Impact of a hospital-based home-care program on the management of COPD patients receiving long-term oxygen therapy
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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 health technology assessed in the paper was a hospital-based home care programme (HCP) for the management of patients suffering from COPD, a progressive disease with frequent exacerbations. The HCP was designed to combine management at home and easy access to hospital resources. The programme included scheduled activities and others designed to meet the requirements of patients on demand.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population included patients suffering from COPD and receiving long-term oxygen therapy (LTOT).

Setting
The setting was the community. The economic study was carried out in Barcelona, Spain.

Dates to which data relate
The effectiveness evidence and the resource use data were gathered from September 1994 to December 1996. 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 undertaken prospectively on the same patient group as that used in the effectiveness analysis.

Study sample
Power calculations were not performed to determine the sample size. Patients were selected from the register of the National Health System oxygen suppliers from September 1994 to December 1999. Inclusion criteria were a primary diagnosis of COPD and requiring LTOT, a history of at least 6 months of LTOT before entering the study, a willingness to participate in a HCP and residence within easy reach of the hospital. The study included 122 patients: 60 patients in the intervention group and 62 in the control group. The mean age was 69 years in both groups.
Study design
The study design was a population-based, randomised, controlled trial, carried out in two centres (L'Hospitalet and El Prat). After an initial evaluation patients were allocated randomly to the HCP intervention group or to the control group. The randomisation codes were kept in sealed envelopes. A minimum follow-up of 12 months was required to evaluate the effects of the programme. Overall, 94 patients (46 in the intervention group and 48 in the control group) completed the one-year follow-up period.

Analysis of effectiveness
The basis for the analysis of the clinical study (intention to treat or treatment completers only) was not stated. The primary health outcomes used in the analysis were the number of emergency department visits, the number of hospital admissions, the days of hospitalisation, the number of home and hospital visits, the arterial blood gas value, and the survival rate, calculated with the Kaplan-Meier method. A questionnaire to assess quality of life was also used and was based on the Spanish version of the Chronic Respiratory Questionnaire. It was applied before the study and after 3 and 12 months. Because of the limited resources available, the questionnaire was used only for the first 40 patients. Several statistical tests were used to show the overall comparability of the two groups in term of demographic and clinical characteristics.

Effectiveness results
After the one year follow-up, a significant decrease in emergency department visits per patient was found in the intervention group compared to the control group: 0.45 (+/- 0.83) versus 1.58 (+/- 1.96), (p=0.0001).

A significant decrease was also found in the number of hospital admissions: 0.5 (+/- 0.86) versus 1.29 (+/- 1.7), (p=0.0001). A significant decrease was also observed in the days of hospitalisation: 7.43 (+/- 15.6) versus 18.20 (+/- 24.55), (p=0.01).

The number of home and hospital visits in the HCP group was 4.8 (+/- 0.8) and 1.5 (+/- 1.07), respectively.

No statistically significant difference was found in the evolution of arterial blood gas exchange between the groups.

Median survival time was 20 months in both groups, with no significant differences between groups regarding the probability of survival.

Finally, with respect to the 33 of the 40 patients who were included in the quality of life study and who completed the one-year follow-up, neither group showed significant differences in baseline, 3-month, and 12-month questionnaires.

Clinical conclusions
Overall, the effectiveness analysis showed that the HCP strategy was both more effective than hospital admissions in terms of some of the outcomes and equally effective with respect to other effectiveness measures.

Measure of benefits used in the economic analysis
Clinical outcomes were not aggregated and no summary benefit measure was used, therefore a cost-consequences analysis was carried out.

Direct costs
The costs of each day of hospitalisation and the costs of an emergency department visit were calculated according to diagnosis-related group and included staffing costs, costs of routine examinations (laboratory arterial blood gases, chest radiography, ECG), and costs of drugs prescribed. The costs of HCP included staffing costs, administrative costs (secretary and telephone), costs of home visits (travel expenses and drugs administered), and costs of extra hospital visits (including the routine examinations, drugs administered, and cost of office space used such as electricity and maintenance). Data on costs were derived from the Financial Department at the authors' institution, based on Spanish
NHS fees. Discounting was not relevant since costs were incurred over a one-year period of time. Quantities and costs were analysed and presented separately. The quantity/cost boundary adopted was that of the hospital. The resource use data were gathered from September 1994 to December 1996. The price year was not reported. Primary care data were not included as they were not available.

### Statistical analysis of costs
No statistical analysis was reported.

### Indirect Costs
Indirect costs were not included.

### Currency
Spanish pesetas (Pta). The authors provided a conversion of the costs to US dollars ($).

### Sensitivity analysis
No sensitivity analysis was carried out.

### Estimated benefits used in the economic analysis
Please refer to the effectiveness results reported earlier.

### Cost results
The costs of hospital admissions were Pta8,328,487 ($47,591) in the HCP group and Pta21,283,911 ($121,622) in the control group.

The costs of emergency visits were Pta740,869 ($4,233) in the HCP group and Pta2,681,241 ($15,321) in the control group.

Finally, the costs of HCP were Pta6,701,796 ($38,296).

The total costs of treatment were Pta15,771,152 ($90,121) in the HCP group and Pta23,965,152 ($136,944) in the control group. The total saving associated with HCP was 8.1 million pesetas ($42,214).

### Synthesis of costs and benefits
Not relevant.

### Authors' conclusions
The authors concluded that for patients with severe COPD a hospital-based HCP carried out by a skilled team was a cost-effective and safe alternative that reduced the number of hospitalisations and emergency department visits.

### CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparator was clear. The comparator was chosen because it represented routine care provided for patients suffering from COPD in Spain. You should consider whether it is a widely used strategy in your own setting.

### Validity of estimate of measure of effectiveness
The effectiveness estimates were derived from a randomised controlled trial and several statistical tests were performed in order to take into account potential confounding factors. The internal validity of the study is thus likely to be high. However, the effectiveness results could have been biased because, for patients with severe COPD, the home care was probably the best option and the routine care was not a feasible strategy.

Validity of estimate of measure of benefit
Not relevant

Validity of estimate of costs
Primary care costs were not available and were not included in the study. Their omission could have affected the authors' conclusions. Statistical analyses of resources and sensitivity analysis of costs were not performed and this may limit the interpretation of the study findings. In addition, the price year was not reported. The cost estimates used in the model are likely to be specific to the Spanish setting. The authors performed appropriate currency conversions.

Other issues
The issue of the generalisability of the results was not specifically addressed and this may represent a limitation for the external validity of the study, given that sensitivity analyses were not conducted on cost and benefit estimates. The authors made appropriate comparisons with other studies and these appear to confirm their results. A possible limitation of the study, as recognised by the authors, was the use of the Spanish version of the Chronic Respiratory Questionnaire, which may not be a valid instrument to detect changes in the quality of life of patients with severe COPD and chronic respiratory failure. In addition, a longer follow-up could have been useful to identify significant differences in survival between the groups.

Implications of the study
The implication of the study was that the adoption of a hospital-based HCP should be enhanced in order to reduce the amount of NHS resources currently used for patients with severe COPD.

Source of funding
None stated.

Bibliographic details

PubMedID
11171710

Indexing Status
Subject indexing assigned by NLM

MeSH
Aged; Costs and Cost Analysis; Female; Home Care Services, Hospital-Based; Hospitalization; Humans; Lung Diseases, Obstructive /physiopathology /therapy; Male; Middle Aged; Oxygen Inhalation Therapy; Spain

AccessionNumber
22001000471

Date bibliographic record published
31/03/2002
Date abstract record published
31/03/2002