Review: Multiple interventions modestly reduce cardiovascular risk factors in primary prevention, but effects on mortality are uncertain

Ebrahim S, Davey Smith G. **Multiple risk factor interventions for primary prevention of coronary heart disease.** Cochrane Review, latest version 24 Feb 1999. In: The Cochrane Library. Oxford: Update Software.

Question

In persons who show no evidence of established cardiovascular disease, how effective is counseling or educational interventions aimed at controlling risk factors in reducing all-cause and coronary artery disease (CAD) mortality?

Data sources

Studies were identified by using MEDLINE (1966 to April 1995) and bibliographies of relevant studies and by contacting experts.

Study selection

Studies were selected if they were randomized controlled trials with ≥ 6 months of follow-up of counseling or educational interventions with or without medications aimed at controlling ≥ 1 cardiovascular risk factor (blood pressure, smoking, total blood cholesterol level, physical activity, and diet) in persons ≥ 40 years of age who show no evidence of cardiovascular disease.

Data extraction

Data were extracted independently by 2 reviewers on study design aspects, patient baseline characteristics, and follow-up. Outcomes were changes in blood pressure and total blood cholesterol level, smoking, all-cause mortality, and CAD mortality.

Main results

18 trials (140 245 patients) were included. Heterogeneity existed among the trials for all outcomes except CAD mortality (2 trials focused on hypertensive patients). Blood pressure, total blood cholesterol level, and smoking prevalence decreased more in patients who received risk factor modification than in patients who received no intervention or usual care (Table). 10 trials included clinical outcomes. All-cause and CAD mortality were not reduced by risk factor modification (Table).

Conclusion

In persons who show no evidence of established cardiovascular disease, multiple risk factor interventions consisting of either counseling or educational interventions modestly reduce blood pressure, total blood cholesterol level, and smoking prevalence but not all-cause or coronary artery disease mortality.

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Risk factor intervention vs no intervention for coronary artery disease (CAD)*

Outcomes (follow-up range 6 mo to 12 y)	Weighted mean decrease (95% CI)			
Systolic blood pressure (mm Hg)	3.3 (1.9 to 4.7)			
Diastolic blood pressure (mm Hg)	2.2 (1.3 to 3.1)			
Total blood cholesterol level (mmol/L)	0.16 (0.09 to 0.24)			
	Weighted event rates		RRR (CI)	NNT (CI)
	Intervention	No intervention		
Smoking prevalence (follow-up range 1 to 12 y)	34.5%	38%	10% (2 to 17)	29 (14 to 200)
All-cause mortality	7.1%	7.2%	5% (–4 to 13)	Not significant
CAD mortality	2.5%	2.6%	4% (–4 to 11)	Not significant

*Random-effects model used for all outcomes except CAD mortality. Abbreviations defined in Glossary; NNT calculated from data in article.

Commentary

Ebrahim and Davey Smith conclude that counseling or education to reduce cardiovascular risk factors fails to reduce all-cause mortality or mortality from CAD. This conclusion is not surprising because patients included in these studies were from the general population and at average risk for CAD, and the trials had a median follow-up of 3 years. The benefits of risk factor reduction may develop after many years.

All risk factors are not created equal. The potential benefits of behavioral approaches to reduce tobacco use in average-risk patients are greater than those of counseling to alter diet or increase exercise. The cost-effectiveness of smoking cessation programs is < $1000 per life-year saved (1). It is also important to emphasize the potential benefit of adjunctive pharmacologic therapy to counseling or education. The addition of a 9-week course of sustained-release bupropion, with or without nicotine replacement therapy, to a brief physician advice and counseling program may produce 1-year abstinence rates > 30% (2).

Finally, not all patients are equally motivated to change their lifestyle. Intensive lifestyle changes in motivated patients with established disease can decrease cardiac events (3). The potential effect of lifestyle modification in motivated, high-risk patients may be substantial.

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References

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3. **Ornish D, Scherwitz LW, Billings JH, et al.** Intensive lifestyle changes for reversal of coronary heart disease. JAMA. 1998;280:2001-7.