical analysis (where appropriate) of a systematic review but may also be studies in their own right.
- Questions to ask when reviewing an article?
 - Are all trials asking a similar question on similar populations in a similar fashion (homogeneity)? Is publication bias addressed?*

*McGovern, DPB., Valori, RM., Summerskill, WSM., & Levi, M. (2001). *Key Topics in Evidence-Based Medicine*. BIOS Scientific Publishers . <http://www.bios.co.uk>

Clinical Issue:
Falls in nursing
homes happen
often

~50% of residents in a LTC facility fall. Rises to ~60% if a fall occurred within the previous year.



Aim of this
systematic
review

To update a previous systematic review in 2013 with a focus on interventions evaluated specifically in the NH environment and examine the generalizability of these interventions to those living with cognitive impairment and dementia

Methods

- Required setting to be in NHs, defined as “residential facilities that provide 24-hour-a-day surveillance, personal care, and limited clinical care for persons who are typically elderly and infirm.”
- Interventions could be single, multiple, or multifactorial falls prevention programs evaluated for the prevention of falls as a primary or secondary outcome
- 36 studies were included in the review
 - Focused on published studies from 09/2013 to 04/2019 (total of 18 studies) and 14 studies published before 2013 plus 4 more studies

Fig. 1 Forest plots: (A) effects of interventions on falls; (B) effects of interventions on fallers; (C) effects of interventions on recurrent fallers. FRA, falls risk assessment; PSRT, progressive strength and resistance training.

