Costs-effectiveness of the urban health center in Nakhon Ratchasima: a case study on diabetes and hypertension.

Pannarunothai S, Kongpan M, Mangklasiri R

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 organisation of primary care services delivered at an urban health centre created by the Social Medicine Department (SMD) in Thailand, was examined.

Type of intervention
Primary health care.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised unselected patients suffering from diabetes and hypertension.

Setting
The setting was primary care. The economic study was carried out in the province of Nakhon Ratchasima in Thailand.

Dates to which data relate
The effectiveness and resource use data were gathered between 1994 and 1996 for groups 1 and 2, and in 1997 for group 3. No price year was reported.

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

Link between effectiveness and cost data
The costing was performed prospectively on the same patient sample as that used in the effectiveness analysis.

Study sample
Power calculations to determine the sample size were not performed. All cases of diabetes and hypertension that registered and made use of the urban health centre from 1994 to 1996 were included in group 1. All diabetic and hypertension patients who resided in the catchment area of the hospital, and visited the regional hospital from 1994 to 1996, were included in group 2. Group 3 included patients identified by the accidental sampling of diabetic and hypertension patients attending the regional hospital in 1997.

There were 36 diabetic patients and 21 hypertension patients in group 1, 24 diabetic patients and 24 hypertension patients in group 2, and 37 diabetic patients and 36 hypertension patients in group 3.
Study design
This was a retrospective review of a cross-sectional study, which was carried out at the Maharaj Nakhon Ratchasima hospital and in the urban health centre in Nakhon Ratchasima. The length of follow-up was not explicitly reported. However, the loss to follow-up among diabetic patients was 5% in group 1, 15% in group 2 and 12% in group 3. The corresponding values among the hypertension patients were 29% (group 1), 15% (group 2) and 8% (group 3), respectively. No blind outcome assessment was performed.

Analysis of effectiveness
All patients included in the study were accounted for in the analysis. For diabetic patients, the primary health outcome used in the analysis was the proportion of tests showing successful blood sugar control (80 - 140 mg/dL). For hypertension patients, the primary health outcome used in the analysis was the proportion of readings showing controlled blood pressure (no higher than 160 mmHg systolic and 95 mmHg diastolic). Some limited information on complications was also reported. The authors did not comment on the baseline comparability of the study groups.

Effectiveness results
For diabetic patients (400 tests in total), successful blood sugar control was shown in 50% of the tests for group 1, 49% of the tests for group 2, and 33% of the tests for group 3.

For hypertension patients, blood pressure control was achieved in 79.4% of the 194 readings for group 1, 72.8% of the 410 readings for group 2, and 79.8% of the 376 readings for group 3.

Clinical conclusions
The effectiveness analysis showed that successful blood sugar control was better achieved in groups 1 and 2, while blood pressure control was better achieved in groups 1 and 3.

Measure of benefits used in the economic analysis
The benefit measure used in the economic analysis was successful blood sugar control for diabetic patients and blood pressure control for hypertension patients. Both were derived from the effectiveness analysis.

Direct costs
Discounting was irrelevant since the costs per patient were incurred in a short time period. The unit costs were not reported separately from the quantities of resources used. The cost/resource boundary adopted in the study was not explicitly reported, but both the patient and provider costs were considered. The standard cost accounting technique was used to estimate the costs in group 1, with costs from the revenue-producing and non-revenue-producing cost centres being directly allocated to the patient service units (general outpatient, home visit, well baby clinic, family planning and antenatal clinic).

The fixed cost element from the cost accounting analysis did not cover the drug costs. The fixed costs for groups 2 and 3 were derived from the cost accounting analysis of other regional hospitals. The provider costs in group 2 included outpatient visits and home visits, while the provider costs of group 3 included only the fixed cost of the regional hospital. The patient costs included the direct medical costs of the drugs and investigations, and the direct non-medical costs of travelling, food and accommodation. The non-medical costs were estimated from interviews.

The costs and quantities were estimated on the basis of actual data. No price year was reported.

Statistical analysis of costs
The costs were treated deterministically.
**Indirect Costs**
The indirect costs were not included.

**Currency**
Thailand bahts.

**Sensitivity analysis**
No sensitivity analyses were conducted.

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

**Cost results**
In the case of diabetic patients, the total yearly provider and patient costs per case were:

- for group 1, Baht 1,408.59 (provider) and Baht 2,325.25 (patient);
- for group 2, Baht 1,457.11 (provider) and Baht 4,576.27 (patient); and
- for group 3, Baht 1,224.30 (provider) and Baht 4,669.76 (patient).

In the case of patients with hypertension, the total yearly provider and patient costs per case were:

- for group 1, Baht 916.54 (provider) and Baht 3,632.42 (patient);
- for group 2, Baht 980.22 (provider) and Baht 4,192.75 (patient); and
- for group 3, Baht 1,049.40 (provider) and Baht 4,692.54 (patient).

**Synthesis of costs and benefits**
An average cost-effectiveness analysis was conducted to combine the costs and benefits. No incremental analysis was performed.

The cost per case of controlled blood sugar was Baht 7,468 in group 1, Baht 12,313 in group 2 and Baht 17,861 in group 3.

The cost per case of controlled blood pressure was Baht 5,729 in group 1, Baht 7,137 in group 2 and Baht 7,195 in group 3.

**Authors' conclusions**
The organisation of primary care services at the urban health centre set up by the Maharaj Nakhon Ratchasima Hospital was cost-effective, compared with the delivery of services by other primary care organisations in the urban area, for the management of patients with chronic diseases such as diabetes or hypertension.

**CRD COMMENTARY - Selection of comparators**
The three providers were selected because they represented feasible infrastructures existing in the study area. You should decide whether they are valid comparators in your own setting.
Validity of estimate of measure of effectiveness
The analysis of the effectiveness used a retrospective review of a cross-sectional study. The authors acknowledged that the design of the study had some drawbacks. For example, the fact that the study was designed when the research had already been implemented for three years. The retrospective collection of partially incomplete data affected the validity of the analysis. Further study groups were small and power calculations were not performed. Consequently, the analysis may have been underpowered. The baseline comparability of the study groups was not discussed. In addition, as acknowledged by the authors, the use of blood sugar control as a main outcome measure for diabetes, rather than glycated haemoglobin (HbA1c), may have led to some patient misclassification.

Validity of estimate of measure of benefit
The benefit measures were derived from the effectiveness analysis and were more likely to have been intermediate outcomes of the interventions. This makes it difficult to compare the benefits of the study interventions with the outcomes of other treatments funded in the health care system.

Validity of estimate of costs
The perspective adopted in the study was not explicitly reported, but the authors included the costs relevant to both the service provider and patient. The unit costs were not reported separately from the quantities of resources used and no price year was reported. Thus, the reproducibility of the economic evaluation in other settings is quite limited. The costs and the quantities were treated deterministically and no sensitivity analyses were conducted. The cost estimates were specific to the study setting.

Other issues
The authors did not compare their findings with those from published studies. They also did not address the issue of the generalisability of the study results to other settings. Thus, the external validity of the analysis is limited. The study referred to patients with diabetes or hypertension, but some of the conclusions of the analysis were extended to the generic services of primary care for urban patients.

Implications of the study
The study suggests that the urban health centre providing home visits for patients with diabetes or hypertension is highly cost-effective and should be recommended for the management of chronic disease in primary care. The group provided by the regional hospital only, without home visits, was associated with high costs and no better effectiveness than the urban health centre. The limitations of the analysis should be considered when drawing on these conclusions.

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