A self-management program for adult asthma. Part II: cost-benefit 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
An educational training programme for self-management of adult asthma.

Type of intervention
Educational intervention; Secondary prevention; Patient management.

Economic study type
Cost-effectiveness analysis.

Study population
Adult patients with moderate to severe asthma as described by themselves. In all cases, asthma had been adequately controlled by medical treatment. Patients were excluded from the study if any one of the following applied to them:

1. a history of asthma < 6 months;
2. irreversible airway obstruction;
3. concurrent uncontrolled medical conditions;
4. asthma caused by occupational exposure;
5. alcohol, tobacco, or drug abuse;
6. obesity;
7. weight reduction below normal standards; and
8. either cognitive or intellectual deficits likely to impair learning.

Setting
Community. The economic study was carried out in Cincinnati, Ohio, USA.

Dates to which data relate
The dates associated with the effectiveness data, resource use data and prices were not provided.

Source of effectiveness data
Effectiveness data were derived from a single study.
Link between effectiveness and cost data
The costing was undertaken retrospectively on a different patient sample than from used in the effectiveness study.

Study sample
The programme was offered to 126 patients with asthma. 41 declined participation and nine dropped out of the study before its completion. The sample included in the analysis was composed of the remaining 76 adult patients with asthma (49 women and 27 men). The patients ranged in age from 27 to 70 years; their average age was 49.8 years. Thirty-six patients were assigned to the 'self-management group', which started self-management training 2 months after initiation of the study and 4 months before the control group of 40 patients receiving the same programme after a 6 month waiting-list period. It was not reported whether power calculations were used to determine the sample size.

Study design
A randomised controlled study. The total duration of observation was different for the self-management group and the control group: 16 months for the former and 20 months for the latter. Both groups were followed up to 1 year after having finished their educational programmes.

Analysis of effectiveness
The analysis of the clinical study was based on treatment completers only. The primary health outcomes used in the analysis were asthma symptoms, medication scores, asthma-related behaviour, cognitive measures and use of health care facilities. The analysis looked at short-term and longer-term outcomes in all measures and was based on within-subject variation. For the short-term, the between-group comparisons of such variations, relative to baseline, were made 6 months after initiation of the intervention (immediately before the control group received the self-management training). For the longer term analysis, however, outcomes were compared at the end of the 1-year follow up for both groups (i.e. with the baseline and end of follow-up measurement points separated by 16 and 20 months, respectively, for the 'self-management' and control groups).

Effectiveness results
The asthma symptoms improved from the first 2 months to the fifth and sixth months in self-management subjects but not in control subjects, with a decreased frequency of both morning (p<0.05) and evening (p<0.01) asthma attacks, higher morning PEFR scores (p<0.05) and reductions in breathing difficulty (p<0.05). From the first 2 months to the fifth and sixth months of the study, self-management patients exhibited a decrease, on average, from 14.9 morning and 16.8 evening attacks to 8.5 morning and 9.8 evening, an increase in average PEFR and a decline in breathing difficulty. The corresponding changes for the control subjects were in the same direction but were not statistically significant.

Asthma attack frequency during the morning hours decreased for subjects in both groups from the initial 2 weeks of the baseline period to the final 2 weeks of the follow up period (p<0.05). Subjects in the self-management group reported short-term increases in the frequency of the performance of self-management behaviours (p<0.01), whereas the control group patients did not present changes in such behaviour. Subjects in both groups (p<0.01) reported fewer asthma-related problems at the end of the follow-up period than they did at the beginning of the baseline period. In contrast to the control group, individuals in the self-management group showed improvements in all cognitive measures after self-management training in the short-term, whilst the longer-term ANOVA showed "no significant group effects or interactions".

Clinical conclusions
The positive changes indicate that patients enhanced the medical treatment they received by learning and performing asthma self-management skills.

Measure of benefits used in the economic analysis
The measure of benefits was asthma attacks avoided.
**Direct costs**
The programme costs and costs associated with expenses for physician visits, hospital admissions, ED visits, asthma medication, self-administered antigen injections, laboratory fees, travel to health care facilities and items such as air-conditioning, cleaning devices, etc., were included in the analysis. The costing covered a period of 1 year and, therefore, discounting was not required. Quantities were not analysed separately from the costs. The cost boundary adopted was that of the hospital and the patient. The source of health resource use data was the records on a patient by patient basis for a sub-sample of the study sample used in the effectiveness study (Patients with scores which deviated from the mean by more than 5 standard deviations (SD) were excluded from the analysis), whilst the programme cost data were based on the figure for the total budget of 1 year. In calculating total costs, each of the recorded figures for the cost categories mentioned above during the 1-year period following the completion of the programme was compared to the figures for the 12-month period preceding entry into the programme. Only those categories with differences having a value of p <0.10 at repeated measures ANOVA (i.e. hospital admissions, n=51, with 3 patients excluded from the analysis due to score >5 SD) were included in the total cost calculations. The dates for the collection of data and the price year were not given.

**Statistical analysis of costs**
Means and standard deviations and repeated measures ANOVA were used to analyse the different cost categories constituting the overall variable of asthma-related resource use.

**Indirect Costs**
The indirect costs considered in the analysis were those associated with income lost to patient because of asthma. In calculating total costs, the estimated average figure for that category during the 1-year period following the completion of the programme was compared to the corresponding figure for the 12-month period preceding entry into the programme. Per patient cost data from 49 patients out of the 76 patients in the study sample of the effectiveness study were used (as for indirect costs, scores deviating more than 5 SD from the mean were excluded, resulting in 3 cases so eliminated). Quantities were not analysed separately from the costs. Dates for the collection of data and price year were not given.

**Currency**
US dollars ($).

**Sensitivity analysis**
A sensitivity analysis was not carried out.

**Estimated benefits used in the economic analysis**
The asthma attacks during morning hours decreased, on average, by 3.10 attacks (from 4.5 to 1.4) for the patients in the 'self-management group' in the effectiveness study and by 1.28 (from 2.10 to 0.82) for the control group of patients in the same study.

**Cost results**
The programme's cost per patient was $208.33, whilst savings per patient were $475.29, yielding a negative net cost figure of -$266.96 per patient (savings).

**Synthesis of costs and benefits**
The authors did not combine costs and benefits after having observed that the intervention (self-management training programme) was the dominant strategy.
Authors' conclusions
The programme improved asthma management in patients whose conditions were already under good medical control. The effects of the programme were apparent a year after the conclusion of self-management training. A self-management programme for adult asthma can effectively reduce the cost associated with asthma.

CRD COMMENTARY - Selection of comparators
The reason for the choice of comparator is clear.

Validity of estimate of measure of benefit
The validity of the estimate of benefit may be questionable due to the principle used in the analysis of the effectiveness data (treatment completers only). The dates during which the study was conducted were not reported.

Validity of estimate of costs
Adequate details about the costs were not given (i.e. dates of data collection and price date were not reported).

Other issues
Appropriate comparisons were made with other studies (Germany and USA), showing results consistent with those of the study reviewed here. However, the issue of generalisability to other countries was not addressed. The results were not adequately presented given that the authors reported cost savings as monetary benefits. In fact they had previously observed that the nature of the study sample (patients whose asthma was under control by medical treatment at baseline) was such that the analysis could be interpreted as one using the framework of cost-minimisation.

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