Training care givers of stroke patients: economic evaluation
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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 training of caregivers of stroke patients was examined. Training consisted of instruction in basic skills of moving and handling, facilitation of activities of daily living, and simple nursing tasks. Caregivers received training over three to five sessions, each lasting from 30 to 45 minutes, and a follow-up session at home.

Type of intervention
Rehabilitation.

Economic study type
Cost-utility analysis.

Study population
The study population comprised stroke survivors requiring rehabilitation.

Setting
The setting was a hospital (stroke rehabilitation unit) and the community. The economic study was carried out in the UK.

Dates to which data relate
The dates during which the effectiveness and resource use data were gathered were not reported. The costs were estimated using 2001-02 prices.

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

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

Study sample
Limited information on the study sample was reported because the clinical study had been published elsewhere (Kalra et al., see Other Publications of Related Interest). Overall, 300 patients and their caregivers were included in the study. There were 151 patients in the training group and 149 patients in the control group.

Study design
This was a prospective, blind, randomised controlled trial. The length of follow-up was one year. Other information on
the study design was not provided.

**Analysis of effectiveness**

The analysis of the clinical study was conducted on an intention to treat basis. The outcome measure was the caregivers' quality of life, which was assessed using the EuroQol five-dimensional questionnaire (EQ-5D). Caregivers responded to the EQ-5D at baseline and at 4, 12, 26 and 52 weeks after the stroke. Missing values were imputed only for caregivers with partial missing data. However, no imputation was carried out if data were missing at all assessment points, if no caregiver data were available from the week 4 assessment onwards, or if the patient had died before the caregiver's missing assessment. Utility weights from a UK general population survey were applied to EQ-5D health states to calculate the quality-adjusted life-years (QALYs). In additional, the length of stay in stroke units for patients with trained caregivers versus patients with no trained caregivers was provided. There was no information on the comparability of the study groups.

**Effectiveness results**

At baseline, the mean QALYs were 0.94 (+/- 0.10) in the training group and 0.94 (+/- 0.14) in the control group.

After one year, the mean QALYs were 0.91 (+/- 0.11) in the training group and 0.90 (+/- 0.14) in the control group.

There was no statistically significant difference between the groups in QALY losses between baseline and one year.

Patients in the training group stayed in hospital less than patients in the no training group. The mean stay was 30.8 days for the training group patients versus 43.2 days for the no training group patients (mean difference -12.4 days, 95% confidence interval, CI: -19.5 - -5.6).

**Clinical conclusions**

The effectiveness analysis showed that both groups showed a small, but comparable, reduction in QALYs. The patients in the training group were associated with a shorter hospital length of stay.

**Measure of benefits used in the economic analysis**

No summary benefit measure was used in the economic analysis because the effectiveness study showed there was no statistically significant difference in the reduction of QALYs. In effect, a cost-minimisation analysis was performed.

**Direct costs**

Discounting was not relevant since the costs were incurred during one year. The unit costs were presented separately for all cost items and a detailed breakdown of the costs was provided. The health services included in the economic evaluation were grouped as follows:

- initial admission for stroke (stroke unit, physiotherapist, occupational therapist, hospital speech and language therapist);
- other secondary care services (general medical ward, outpatient visits, accident and emergency visit, and day hospital);
- social services (personal care, domestic assistance, laundry assistance, shopping assistance, meals on wheels, carelink, and social services day care centre); and
- community-based care (general practitioner home visit and surgery visit, district nurse, dentist, optician, chiropody home and clinic visit, and respite care).

The perspective of the health service provider (the National Health Service, NHS) was adopted in the analysis of the direct costs. Resource use was estimated using individualised data coming from the sample of patients included in the effectiveness study. Resource use after hospital discharge was estimated using a specially adapted version of the client service receipt inventory. Hospital data were available for the 3 months before stroke. The costs came from several
sources, including typical NHS sources and local service provider unit costs. Some assumptions were made for minor cost categories. All the costs were presented in 2001-02 values using the NHS Executive's hospital and community health services inflation index, or personal social services inflation index.

**Statistical analysis of costs**
The costs were presented as mean values with standard deviations. Student's t-test was used to compare differences between groups, while non-parametric bootstrap methods (5,000 repetitions) were used to obtain 95% CIs.

