Cost-effectiveness analysis of treatment to reduce cholesterol levels, blood pressure and smoking for the prevention of coronary heart disease; evaluative study carried out in Spain

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Drug and dietary treatment of hypercholesterolemia, hypertension treatment, and smoking cessation treatment in the prevention of cardiovascular disease.

Type of intervention
Treatment; Primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Patients with cardiovascular risk factors.

Setting
Hospital. The economic study was carried out in Barcelona, Spain.

Dates to which data relate
The effectiveness data relating to the drug treatment of hypercholesterolemia were extracted from papers published between 1990 and 1995. The effectiveness data relating to the dietary treatment of hypercholesterolemia were derived from studies published in 1991 and 1997. The effectiveness data for hypertension treatment were gathered from studies published in 1987, 1990, and 1993. The effectiveness data for the smoking cessation treatment were collected from studies published in 1986, 1989, and 1994. The resource utilisation data were extracted from studies published between 1991 and 1992. 1996 prices were used.

Source of effectiveness data
The evidence for the final outcomes was derived from a review of previously published studies and was estimated using the Framingham equation.

Modelling
The multiple logistic Framingham equation was used to estimate the life-years gained.

Outcomes assessed in the review
The outcomes assessed in the review were the rate of cholesterol reduction due to the hypercholesterolemia treatment with lovastatin (20, 24 and 80 mg/day), cholestyramine (12 and 24 g/day), and gemfibrozil (1.2 g/day) or dietary treatment; diastolic blood pressure reduction; smoking cessation rate and adherence to the smoking cessation
programme.

**Study designs and other criteria for inclusion in the review**
Not stated.

**Sources searched to identify primary studies**
Not stated.

**Criteria used to ensure the validity of primary studies**
Not stated.

**Methods used to judge relevance and validity, and for extracting data**
Not used.

**Number of primary studies included**
At least 11 published papers were used to extract the clinical probabilities.

**Methods of combining primary studies**
Narrative method.

**Investigation of differences between primary studies**
Not stated.

**Results of the review**
The rate of cholesterol reduction due to the hypercholesterolemia treatment with lovastatin (20, 24 and 80 mg/day) was 20, 28, and 34%, respectively; with cholestyramine (12 and 24 g/day) it was 10 and 13%, respectively; and with gemfibrozil (1.2 g/day) it was 11%. The rate of cholesterol reduction due to the dietary treatment was 5%. Diastolic blood pressure reduction for patients with moderate/severe hypertension ranged from 4.9 mm Hg for captopril to 10 mm Hg for nifedipine. The corresponding values for patients with mild hypertension ranged from 13.4 mm Hg for hydrochlorothiazide to 21.4 mm Hg for propranolol. The smoking cessation rate for medical advice was 3.8% versus 6.7% for nicotine gum and 8.1% for nicotine patches. Adherence to the smoking cessation programme for medical advice was 35% versus 25% for the programme using medical advice and nicotine treatment.

**Measure of benefits used in the economic analysis**
Life years gained (LYG) were estimated as the main measure of benefit using the Framingham equation.

**Direct costs**
Costs were discounted. Quantities were not reported separately from the costs. Unit of cost was reported separately for the cost items. The direct treatment cost consisted of the cost of medication, medical visits, blood analysis, and screening for hypercholesterolemia and hypertension. Total programme cost minus cost savings from cardiovascular disease averted through prevention led to the net programme cost. It was not explicitly stated from whose perspective the cost analysis was performed. The sources of cost data were reports published in 1992-1996.

**Indirect Costs**
Currency
US dollars ($).

Sensitivity analysis
A set of one-way sensitivity analyses was performed on programme costs, health effects, coronary heart disease costs, programme compliance and discount rate.

Estimated benefits used in the economic analysis
The results for estimated life years gained (LYG) were not reported.

