Risk factor profile and achievement of treatment goals among hypertensive patients from the Israeli Blood Pressure Control (IBPC) program: initial cost utility analysis

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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
The Israeli Blood Pressure Control (IBPC) programme was under examination. This programme was initiated to enhance the control of modifiable risk factors among high-risk hypertensive patients under follow-up by general practitioners in Israel. The IBPC programme referred to current guidelines for the control of cardiovascular risk factors, which may have been properly followed in general practice.

Type of intervention
Primary prevention.

Economic study type
Cost-utility analysis.

Study population
The study population comprised hypertensive patients.

Setting
The setting was primary care. The economic analysis was conducted in Israel.

Dates to which data relate
The effectiveness and resource data were gathered between 2000 and 2002. The price year was 2002.

Source of effectiveness data
The effectiveness data were derived from a prospective single study and from one assumption.

Link between effectiveness and cost data
The costing was undertaken prospectively on the same group of patients as that used in the effectiveness study.

Study sample
The use of power calculations was not reported. Patients from 30 general practice clinics across Israel, and directed by specialists in family medicine, were included in the study. Physicians who showed readiness to join the programme were enrolled in the study. All physicians underwent a one-month course in the primary prevention of cardiovascular disease. Each physician was allocated a small budget for programme-related expenses. All physicians were asked to screen between 5 and 250 hypertensive patients, and to fill out forms at the beginning and end of the first year. A total of 4,948 patients were registered. The mean age was 64.8 (+/-12) years and 42% were males.
Study design
This was a case series study that was conducted in 30 general practices in Israel. The duration of follow-up was one year. No loss to follow-up was reported.

Analysis of effectiveness
All of the patients entered into the study were included in the analysis. The primary health outcomes were:

- the prevalence of patients with controlled risk factors after one year, such as blood pressure (less than 140/90 mmHg), body mass index (less than 27 kg/m2), low-density lipoprotein (less than 130 mg/dL) and fasting glucose (less than 126 mg/dL and greater than 200 mg/dL);
- the expected 10-year incidence of acute myocardial infarction (AMI) in the national population and in the pre-treatment group; and
- the reduction in incidence of AMI in the first year.

Effectiveness results
After one year of follow-up versus baseline, blood pressure control was achieved in 46.7% versus 29% of all hypertensive patients, (p<0.05).

After one year of follow-up versus baseline, low-density lipoprotein control (JNC VI criteria) was achieved in 41.7% versus 31.2% of all patients, (p<0.05).

After one year of follow-up versus baseline, fasting plasma glucose control (glucose less than 126 mg/dL) was achieved in 22% versus 19% of diabetic patients, (p<0.05), whereas 3.1% versus 5.2% of the diabetics had fasting plasma glucose levels greater than 200 mg/dL, (p<0.05).

After one year of follow-up, obesity (body mass index greater than 30 kg/m2) was noted in 43.8% versus 36.7% at baseline, (p<0.05).

At baseline, the estimated 10-year risk of AMI in the national population was 1.8% for males and 3.9% for females. The calculated 10-year risk for the pre-treatment group was 19.9% for males and 7.5% for females. After one year of follow up, the 10-year risk for the post-treatment group was 17.7% for males and 6.4% for females.

The expected reduction in AMIs was 11.2% in males and 14.7% in females.

Clinical conclusions
With the programme, there was a significant increase in the percentage of patients who were defined as "controlled". Morbidity and mortality were also reduced.

Methods used to derive estimates of effectiveness
The authors made one assumptions for calculating the expected reduction in cardiovascular accidents (CVAs).

Estimates of effectiveness and key assumptions
The expected reduction in CVAs was 35%.

Measure of benefits used in the economic analysis
The measures of health benefits were the number of AMI and CVA cases prevented, and the number of quality-adjusted life-years (QALYs) saved. The QALYs saved as a result of a decreased incidence in CVAs were derived from internationally published data on loss of QALYs after AMI, adjusted for age- and gender-specific life expectancies in
Israel.

