Effectiveness of intervention programs in preventing falls: a systematic review of recent 10 years and meta-analysis

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CRD summary

The authors concluded that fall prevention programmes were modestly effective and that further research was required to identify the most effective components of these programmes. The authors' tentative conclusion reflected the evidence. Potential biases in the search and review process, and unclear quality of included trials, means the reliability of this conclusion is uncertain.

Authors' objectives

To evaluate the effectiveness of fall prevention programmes for older adults.

Searching

PubMed, PsycINFO, CINAHL and RefWorks were searched from 2000 to 2009. Search terms were reported and only studies in English were included.

Study selection

Eligible studies compared a falls prevention programme with a control group, included either the number of falls or fall rate as a primary outcome and had a follow-up of at least five months. Studies were excluded if they were not RCTs (randomised controlled trials) or included men or women only.

The mean patient age was 79.2 years. Most studies were conducted in the community and approximately a fifth in nursing homes. The intervention period ranged from one to 12 months. Most studies were multifactorial and included various types of intervention such as comprehensive medical exam, occupational therapy assessment, activities of daily living, home environmental and behavioural assessment, cognition assessment, gait stability, medication review, staff training and education for residents. Approximately half of the studies included an intervention and a follow-up period whilst the rest included treatment throughout the study period and an assessment at endpoint. A variety of outcome measures were used to examine falls prevention.

The selection of studies for inclusion appeared to be conducted by one author.

Assessment of study quality

The Downs and Black Checklist was used to assess study quality which included 27 items on reporting, external validity, internal validity, selection bias and power. In addition, it was assessed if allocation concealment and intention-to-treat analyses were reported.

Two researchers assessed study quality.

Data extraction

Overall fall-reduction rate was extracted from each individual study to calculate risk ratios with 95% confidence intervals (CI).

Data extraction was conducted by two independent reviewers.

Methods of synthesis

The studies were pooled using a random-effects model. Heterogeneity was assessed using I^2 and the Q statistic. Subgroup analyses were conducted to examine the impact of type of intervention (single versus multifactorial), setting (community versus nursing home) and intervention intensity (assessment after follow-up period or at endpoint of intervention). It was unclear if these were planned or identified after analyses to explain the presence of heterogeneity. Sensitivity analyses evaluated the impact of excluding outliers. Publication bias was examined using a funnel plot. A meta-regression was conducted with sample size as a covariate.

Results of the review

Seventeen studies were included in the systematic review (5,501 participants). Follow-up ranged from five to 18 months (the definition of follow-up varied across studies). Limited information that related to the quality assessment was provided. Allocation concealment was reported for one study, intention-to-treat analyses were conducted for six studies and none reported blinding.

There was a statistically significant reduction in overall fall rate for the fall prevention programmes compared with controls but very high heterogeneity (risk ratio 0.86; 95% CI 0.74 to 0.99; I^2 = 91.8%). Sensitivity analyses removing outliers reduced heterogeneity substantially and resulted in a slightly lower reduction (risk ratio 0.91; 95% CI 0.85 to 0.96; 13 studies; I^2=35.4%).

There were large differences favouring studies conducted in nursing homes compared with studies in the community (Q=62.79, p<.001). No differences between study groups were found for subgroup analyses on intensity or type of intervention. Further subgroup analyses were conducted on the 13 studies after outliers were removed. No differences were found in this smaller sample of studies.

There was some evidence of asymmetry in the funnel plot suggesting potential publication bias, and the meta-regression suggested the effect estimate was impacted by sample size.

Authors' conclusions

Fall prevention programmes were modestly effective. Identifying what were the most effective components of such a programme was extremely difficult and unclear from available research.

CRD commentary

The review question and inclusion criteria were clear. The search strategy included a good coverage of electronic databases. However, there did not appear to be a search for unpublished studies and there was potential for language bias. In addition, there did not appear to be adequate measures to minimise risks of error and bias in study selection. Whilst formal quality assessment was conducted, only limited data from these findings were provided in the paper which made it difficult to assess potential limitations of the included studies.

With such high heterogeneity, the pooled estimates were of questionable quality. However, authors did seek to explore heterogeneity and examine the impact of outliers. Furthermore, potential publication bias was identified. The authors' tentative conclusion reflected the evidence presented. Some concerns about potential biases in the search and review process, and the unclear quality of included trials, means that the reliability of this conclusion is uncertain.

Implications of the review for practice and research

Practice: The authors stated five main recommendations for practice: identify risk factors for an individual; determine predisposing factors for falls; provide intervention programmes based on lower extremity balance and strengthening; consider psychological factors such as fear of falling; classify injuries when they occur based on the International Classification of Diseases-10.

Research: The authors stated further RCTs of at least six month follow-up should be conducted to examine the effectiveness of fall prevention programmes.

Funding

None stated

Bibliographic details

DOI

Original Paper URL

Indexing Status
Subject indexing assigned by CRD

MeSH
Accidental Falls; Humans; Accident Prevention; Program Evaluation

AccessionNumber
12012006632

Date bibliographic record published
10/04/2012

Date abstract record published
27/06/2012

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.