A Effects of Interventions on Falls

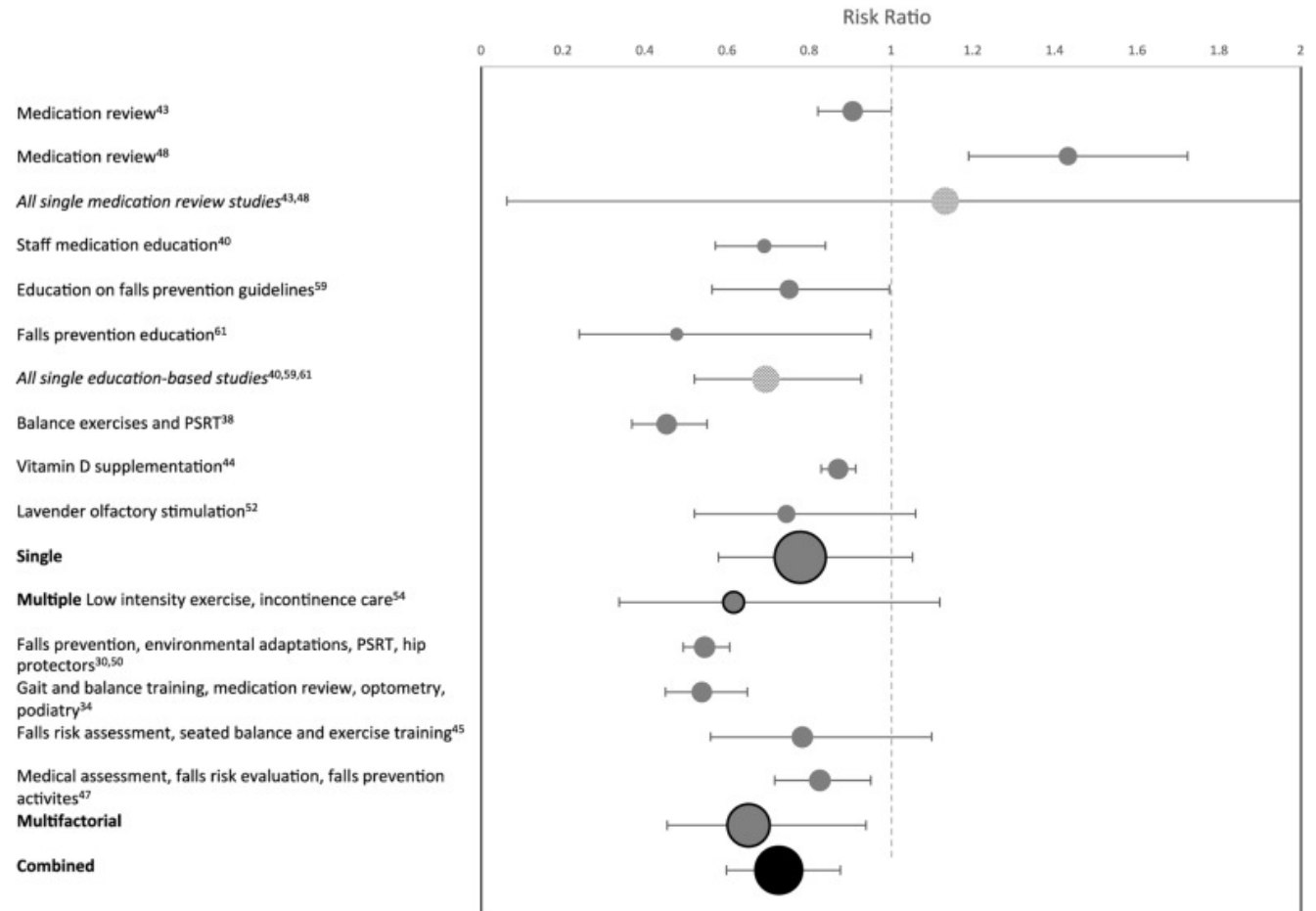


Fig. 1 Forest plots: (A) effects of interventions on falls; (B) effects of interventions on fallers; (C) effects of interventions on recurrent fallers. FRA, falls risk assessment; PSRT, progressive strength and resistance training.

