Pharmacoeconomic evaluation of a pharmacist-managed hypertension clinic
Okamoto M P, Nakahiro R K

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
Hypertension care, as provided by either a pharmacist-managed hypertension clinic or physician-managed general medical clinics, was examined.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients with mild-to-moderate essential hypertension. Patients were included in the study if they were at least 18 years old, had been members of the managed care organisation for at least 1 year, and had filled prescriptions at the managed care organisation's pharmacies. They also had to be taking the targeted antihypertensive drugs nifedipine, verapamil, captopril, diltiazem, clonidine, terazosin, propranolol, or lisinopril, or at least three prescription antihypertensive drugs. Patients were excluded if they had secondary hypertension, significant end-organ disease, or a baseline blood pressure (BP) higher than 200 mmHg (systolic) or 105 mmHg (diastolic).

Setting
The setting was secondary and primary care. The economic analysis was conducted in the USA.

Dates to which data relate
The dates to which the effectiveness and resource data related were not reported. The price year was 1998.

Source of effectiveness data
The effectiveness data were derived from a single study.

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

Study sample
Power calculations were reported. Ninety patients in each group had to be recruited to have a 90% power of detecting a difference of 10 mmHg in BP. The patients were recruited by a telephone screening survey. Of the 381 patients who met the inclusion criteria, 51 were not included for various reasons (e.g. no agreement from physicians, protocol violation, patient dropouts or being lost to follow-up). A total of 330 patients were randomly assigned to one of two groups. There were 164 patients in the pharmacist-managed hypertension clinic (experimental group) and 166 in the
physician-managed clinics (control group).

**Study design**
This was a randomised, prospective comparative study that was conducted at a hypertension clinic and general medicine clinics within a managed care facility. There was no mention of how the participants were randomised or if there was blinding involved. The duration of follow-up was 6 months. There were 11 dropouts in each group.

**Analysis of effectiveness**
The analysis of the clinical study was conducted on the basis of treatment completers only. The primary health outcomes used were systolic and diastolic BP, and the patients' health-related quality of life. To assess the health-related quality of life, the patients completed the short-term health survey (SF-36) at baseline and at 6 months. Within- and between-group analyses were performed. No statistically significant differences were noted between the groups at baseline.

**Effectiveness results**
In the experimental group, there were statistically significant decreases in both the systolic and diastolic BP when comparing baseline values with those at 6 months. The BP values were 144.23 mmHg (systolic) and 82.79 mmHg (diastolic) at baseline and 135.10 mmHg (systolic) and 77.65 mmHg (diastolic) at 6 months, (p<0.001).

In the control group, there were no statistically significant alterations in either systolic or diastolic BP when comparing baseline values with those at 6 months. The BP values were 142.91 mmHg (systolic) and 82.13 mmHg (diastolic) at baseline and 141.66 mmHg (systolic) and 80.67 mmHg (diastolic), (systolic, p=0.31; diastolic, p=0.06).

Over the 6 months, the reductions in BP were significantly higher in the experimental group than in the control group. For systolic BP, the reductions were 9.13 mmHg in the experimental group versus 1.32 mmHg in the control group, (p<0.001). For diastolic BP, the reductions were 5.1 mmHg (experimental group) and 1.46 mmHg (control group), respectively, (p<0.001).

Within-group analyses of health-related quality of life showed that there were no statistically significant changes in quality of life in the experimental group when comparing baseline values with those at the final visit. In the control group, statistically significant reductions occurred in the physical functioning and general health domains, (p<0.01).

There were generally no statistically significant differences between the two groups in the patients' health-related quality of life at 6 months of follow-up. The exception was observed in the role-physical domain, in which the scores were significantly higher in the experimental group than in the control group, (p=0.03).

**Clinical conclusions**
In a hypertension clinic, pharmacists can improve clinical outcomes and patient satisfaction in comparison with physician-managed clinics.

**Measure of benefits used in the economic analysis**
The authors did not develop a specific summary benefit measure. The primary health outcome (BP measurement) was used as the measure of benefit.