Direct costs
Discounting was not carried out because the costs were incurred during less than 2 years. The perspective adopted in the analysis was not reported and only the direct costs were included. The unit costs were not presented separately from the quantities of resources used. The direct costs estimated were for the programme, AMIs and CVA. The costs of the programme covered teaching costs, computers and database, administration costs and the costs of additional drugs. The costs of AMIs and CVAs included the costs of general hospital care, care in a nursing home and care in a rehabilitation hospital. The resource use data for the project was based on the pilot project of 30 clinics. The source of the unit costs was unclear. All the costs were adjusted to mid-2002 price levels. The authors assumed that the programme would result in an increase in the use of drugs from 20 to 40% during the first year.

Statistical analysis of costs
No statistical analysis of the costs was performed.

Indirect Costs
The indirect costs were not included.

Currency
US dollars ($). The exchange rate was 4.9 new Israeli shekels = $1.

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
After one year of follow-up, 77 cases of CVA were prevented (36 in men and 41 in women).

After one year of follow-up, 22 cases of AMI were prevented (10 in men and 12 in women).

The programme saved 602 QALYs.

Cost results
The total cost of the programme was $383,709. This included $62,500 for direct training, $15,625 for computers and database, $15,625 for administrative overheads and $289,959 for extra drugs.

The cost per case of CVA was $15,185. The cost per case of AMI was $8,392.

Savings to health services were $1,361,702.

The net savings of the programme were $977,993.

Synthesis of costs and benefits
The authors did not report any synthesis of the costs and benefits, as the programme was both more effective and less costly than no programme.

Authors' conclusions
Better risk factor control in hypertensive patients by general practitioners could reduce morbidity and mortality. It could also be cost-effective.

**CRD COMMENTARY - Selection of comparators**
The rationale for the choice of the comparator (no programme) was clear.

**Validity of estimate of measure of effectiveness**
The basis of the analysis of effectiveness was a case series study, which was not really appropriate for the study question. The authors acknowledged that the study design may have biased the results in favour of the programme. Since the selection of the physicians was not randomised, the study sample may not have been representative of the study population. A double-blind, randomised controlled trial would have been more appropriate for the study question. Thus, caution is required when transferring the results of the analysis to other centres, owing to variability in standard patterns.

**Validity of estimate of measure of benefit**
The utility values from a published study were assessed, although the method used to derive them was not reported. This fact may limit the generalisability of the QALY measurements. The authors made an assumption in order to estimate the reduction in incidence of CVA, but did not provide any justification for it. No sensitivity analysis was carried out to enhance the external validity of the analysis.

**Validity of estimate of costs**
The perspective adopted in the study was not explicitly stated, but it appears to have been that of the National Health Service in Israel. If this was the case, then all the relevant categories of costs were included in the analysis. The source of the cost data was reported but few details of the cost analysis were provided. In particular, the quantities of resources used and the unit costs were not reported. The costs were only broken down for gross categories. This makes the replication of the economic analysis difficult. The costs were treated deterministically, no statistical analysis being carried out. However, no sensitivity analysis was performed to test the variability associated with the estimates. This limits the generalisability of the results to other settings and wide variations in costs may occur in other contexts.

**Other issues**
The authors did not compare their findings with those from other studies. The issue of generalisability to other settings was not addressed in the sensitivity analysis. The authors do not appear to have presented their results selectively and their conclusions reflected the scope of the analysis. The limitations that the authors reported were those associated with the study design (possible biases due to lack of randomisation) and the cost extrapolation (possible differences during extrapolation).

**Implications of the study**
Adherence to guidelines through a programme such as this is not only efficient in reducing mortality and morbidity, but it also leads to a net saving to the health services.

**Source of funding**
Funded by the Israeli Blood Pressure Control (IBPC) programme.

**Bibliographic details**