Primary care - relevant interventions to prevent falling in older adults: a systematic evidence review for the U.S. preventive services task force


CRD summary
This review found that exercise or physical therapy interventions and vitamin D supplementation reduced the risk of falling among community-dwelling older adults, but it was unclear whether multifactorial management interventions were effective. Overall the review was well conducted, the authors’ conclusions follow from the evidence presented and their recommendations for further research appear appropriate.

Authors' objectives
To assess the effectiveness and safety of interventions to prevent falls in older adults as appropriate for use by primary care practitioners in an out-patient setting

Searching
Following a search for existing systematic reviews, a Cochrane review was obtained (CD000340 withdrawn) and references from this review identified. MEDLINE, CINAHL and the Cochrane Central Register of Controlled Trials (CENTRAL) were searched from 1992 to February 2010 and further trials identified. Only studies published in English were included in the review.

Study selection
To be eligible, studies needed to be randomised controlled trials (RCTs) of community dwelling older adults (average age 65 years or older) in settings generalisable to USA primary care populations. Trials were included if they assessed falls as a primary or secondary outcome.

Two researchers independently screened studies for inclusion in the review. Disagreements were resolved by consensus.

Intervention types included: multifactorial assessment and management interventions; exercise or physical therapy (assessing a variety of interventions with all but one trial including a type of gait, balance or functional training); single clinical treatments (vitamin D supplementation, vision correction, medication assessment and withdrawal); home-hazard modification; and clinical education or behavioural counselling. Falling was assessed in a variety of ways across the studies: number of fallers (the most consistently assessed measure), fall rate, time to first fall and number of frequent fallers.

Assessment of study quality
Study quality was assessed using the USA Preventative Task Force criteria which included selection and maintenance of comparable treatment groups, differential loss to follow-up or overall high loss to follow up, a clear definition of the intervention, equal, reliable and valid outcome measurement and intention-to-treat analysis. Studies with fatal flaws were rated poor quality and omitted from the review.

Two researchers independently assessed all studies; discrepancies were resolved with a third researcher.

Data extraction
One researcher extracted the data and a second checked the results.

Methods of synthesis
Results were grouped by intervention type and a narrative synthesis was presented for each group. Within each group results were pooled to generate an effect size where appropriate. Primary analyses estimated the relative risk (RR) for falling using a random-effects model. Heterogeneity was assessed using $X^2$ and $I^2$. Random-effects meta-regression models were used to evaluate potential sources of heterogeneity in fall risks. Further details are provided in the report.

Results of the review
Fifty-four RCTs (26102 participants) were included in the review.

**Multifactorial assessment and management interventions (19 trials, 7,099 participants)**

Most trials in this group were rated as fair quality and used prospective methods to assess falling. Most trials enrolled patients considered at high risk of falling. The pooled result did not demonstrate superiority of the intervention: RR 0.94 (95% CI, 0.87 to 1.02). This remained the case when only the six trials with "comprehensive" interventions were included. Overall heterogeneity was high ($I^2=61.5\%$, $p<0.001$). Meta-regression models did not identify any variable that clearly accounted for the heterogeneity. There were limited data on harms of the intervention across the included trials.

**Exercise or physical therapy (18 trials, 3,986 participants)**

Overall, trials in this group were rated as fair quality. The pooled result showed a statistically significant reduction in falling: RR 0.87 (95% CI, 0.81 to 0.94). There was no statistically significant heterogeneity. There was no evidence of harms of the intervention across the included trials.

**Single clinical treatments**

There were nine trials of vitamin D supplementation (14 trials, 5,809 participants). All trials were rated as fair quality but only three assessed falls prospectively. The pooled result showed a statistically significant reduction in falling with vitamin D: RR 0.83 (95% CI, 0.77 to 0.89). There was no statistically significant heterogeneity. There was no evidence of harms of the intervention across the included trials. There were four trials of vision correction (1,437 participants). Overall, trials were rated as fair quality with all trials including high risk populations. There was no reduction in the proportion of fallers and one study identified an increase in fallers in the intervention group. There was one trial of medication assessment and withdrawal (48 participants) which found that intervention was not associated with a reduced fall rate. No harms were reported in this trial.

**Home hazard modification (three trials, 2,348 participants).**

The pooled result did not demonstrate superiority of the intervention: RR 0.81 (95% CI, 0.63 to 1.04) and significant heterogeneity was noted. There was no evidence of harms of the intervention across the trials.

**Clinical education or behavioural counselling (one trial, 310 participants)**

The trial was rated "good". There was no reduction in fall risk, no increase in falls or fallers and no additional adverse events reported.

**Authors' conclusions**

Exercise or physical therapy interventions and vitamin D supplementation reduced the risk of falling among community-dwelling older adults but it was unclear whether multifactorial management interventions were effective. Overall there were no major clinical harms in the interventions found to be effective.

**CRD commentary**

This review was based on defined inclusion criteria and was underpinned by a search of three databases designed to update a previously published review. There was a possibility of language bias as studies needed to be in English to be included. Study quality was assessed and results presented in the context of quality. Study selection, data extraction and quality assessment were carried out by more than one reviewer which aims to reduce the possibility of error or bias. Trial grouping and analysis appeared to be appropriate. For some interventions in the review all or most trials were conducted in high-risk populations and this could limit generalisability of the findings. Overall the review was well conducted. The authors' conclusions follow from the evidence and their recommendations for further research appear appropriate.

**Implications of the review for practice and research**

**Practice:** The authors did not state any implications for practice.
Research: The authors made a number of research recommendations in their report. These included development and validation of a standardised assessment of absolute fall risk and appropriate targeting of interventions. Further research on falls prevention interventions should include outcomes other than falling. Further research should also clarify the specific elements of successful interventions. Future studies should systematically evaluate potential harms of interventions.

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