Cost results
The discount rate adopted was 5%. Total annual cost per patient for coronary heart disease costs for drug treatment for hypercholesterolemia ranged from $551.4 for cholestyramine (12 g/day) to $2,555.2 for lovastatin (80 mg/day). The corresponding figures for the moderate/severe hypertension treatment programme were from $360.4 for hydrochlorothiazide 100 mg/day to $2,289 for captopril 225 mg/day. The corresponding figures for the mild hypertension treatment programme ranged from $270.3 for hydrochlorothiazide 75 mg/day to $763 for captopril 75 mg/day. The corresponding figures for smoking cessation ranged from $147.3 for medical advice to $467.3 for nicotine patches 4 mg/day. The corresponding figure for the dietary treatment programme was $123.2.

Synthesis of costs and benefits
Average and incremental cost-effectiveness ratios were reported in terms of gender, age categories, and type of drug used. The hypercholesterolemia treatment programme had a range of average cost-effectiveness from $33,850 to $105,306 per LYG for men and from $104,100 to $350,663 for women. In terms of drug treatment for hypercholesterolemia, lovastatin had the lowest incremental cost-effectiveness ratio. The moderate/severe hypertension treatment programme had a range of average cost-effectiveness from $7,061 per LYG to $44,678 for men and from $6,351 to $81,027 for women. The corresponding figures for mild hypertension were from $10,877 per LYG to $68,246 for men and from $10,100 to $126,990 for women. According to the incremental cost-effectiveness ratio, hydrochlorothiazide was the most cost-effective drug for the hypertension treatment. The smoking cessation programme had a range of cost-effectiveness ratios from $2,608 to $5,494 per LYG for men versus $4,413 to $8,058 for women. The dietary treatment programme had a range of cost-effectiveness ratios from $7,581 to $38,442 per LYG for men versus from $31,806 to $149,246 for women. The sensitivity analysis established the sensitivity of the cost-effectiveness ratios to alterations in programme costs, health effects and discount rates.

Authors' conclusions
The cost-effectiveness analyses performed in this study show that the treatments to reduce blood cholesterol levels, BP and smoking which were evaluated are associated with favourable cost-effectiveness ratios. New strategies for coronary heart disease prevention should be developed, taking into account cost-effectiveness data in addition to the efficacy and tolerability of available treatments.

CRD COMMENTARY - Selection of comparators
No specific prevention programme was considered as the comparator.

Validity of estimate of measure of benefit
Since no systematic literature review or quality assessment of the primary studies were performed, there is insufficient information to judge the internal validity of the estimate of the benefit measure.
Validity of estimate of costs
Quantities were not reported separately from the costs. The internal validity of cost estimation can not be assessed since adequate information was not given in regard to the reliability of the cost data.

Other issues
Given the lack of a systematic literature review, quality assessment of the primary studies, and statistical analysis of the costs, the results need to be treated with some caution. As acknowledged by the author, costs and benefits estimated in this study may not be generalisable to other settings or countries.

Source of funding
None stated.

Bibliographic details
Plans-Rubio P. Cost-effectiveness analysis of treatment to reduce cholesterol levels, blood pressure and smoking for the prevention of coronary heart disease; evaluative study carried out in Spain. PharmacoEconomics 1998; 13(5 Part 2): 623-643

PubMedID
17165328

Other publications of related interest
This study is also reported in International Journal of Technology Assessment in Health Care 1998;14(2):320-330 (for which an abstract is also included in this database 988176).

Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Aged; Anticholesteremic Agents /economics /therapeutic use; Antihypertensive Agents /economics /therapeutic use; Coronary Disease /prevention & control; Cost-Benefit Analysis; Female; Health Resources; Humans; Hydroxymethylglutaryl-CoA Reductase Inhibitors /therapeutic use; Hypercholesterolemia /therapy; Hypertension /drug therapy; Male; Middle Aged; Smoking Cessation /economics

AccessionNumber
21998008153

Date bibliographic record published
31/01/1999

Date abstract record published
31/01/1999