B Effects of Interventions on Fallers

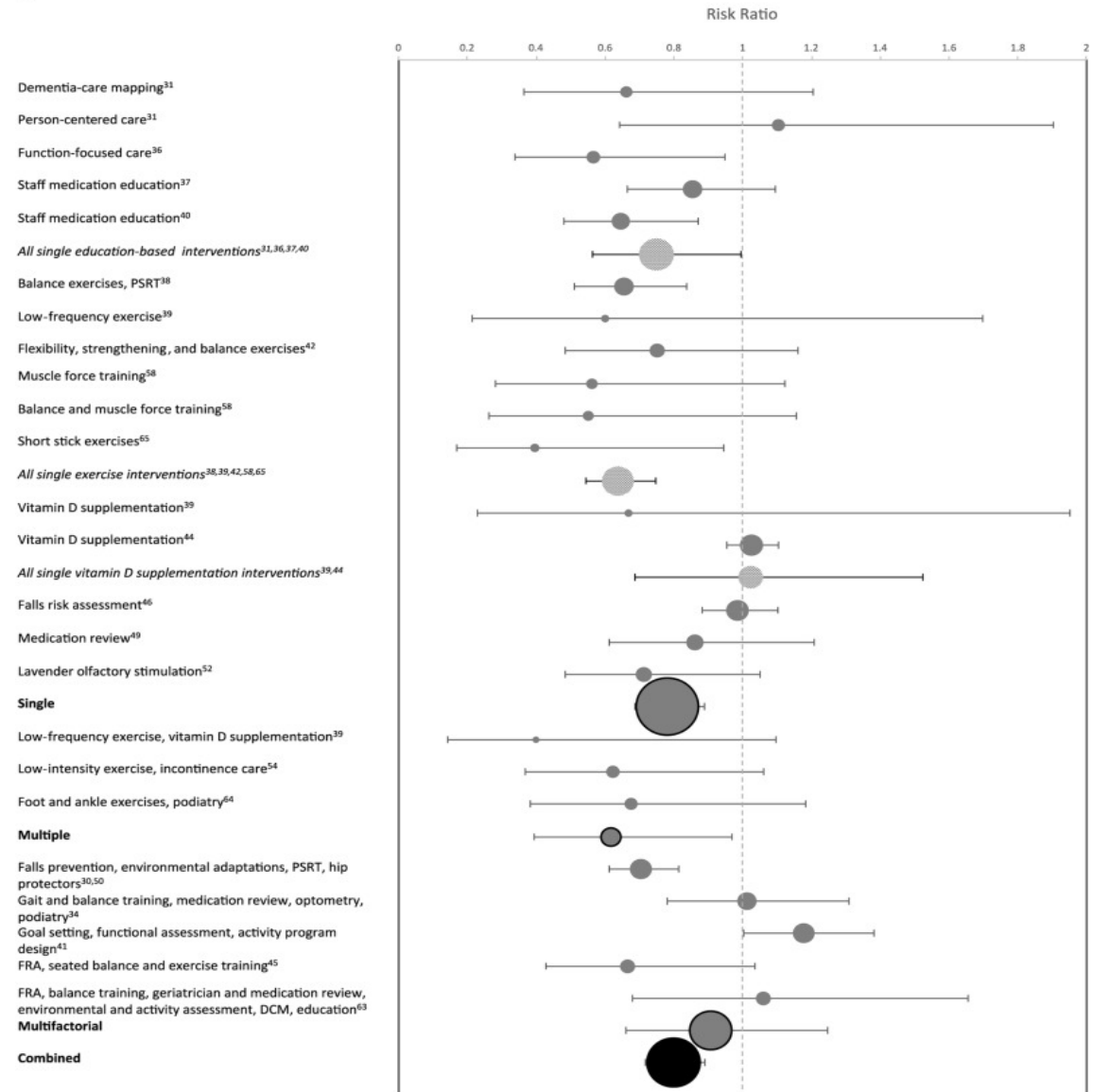


Fig. 1 Forest plots: (A) effects of interventions on falls; (B) effects of interventions on fallers; (C) effects of interventions on recurrent fallers. FRA, falls risk assessment; PSRT, progressive strength and resistance training.