**Indirect Costs**
A societal perspective was adopted and, as such, the costs of informal care (i.e. domestic assistance and caregivers’ time) were considered in the study. Resource use was derived from the sample of patients included in the clinical trial, while the costs were mainly derived from UK minimum wages as a proxy of value for caregivers' time. The unit costs were presented separately from the quantities of resources used. As in the analysis of the direct costs, discounting was not relevant and 2001-02 values were used.

**Currency**
UK pounds sterling (£).

**Sensitivity analysis**
A univariate sensitivity analysis was carried out to examine the impact of varying some cost categories. The cost of informal care was recalculated using the cost of professional care in place of the cost of informal caregivers. The length of stay for patients in the training group was also increased.

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

**Cost results**
The average costs associated with initial hospital admission for stroke were 8,554 (+/- 6,939) in the training group and 11,729 (+/- 8,506) in the control group. The average cost-difference was -3,176 (95% CI: -4,980 - -1,409; p<0.001).

When the costs of informal care were excluded, the average costs of the 12-month follow-up period were 1,953 (+/- 3,400) in the training group and 2,494 (+/- 4,060) in the control group. The average cost-difference was -541 (95% CI: -1,479 - 353; p=0.244). When the costs of informal care were included, the average costs were 2,837 (+/- 4,182) and 3,427 (+/- 4,409), respectively. The average cost-difference was -590 (95% CI: -1,634 - 469; p=0.270).

When the costs of informal care were excluded, the total annual costs were 10,544 (+/- 9,278) in the training group and 14,587 (+/- 10,844) in the control group. The average cost-difference was -4,043 (95% CI: -6,544 - -1,595; p=0.001). When the costs of informal care were included, the average costs were 11,429 (+/- 9,825) and 15,520 (+/- 11,106), respectively. The average cost-difference was -4,091 (95% CI: -6,675 - -1,578; p=0.002).

The sensitivity analysis showed that the use of higher costs or longer length of stay increased the total costs in both groups, but did not affect the comparison of the total costs.

**Synthesis of costs and benefits**
A synthesis of the costs and benefits was not relevant since a cost-minimisation analysis was performed.

**Authors' conclusions**
Training caregivers reduced the costs of health care and social care in the first year after stroke compared with no training. Since the costs of informal care were comparable between training and standard care, there was no evidence of a shift in the burden of care from statutory services towards carers. The caregivers' quality of life did not change over the study period.

CRD COMMENTARY - Selection of comparators
The selection of the comparator was appropriate as it reflected conventional care at the authors' setting. You should decide whether this is a valid comparator in your own setting.

Validity of estimate of measure of effectiveness
There was limited information on the design and sample of patients since the clinical study had been published elsewhere. However, the design of the study (randomised, clinical trial) and the use of intention to treat as the basis of the clinical study ensured a high internal validity. The length of follow-up appears to have been adequate for capturing the effect of the intervention.

Validity of estimate of measure of benefit
No summary benefit measure was used in the analysis because a cost-minimisation analysis was conducted. Please refer to the comments in the "Validity of estimate of measure of effectiveness" field (above).

Validity of estimate of costs
The authors adopted a societal perspective and, as such, all the relevant costs were included in the analysis. The unit costs, quantities of resources used, and price year were clearly reported, which enhances the possibility of replicating the study and reflating the results of the analysis in other settings. The source of the data was provided for all items. The use of alternative cost estimates was investigated in the sensitivity analysis. Statistical analyses were also performed to test the statistical significance of differences in the total costs. The cost analysis was performed satisfactorily.

Other issues
The authors stated that prior evidence for caregivers during the rehabilitation of stroke patients was not reliable because of methodological weakness. The issue of the generalisability of the study results to other settings was not explicitly addressed and few sensitivity analyses were carried out. Therefore, the external validity of the analysis is low. The authors highlighted some limitations to their study. For example, potential biases related to the cost-advantage associated with the intervention under examination, and the fact that initial investment costs were not considered in the cost calculation. The authors noted that the EQ-5D was not very sensitive to changes in caregivers' quality of life and, consequently, some changes were detected instead using a visual analogue scale. A strength of the study was the simultaneous assessment of the costs and benefits of the training strategy.

Implications of the study
The study results suggested that the training of caregivers of stroke patients reduced the costs associated with stroke rehabilitation, without worsening the caregivers' quality of life.

Source of funding
None stated.

Bibliographic details