Physician-pharmacist comanagement of hypertension: a randomized, comparative trial

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
An evidence-based, systematic approach to hypertension care, which involved co-management of patients by primary care physicians and clinical pharmacists, was examined. At a hypertension clinic, the pharmacists determined blood pressure (BP) and collected patient assessments to determine adherence to antihypertensive drugs, potential drug side effects, and relevant patient habits (tobacco use, diet and exercises). Individualised education on dietary and lifestyle modification was provided. The pharmacists contacted each patient's physician to communicate the results and make treatment recommendations in accordance with the evidence-based treatment algorithm. The physicians made all final treatment decisions.

Type of intervention

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients aged 18 years or older with hypertension. Patients were excluded if advanced dementia, terminal illness, organ transplantation, or secondary hypertension was documented.

Setting
The setting was primary care. The economic study was conducted in the USA.

Dates to which data relate
The effectiveness and resource use data were gathered from 1996 to 1998. The price year was not reported.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

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

Study sample
Power calculations were not carried out. Eligible patients were recruited from the two main offices of a group medical practice of general internists and internal medicine sub-specialists affiliated to a large community hospital. A sample of 1,272 patients was initially identified and allocated to either PPCM (637 patients) or UC (635 patients). However, further exclusion criteria were applied:
absence of recorded blood pressure measurement,
recent withdrawal from the medical group,
insufficient or inadequate contact information,
recent change to non-capitated medical insurance, and
missing medical records.

In addition, inclusion in the study required the permission of the patient's primary care physician to contact the patient, and the patient's agreement to participate in the study.

After applying the exclusion criteria, the final sample eligible for the analysis comprised 99 patients in the UC group and 98 patients in the PPCM group. The patients in the UC group had a mean age of 61.5 years (35 patients were 65 years or older) and 41 were men. The patients in the PPCM group had a mean age of 62.5 years (31 patients were 65 years or older) and 36 were men. The authors stated that patients who were excluded from the study were comparable with those who were included in the final sample.

**Study design**
This was a prospective, randomised clinical trial that was carried out in several primary care centres. The method of randomisation was not described. The length of follow-up was one year. Follow-up visits were scheduled every 2 to 4 weeks, at the discretion of the pharmacist, for PPCM patients only. The final study sample comprised patients for whom full clinical data were available.

**Analysis of effectiveness**
The authors stated that the analysis of the clinical study was conducted on an intention to treat basis because patients were evaluated in the group to which they were initially randomised. However, patients with insufficient clinical data were not considered in the final analysis. Thus, it would appear that the clinical end points were assessed on the basis of treatment completers only. The outcomes used in the analysis were:

- reductions in systolic BP and diastolic BP;
- the percentage of patients reaching BP pressure goals, defined as systolic BP below 140 mmHg and diastolic BP below 90 mmHg for patients younger than 65 years, and systolic BP below 160 mmHg and diastolic BP below 90 mmHg for patients aged 65 years or older; and
- the change in the proportion of patients receiving at least one first-line antihypertensive agent.

The study groups were comparable at baseline in terms of age, gender, baseline diastolic BP, or co-morbid conditions. However, the PPCM group had significantly more Afro-American patients and higher systolic BP at baseline than the UC group.

**Effectiveness results**
The reductions in systolic BP from baseline to the 1-year assessment were -11 mmHg in the UC group, (p<0.01), and -22 mmHg in the PPCM group, (p<0.01). The difference between the groups was statistically significant, (p<0.01).

The reductions in diastolic BP from baseline to the 1-year assessment were -7 mmHg in the UC group, (p<0.01), and -8 mmHg in the PPCM group, (p<0.01). However, the difference between the groups was not statistically significant, (p=0.53).

The percentage of patients reaching BP goals was 43% in the UC group and 60% in the PPCM group, (p=0.02).
The proportion of patients receiving at least one first-line antihypertensive agent changed from 68 to 80% in the PPCM group, (p=0.02), and from 60 to 70% in the UC group, (p=0.02).

**Clinical conclusions**
The effectiveness analysis showed that, compared with UC, PPCM led to higher rates of BP control and greater reductions in systolic BP in patients with uncontrolled hypertension.