C Effects of Interventions on Recurrent Fallers

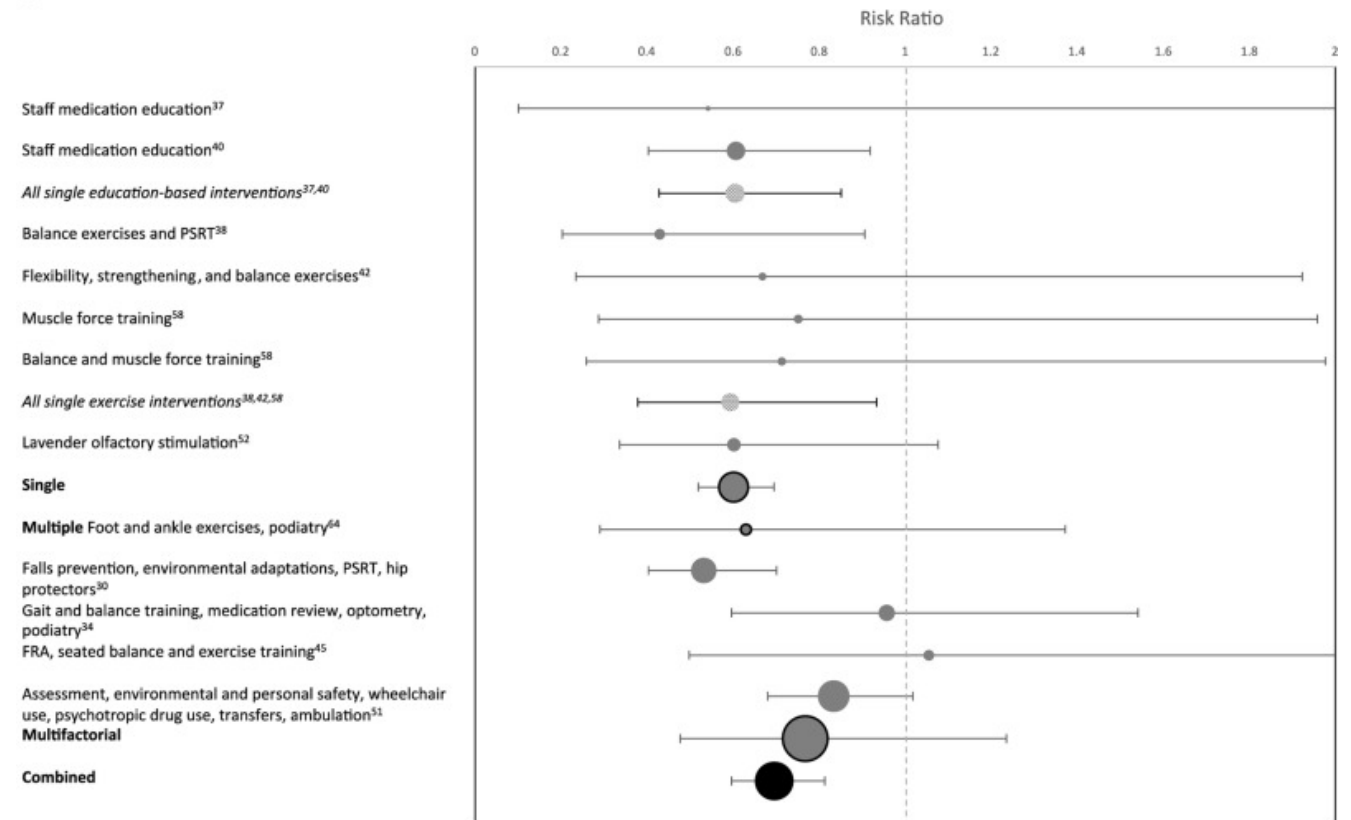
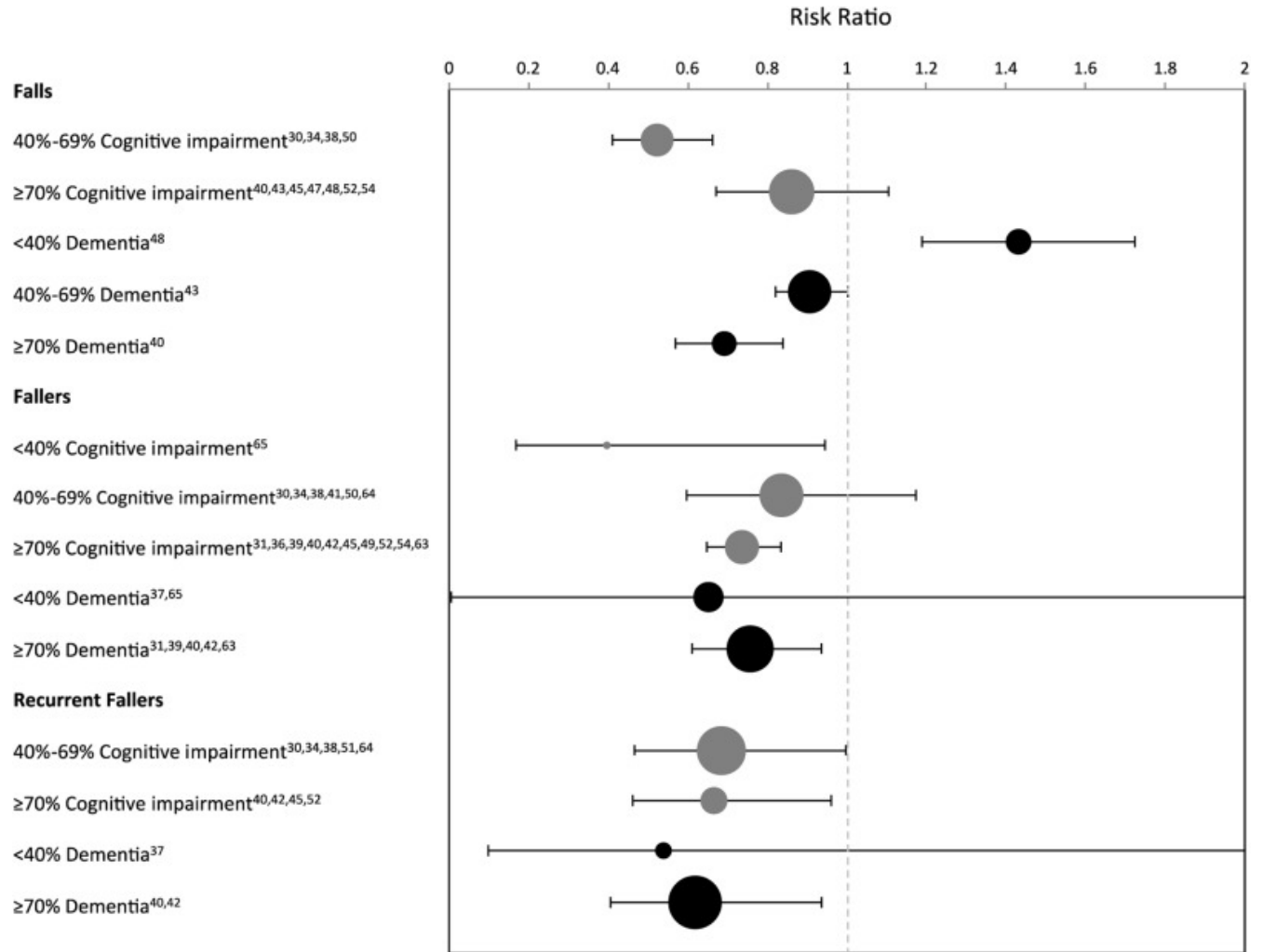


