Primary prevention of cardiovascular disease using validated risk scores: a systematic review

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CRD summary
This review found insufficient evidence to conclude that the use of risk scores followed by multifactorial interventions was the appropriate strategy to reduce cardiovascular disease risk, but this strategy did show potential. Despite some limitations of the review, the conservative conclusions are likely to be reliable.

Authors' objectives
To evaluate the use of validated cardiovascular disease (CVD) risk scores when combined with lifestyle interventions to identify individuals at high risk for the primary prevention of CVD.

Searching
EMBASE, MEDLINE and The Cochrane Library were searched without language restrictions from inception to September 2008; the MEDLINE strategy was available in an online appendix.

Study selection
Eligible randomised controlled trials (RCTs) assessed the effect of multifactorial lifestyle interventions on CVD risk score, CVD mortality or morbidity. Participants had to be aged 40 years or over and free of CVD, but classified as high risk by a validated CVD risk score. RCTs had to have at least six months follow-up.

Participant age ranged from 18 to 65 years. Each study used a different CVD risk assessment tool, and the interventions implemented and evaluation methods varied considerably across studies. All control arms received normal/conventional care; some also received additional educational brochures and booklets. Follow-up ranged from one to seven years.

Two reviewers selected studies for the review.

Assessment of study quality
Two reviewers assessed study quality using the Cochrane risk of bias tool; blinding was omitted as it was not considered feasible.

Data extraction
Two reviewers independently extracted data on CVD mortality, incidence of cardiovascular events, and changes in risk score; percentage changes were reported.

Methods of synthesis
The studies were combined in a narrative synthesis organised by outcome. Study details and results were summarised in the text and tables. Differences between studies were discussed in the text.

Results of the review
Five RCTs were included in the review (31,651 participants; range 110 to 18,210). Only two of the trials were considered to be adequately powered to detect a difference in CVD mortality; these two studies accounted for 98% of the review's participants. Of the five RCTs, three reported appropriate sequence generation, two reported adequate allocation concealment, four addressed incomplete data and selective outcome reporting and discussed other sources of bias.

Risk score reduction (five RCTs): One small RCT reported a significant reduction in the Framingham score compared with control patients (intervention -3.10, 95% CI -3.98 to -2.22; control -1.30, 95% CI -2.18 to 0.42). The other four trials reported no statistically significant difference between groups.

Mortality (two largest RCTs): Deaths due to coronary heart disease were reduced by 7.1% and 7.4% with a
multifactorial intervention compared to controls; neither was statistically significant. One RCT reported that death by CVD was 4.7% lower with a multifactorial intervention; the p-value was not reported.

**Change in risk factors (three RCTs):** The main risk factors measured were total cholesterol, body weight, systolic blood pressure, blood glucose and smoking history. Results were conflicting across studies.

**Authors’ conclusions**  
Multifactorial interventions aimed at individuals selected by CVD risk scores had the potential to lower cardiovascular disease risk and mortality but the evidence was currently not strong enough to formulate a definitive conclusion.

**CRD commentary**  
The review addressed a clear review question supported by reproducible inclusion criteria. Relevant sources were searched seemingly without language restrictions, but there was no specific search for unpublished studies. Data extraction and the assessment of study quality were conducted in duplicate; it was unclear whether similar methods to reduce error and bias during study selection were used.

Appropriate criteria were used to assess study quality, and the results were published in full. Three of the five studies were subject to a high risk of bias (did not report on sequence generation or allocation concealment); one of these low quality studies was one of the two large trials in the analysis. The decision to combine studies in a narrative synthesis seems appropriate.

Despite some limitations of the review, the paucity of good quality studies means that the conservative conclusions drawn are likely to be reliable.

**Implications of the review for practice and research**  
**Practice:** The authors stated that there was some evidence to support the potential use of validated risk scores to identify those at high risk of CVD, and to provide appropriate management with lifestyle interventions and pharmacological therapy, as a means of reducing mortality.

**Research:** The authors stated that the evidence for the approach of identifying 'high risk' individuals for the targeting of intensive interventions needed to be strengthened; further research was needed to provide evidence to inform the development of future interventions. The authors also stated that all future trials in this area would benefit from a more thorough economic evaluation given the current financial climate.

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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.