The effect of lifestyle modification and cardiovascular risk factor reduction on erectile dysfunction: a systematic review and meta-analysis


CRD summary
This review concluded that the evidence that lifestyle modification and pharmacotherapy for cardiovascular risk factors were effective in improving sexual function in men with erectile dysfunction was strengthened. Despite the limitations of the evidence available, this was a generally well-conducted review and the conclusions are likely to be reliable.

Authors' objectives
To determine the effect of lifestyle interventions and pharmacotherapy for cardiovascular risk factors on the severity of erectile dysfunction.

Searching
MEDLINE, MEDLINE In-Process and Other Non-Indexed Citations, EMBASE, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials (CENTRAL) and Scopus were searched from inception to August 2010 for studies in English; search terms were reported. Reference lists of retrieved articles were scanned.

Study selection
Randomised controlled trials (RCTs) with at least six weeks follow-up that evaluated the severity of erectile dysfunction measured with the International Index of Erectile Dysfunction (IIEF-5) questionnaire in men who received lifestyle modification or pharmacotherapy for cardiovascular risk factors were eligible for inclusion.

The mean age of the participants ranged from 43.5 to 64 years. Where reported, body mass index from 24.2 to 36.9, total cholesterol from 100.5 to 215 and low-density lipoprotein cholesterol from 108 to 140.2. Where reported, studies varied as to whether or not they included patients with coronary artery disease, hypertension and diabetes and current smokers. A range of interventions were evaluated and included diet, exercise and lifestyle changes and treatment with atorvastatin; 35% of the men had concurrent PDE 5 inhibitor use. Study duration ranged from eight to 104 weeks.

Two reviewers screened studies for inclusion in the review; disagreements were resolved by consensus.

Assessment of study quality
Study quality was independently assessed by two reviewers in terms of treatment allocation, similarity of groups at baseline, eligibility criteria, blinding, loss to follow-up, measures of variability presented and intention-to-treat analysis. Disagreements were resolved by consensus.

Data extraction
Data were extracted by two independent reviewers in order to calculate mean differences for the net change in IIEF-5 score along with 95% confidence intervals (CI). Disagreements were resolved by consensus.

Methods of synthesis
Weighted mean differences (WMD), with 95% confidence intervals, were calculated using a random-effects model. Heterogeneity was assessed using $I^2$; values greater than 50% were considered to indicate large heterogeneity. Trials that analysed lifestyle intervention alone and cardiovascular risk factor reduction strategy were analysed separately. Meta-regression was conducted to determine the impact of length of trial follow-up. Publication bias was assessed by the Egger regression test and visual inspection of funnel plots.

Results of the review
Six RCTs met the inclusion criteria (n=740 participants, range 12 to 372). Studies were considered to be of moderate to good quality. Studies were seemingly scored out of a possible 9, but it might have been 10): one RCT scored 9, two scored 7, two scored 6 and one scored 3. Loss to follow-up ranged from zero to 17.7%.
All trials demonstrated improvement in erectile dysfunction with lifestyle changes and improvement in lipid parameters. There was a statistically significant improvement in sexual function associated with improvements in IIEF-5 score (standardised mean difference (SMD) 2.66, 95% CI 1.86 to 3.47, I²=0%; six RCTs).

When pooled separately, lifestyle changes showed a statistically significant improvement in sexual function associated with improvements in IIEF-5 score (SMD 2.40, 95% CI 1.19 to 3.61, I²=14%; four RCTs) as did pharmacotherapy (SMD 3.07, 95% CI 1.84 to 4.30, I²=22%; two RCTs). Length of study follow-up did not impact the effect size.

In patients who received a concurrent PDE 5 inhibitor, lifestyle interventions and pharmacotherapy resulted in a significant improvement in IIEF-5 score (SMD 2.09, 95% CI 0.22 to 3.95; three RCTs).

There was no evidence of publication bias, but the analysis was underpowered.

**Authors' conclusions**
The results of the review strengthened the evidence that lifestyle modification and pharmacotherapy for cardiovascular risk factors were effective in improving sexual function in men with erectile dysfunction.

**CRD commentary**
The review addressed a clear review question supported by appropriate inclusion criteria. Several relevant sources were searched. The search was restricted to articles in English and there was no specific search for unpublished studies, so language and publication biases may have been present. Each stage of the review was conducted in duplicate, which reduced potential for error and bias. Study quality was assessed using appropriate criteria and the results were reported in full in an online appendix.

There are discrepancies between the text and figures (the text reported results as weighted mean differences and the figures as standardised mean differences). There were discrepancies in the results of the quality assessment between the paper and the online appendix and within the table in the online appendix, which made it difficult to interpret the results. Most of the included RCTs had small sample sizes, were conducted in restrictive populations and had short follow-up times, all of which were acknowledged by the authors. Appropriate methods of synthesis were used.

Despite the limitations of the evidence available and the inconsistencies in reporting, this was a generally well-conducted review and the conclusions are likely to be reliable.

**Implications of the review for practice and research**
**Practice:** The authors stated that men with erectile dysfunction provided an opportunity to identify cardiovascular risk factors and initiate lifestyle changes. Lifestyle interventions focused on modifiable health behaviours may be a safe strategy to improve erectile dysfunction and reduce cardiovascular risk factors. The authors stated that the pooled IIEF-5 score improvement of 2.7 points might not translate into clinically important differences for moderate and severe erectile dysfunction.

**Research:** The authors stated that more studies were needed to test the various nonpharmacologic and pharmacologic interventions.

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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.