Fig. 2 Forest plot of effects of interventions on falls by proportion of participants with cognitive impairment or diagnosis of dementia.



Author's Conclusions

- Falls prevention interventions in NHs
 - Reduced falls by 27%
 - Reduced fallers by 20%
 - Reduced recurrent fallers by 30%
- Exercise as a single intervention reduced the number of fallers and recurrent fallers by 36% and 41%, respectively, in people living in NHs.
- Exercise interventions appear to be less effective in people with cognitive impairment and have not been evaluated in people with dementia.

Reading Beyond the Conclusions



Letters to the Editor

Response to “Do Exercises Prevent Falls Among Older Adults: Where Are We Now? A Systematic Review”



To the Editor:

Senderovich and Tsai¹ provide a unique update on single, multifactorial, and multicomponent falls prevention interventions for community-dwelling older adults and long-term care (LTC) residents. Falls are an ongoing concern for older adults and health care providers alike and can result in significant injury and disability. Exercise is one of many nonpharmacologic fall prevention interventions and we are encouraged by the recent focus on exercise. However, we question their decision to focus on a “healthy” LTC population and for combining studies in LTC and the community in their results, discussion, and conclusions.

First, including studies with LTC residents who are “healthy” is not representative of the LTC population. Worldwide, LTC residents live with increasingly complex health conditions.^{2–4} In 2015, less than 1% of LTC residents in Ontario, Canada, had no comorbid health conditions.⁵ The study by Senderovich and Tsai¹ found no single or multicomponent and 1 multifactorial intervention primary studies, and 2 review studies that were completed in LTC. Given their inclusion criteria of healthy individuals without comorbidities, the small number of eligible articles is not surprising. There are serious concerns with drawing conclusions about the effect of exercise to prevent falls in LTC when, so few studies completed in LTC are included, and the studies that are included do not represent the population. Representativeness of included populations and generalizability of study results to the LTC context are ongoing issues in exercise studies in LTC.⁶

Further, combining both community-dwelling older adults and LTC residents in the discussion and conclusions regarding fall prevention is problematic. The 2 populations have different fall risk factors, and implementation of fall prevention strategies must subsequently be adapted to the setting.⁷ Intrinsically, LTC residents tend to have more comorbidities and cognitive and functional impairment than community-dwelling older adults.^{2,8} Extrinsic, environmental factors (eg, flooring, trip hazards, policies) are substantially different between LTC homes and community dwellings.⁹ Combining conclusions about LTC and community-dwelling older adults implies that implementation of falls prevention strategies will be similar, when careful consideration of the population and context are necessary to ensure reduction of falls in each environment independently. Indeed, the authors recognize

this limitation when they state that “similar types of exercises are not necessarily effective across settings or for different individuals.”¹