**Direct costs**
The perspective adopted was not stated. The direct costs included managed care costs such as clinic visits, emergency room visits and hospitalisations, and drug costs. The resource use data were collected during the study period. The costs of clinic visits, emergency room visits and hospitalisations were derived from actual managed care costs for health care services. The costs of clinic visits were based on the salary of the provider. Cost comparisons were conducted in
separate analyses using two series of drug costs (drug acquisition costs and costs based on the average wholesale price). The resource quantities and the costs were reported separately. It appears that all the costs have been adjusted to year 1998. The costs were not discounted since the duration of follow-up was less than one year.

Statistical analysis of costs
Standard statistical tests were carried out to test the statistical significance of differences in the cost estimates across the two groups.

Indirect Costs
The indirect costs were not included.

Currency
US dollars ($).

Sensitivity analysis
A sensitivity analysis was performed to determine if the results differed depending on whether drug acquisition costs or costs based on the average wholesale price were used.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
No statistically significant differences occurred in the total costs per patient between the groups. The total costs per patient were $242.46 in the experimental group and $233.20 in the control group, (p=0.71).

The costs associated with clinic visits were higher in the experimental group ($130.67 per patient) than in the control group ($73.51 per patient), (p<0.001).

The average cost per patient related to emergency room visits was lower in the experimental group ($0) than in the control group ($10.84), (p<0.04).

Synthesis of costs and benefits
The marginal cost of decreasing the diastolic BP by 1 mmHg was lower in the experimental group ($48) than in the control group ($151).

The marginal cost of decreasing the systolic BP by 1 mmHg was also lower in the experimental group ($27) than in the control group ($193).

Compared with physician-managed clinics, the incremental cost-effectiveness ratio of a pharmacist-managed hypertension clinic was $1.18 per systolic BP decrease and $2.51 per diastolic BP decrease.

The sensitivity analysis showed that the results were not sensitive to the different cost structures.

Authors' conclusions
In a hypertension clinic, pharmacists can be a cost-effective alternative to physicians in managing the treatment of patients. They can improve clinical outcomes and enhance patient satisfaction, thus allowing physicians to spend more time treating other patients.
CRD COMMENTARY - Selection of comparators
The choice of the comparator, physician-managed clinic, was justified on the grounds that it represented the most commonly managed care for hypertension in the authors' setting. You should consider whether this is a widely used practice in your own setting.

Validity of estimate of measure of effectiveness
The basis of the analysis was a randomised prospective study, which was appropriate for the study question. Selection bias was likely to have been low due to randomisation. Power calculations were reported. The patients were shown to be comparable at analysis, so confounding should be low. The BP measurement was an intermediate health outcome. The impact on morbidity and mortality rates would also have been appropriate to assess the effectiveness. The quality of life was evaluated using the SF-36 instrument. However, the authors acknowledged "the SF-36 is a non specific instrument and may not be sufficiently responsive in assessing patients with essential hypertension or who are asymptomatic". The follow-up period may have been too short to detect a difference in the outcome measures.

Validity of estimate of measure of benefit
The authors used a reduction in systolic and diastolic BP of 1 mmHg as a benefit measure to be synthesised with the costs. However, this is not particularly meaningful. The analysis is best considered as a cost-consequences analysis.

Validity of estimate of costs
The perspective adopted was not stated. As far as direct costs were concerned, the authors analysed managed care costs but did not include the capital or operating costs, or the patients' personal expenditure. This exclusion might have reduced the estimated costs of managed care. A detailed breakdown of the cost components (e.g. staff, materials) was not given. The quantities were reported for clinic visit and emergency room visit per patient. However, the unit costs were not reported, which means that the cost analysis cannot be reworked for other settings. Discounting was unnecessary since all the costs were incurred during less than one year. The authors reported 'marginal costs' which were in fact 'average costs'.

Other issues
The generalisability of the results was not fully addressed. The authors did not compare their findings with those from other studies. The authors highlighted some, but not all, of the limitations of their study. They do not appear to have reported their results selectively.

Implications of the study
The authors did not report any recommendation or need for further research. However, further research is needed on end point measures and long-term follow-up to demonstrate the cost-effectiveness of pharmacist-managed hypertension clinic more clearly.

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None stated.

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Other publications of related interest

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