Does exercise prevent all-cause mortality in patient with hypertension, type 2 diabetes or cardiovascular disease? Results for systematic review with meta-analysis and trial sequential analysis

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Abstract

Background: Exercise is a simple and relatively cheap intervention recommended for people with hypertension, type 2 diabetes, or cardiovascular disease. The previous evidence on prevention of mortality have been underpowered and inconclusive.

Method: We conducted systematic review with meta-analysis and trial sequential analysis of randomised clinical trials adding any form of trialist defined exercise to usual care versus usual care in participants with either hypertension, type 2 diabetes or cardiovascular disease irrespective of setting, publication status, year and language. One of the primary outcomes was all-cause mortality. We searched on The CENTRAL, MEDLINE, EMBASE, Science Citation Index Expanded on Web of Science and BIOSIS from inception to July 2020. Five independent reviewers extracted data and assessed risk of bias in pairs. Our methodology was based on Preferred Reporting Items for Systematic Reviews and Meta-Analyses, Grading of Recommendations Assessment, Development and Evaluation and Cochrane Risk of Bias-version 1.

Results We included 950 trials, of which 98 trials randomising 12,976 participants reported on all-cause mortality. All included trials were at high risk of bias. The major types of exercise reported were dynamic aerobic exercise (58% trials), combined aerobic and resistance exercise (19%) and dynamic resistance exercise (9%). The median assessment time point was at 6 months (IQR: 3–12 months) after randomisation. Meta-analyses and trial sequential analyses showed evidence of a beneficial effect of adding exercise to usual care when assessing all-cause mortality (risk ratio (RR) 0.82; 95% CI 0.73 to 0.93; I^2=0%, moderate certainty of evidence).

Conclusions A short duration of any type of exercise seems to reduce the risk of all-cause mortality in participants with either hypertension, type 2 diabetes or cardiovascular diseases. Exercise seems to have statistically significant effects on quality of life, but the effect sizes seem minimal.

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Keyword: all-cause mortality, exercise, cardiovascular disease

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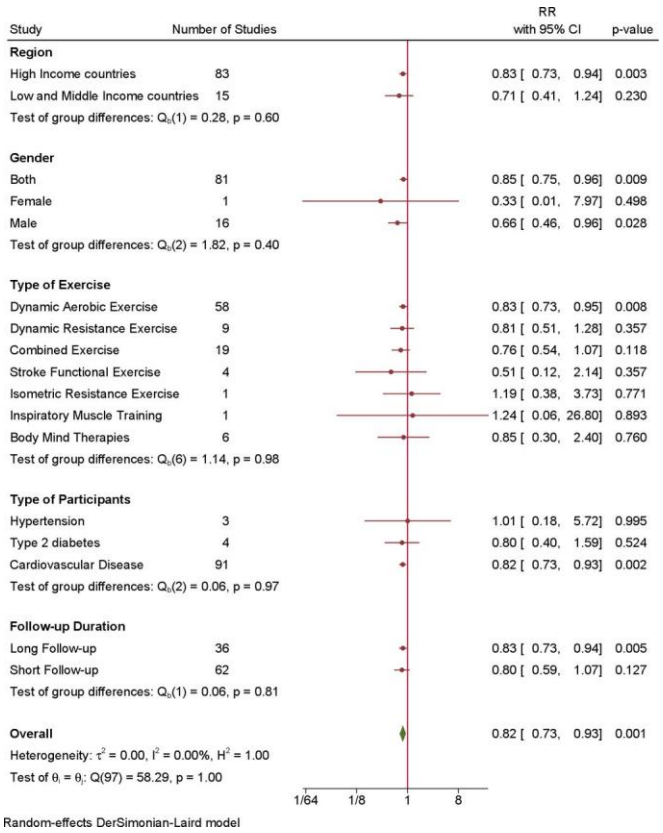

Figure: Forest plot of subgroup analysis on all-cause mortality(also showing overall RR for 98 trials)
Note: RR (risk ratio)