LTC residents are often medically complex, experiencing several comorbidities in addition to functional and cognitive impairments. They live in a complex environmental system, governed by regulations and metrics. Fall prevention is an ongoing concern for the LTC sector, and exercise is a promising prevention strategy. However, implementation of exercise to prevent falls in LTC is nuanced and requires careful consideration of resident- and system-level factors. We urge authors to design primary studies and conduct systematic reviews that represent complex residents in the LTC environment and do not combine results with healthy community-dwelling older adults who experience different risk factors. The results of these studies will be generalizable to LTC residents, will result in interventions that are feasible in the LTC setting, and will be able to influence clinical practice and resident outcomes.

References

1. Senderovich H, Tsai PM. Do exercises prevent falls among older adults: Where are we now? A systematic review. *J Am Med Dir Assoc* 2020;21:1197–1204.e2.
2. Hirdes JP, Mitchell L, Maxwell CJ, White N. Beyond the “iron lungs of gerontology”: Using evidence to shape the future of nursing homes in Canada. *Can J Aging* 2011;30:371–390.
3. Ng R, Lane N, Taussepato P, et al. Increasing complexity of new nursing home residents in Ontario, Canada: A serial cross-sectional study. *J Am Geriatr Soc* 2020;68:1280–1300.
4. Katz PR. An international perspective on long term care: Focus on nursing homes. *J Am Med Dir Assoc* 2011;12:487–492.e1.
5. McArthur C, Gibbs J, Patel R, et al. A scoping review of physical rehabilitation in long-term care: Interventions, outcomes, tools. *Can J Aging* 2017;36:435–452.
6. Guha HJ, Patel V, Anra V, et al. Efficacy and generalizability of falls prevention interventions in nursing homes: A systematic review and meta-analysis. *J Am Med Dir Assoc* 2020;21:924–930.e4.
7. Sherrington C, Michaleff ZA, Fairhall N, et al. Exercise to prevent falls in older adults: An updated systematic review and meta-analysis. *Br J Sports Med* 2017;51:1750–1758.
8. McArthur C, Ioannidis G, Jaitzi M, et al. A higher proportion of home care recipients experience nonhip fractures than long-term care residents. *J Am Med Dir Assoc* 2020;21:289–296.
9. Berta W, Beare GJ, Gilbert E, et al. Spanning the know-do gap: Understanding knowledge application and capacity in long-term care homes. *Soc Sci Med* 2010;70:1326–1334.

Caitlin McArthur
Dalhousie University
Halifax, Nova Scotia, Canada

Andrea Iaboni
University of Toronto
Toronto, Ontario, Canada

<https://doi.org/10.1016/j.jamda.2020.09.013>

The authors declare no conflicts of interest.

<https://doi.org/10.1016/j.jamda.2020.09.013>

Reading Beyond the Conclusions

- Included studies with LTC residents who were “healthy”
- Concerns with drawing conclusions about the effect of exercise to prevent falls in LTC when so few studies completed in LTC are included and the studies that are included do not represent the population.
- Combining both community-dwelling older adults and LTC residents in conclusions is problematic
 - Different populations with different fall risk factors

<https://doi.org/10.1016/j.jamda.2020.09.013>

Reading Beyond the Conclusions

- Combining conclusions about LTC and community-dwelling older adults implies that implementation of falls prevention strategies will be similar.
 - Study authors: “similar types of exercises are not necessarily effective across settings or for different individuals”.
- Future research:
 - Primary studies with complex residents in LTC without combining data from healthy, community-dwelling older adults who experience different risk factors.

<https://doi.org/10.1016/j.jamda.2020.09.013>

Thank you

drtedmondson@gmail.com