**Measure of benefits used in the economic analysis**
The health outcomes were left disaggregated and no summary benefit measure was used in the economic analysis. In effect, a cost-consequences analysis was carried out.

**Direct costs**
Discounting was not relevant since the costs were incurred during a short timeframe. The unit costs were not presented separately from the quantities of resources used. The health services included in the economic evaluation were drugs and visits (physician, pharmacist and office personnel). The cost/resource boundary of a capitated medical group was used. The costs were estimated from average wholesale prices for drugs and the salary levels of physician, pharmacist and office personnel at the time of the study. Resource use was estimated using data prospectively collected from the sample of patients included in the effectiveness analysis. The price year was not reported.

**Statistical analysis of costs**
The costs were treated deterministically.

**Indirect Costs**
The indirect costs were not considered in the economic evaluation.

**Currency**
US dollars ($).

**Sensitivity analysis**
Sensitivity analyses were not carried out.

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

**Cost results**
The average provider visit costs per patient were $160 with PPCM and $195 with UC, (p=0.04).

Primary care physician visits were significantly lower for PPCM patients than for UC patients (3.4 versus 6.6; p<0.01). However, there were more total provider visits in the PPCM group, although the difference did not reach statistical significance, (8.0 versus 6.6; p=0.06).

The change in drug costs from baseline to the 1-year assessment was $11.31 in the PPCM group and $4.25 in the UC group. The difference was not statistically significant, (p=0.12).

**Synthesis of costs and benefits**
A synthesis of the costs and benefits was not relevant since a cost-consequences analysis was carried out.

**Authors' conclusions**

Physician-pharmacist co-management (PPCM) led to better control of hypertension than usual care (UC) and also resulted in a statistically significant reduction in annual provider visit costs.

**CRD COMMENTARY - Selection of comparators**

The rationale for the choice of the comparator was clear. UC was selected to represent the traditional approach for the management of hypertensive patients. You should decide whether this is a valid comparator in your own setting.

**Validity of estimate of measure of effectiveness**

The analysis of effectiveness was based on a clinical trial, which was appropriate for the study question. The method used to randomise the patients to the intervention groups was not reported. The method used to select the sample was described and a substantial proportion of patients who were initially recruited were then excluded from the analysis of the clinical study. This could have introduced some selection bias. However, the authors highlighted that there was no difference between patients who were excluded from the study and those who were included. The authors stated that the analysis was conducted on an intention to treat basis, but only patients who completed the follow-up evaluations were considered in the analysis. The study groups were not comparable at baseline since the systolic BP was significantly higher in the PPCM group. An analysis of variance was carried out in order to take differences between the groups at baseline into consideration. Power calculations were not reported and there was no evidence that the choice of the sample size was appropriate. These issues tend to limit the internal validity of the analysis.

**Validity of estimate of measure of benefit**

No summary benefit measure was used in the analysis because a cost-consequences analysis was conducted.

**Validity of estimate of costs**

The analysis of costs was carried out from a very limited perspective. Only the costs strictly related to the intervention within a primary care setting were considered. Other costs related to the impact of the intervention on patient health, such as fewer episodes of stroke or myocardial infarction, were not included in the analysis. The unit costs and the quantities of resources used were not presented separately and the price year was not reported, which limits the possibility of replicating the study and reflating the results of the analysis in other settings. The costs were treated deterministically and all the economic estimates were specific to the study setting. The authors stated that the actual drug costs, which reflected patient compliance rates and acquisition costs that could vary by payer, were not actually determined.

**Other issues**

The authors made some comparisons of their findings with those from other studies that reported similar conclusions. However, the issue of the generalisability of the study results to other settings was not addressed and sensitivity analyses were not carried out, thus reducing the external validity of the analysis. The study referred to patients with uncontrolled hypertension and this was reflected in the conclusions of the analysis. The authors noted some limitations, which have been described already.

**Implications of the study**

In terms of clinical practice, the results supported the use of PPCM from both clinical and economic points of view. The authors suggested that future studies should assess the impact of PPCM in other patient populations and in various clinical settings to allow for the transferability of the study results.
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Other publications of related interest


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