Cost-benefit analysis of an integrated approach to reduce psychosocial trauma following neurosurgery compared with standard care: two-year prospective comparative study of enhanced specialist liaison nurse service for aneurysmal subarachnoid haemorrhage (ASAH) patients and carers

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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 enhanced service was compared with standard care for dysfunctional psychosocial stress for aneurysmal subarachnoid haemorrhage (ASAH). A specialist liaison nurse (SLN), who was an experienced neurosurgical ward sister with the role of supporting and counselling both patients and their families, provided the enhanced service. Standard care involved medical and nursing care as inpatients, and general practitioner (GP) care when discharged back into the community by their own GPs.

Type of intervention
Rehabilitation.

Economic study type
Cost-effectiveness analysis.

Study population
The population comprised patients treated for an ASAH.

Setting
The setting was secondary care (Wessex Regional Neurologic Unit) and community care. The economic study was carried out in London, UK.

Dates to which data relate
The dates to which the effectiveness and/or resource use data related were not stated. The price year was 2003.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costs were calculated prospectively for the same sample of patients and their carers as that used in the effectiveness analysis.

Study sample
The prospective 2-year SLN cohort consisted of 184 consecutive patients, whereas the retrospective control 18-month ASAH cohort comprised 142 patients. No details of patients that refused to participate and/or those excluded from the
initial sample were given. There were no significant clinical differences between responders and nonresponders in each group. No sample power calculations were reported.

**Study design**

This was a single-centre prospective comparative study with a historical control. No member of the clinical team had access to psychosocial data. However, no method of blinding was reported. The duration of follow-up was 2 years for the intervention group and 18 months for the control group. In the SLN intervention group, 17 cases were lost from the sample (12 died, 2 no translation, 3 untraceable). Wessex Patient Carer Questionnaires (WPCQ) were returned from 153 cases (136 patients and 143 carers), giving an effective response rate of 91%. For the control group there was an effective response rate of 77% of cases (97 patients and 98 carers).

**Analysis of effectiveness**

All study participants for whom the questionnaires were received were accounted for in the analysis. One of the clinical teams obtained clinical data, such as Glasgow Coma Scale scores and high-risk bleeds, from the consultants' notes to determine if they were high or low risk for the development of ischaemic complications. Psychosocial data relating to inpatient and post-discharge care were drawn from the standardised patient/carer designed WPCQ, 6 months after treatment for the ASAH. The WPCQ was self-administered, anonymous and non-attributable. To avoid any Hawthorn Effect, some of the structured statements were couched in negative terms.

The effectiveness results were presented in terms of the numbers of patients or carers who agreed or disagreed with the different statements on patients/inpatient care, emotional state, post-discharge care, emotional state at home and number of helpful-unhelpful contacts with the community nurse, GP, and so on. The two cohorts were good clinical and social matches. However, no adjustments for selection bias or confounding were reported.

**Effectiveness results**

The majority of the results presented by the authors were statistically significant at 5% or over; the results listed below are some of those considered highly significant (p≤0.0001). The results are presented for the patient control group versus the patient intervention group, followed by the carer intervention group versus the control group. Further statistically significant results were presented in the paper.

Results for patients (control N=97; project N=136).

For post-discharge care,

"After discharge family worse than at crisis", 72 agreed and 20 disagreed in the control group, while 18 agreed and 78 disagreed in the project group;

"Help if consultant said I was discharged", 52 agreed and 26 disagreed in the control group, while 26 agreed and 54 disagreed in the project group;

"Have all the support I need", 32 agreed and 56 disagreed in the control group, while 74 agreed and 13 disagreed in the project group.

In the Emotional State at Home category, 40 patients answered that they felt frightened and 34 disagreed with this statement in the control group. Eleven patients agreed and 63 disagreed with this statement in the project group.

Results for carers (control N=98; project N=143).

"Information about medication always clear”, 41 agreed and 48 disagreed in the control group, while 68 agreed and 17 disagreed in the project group;

"Patients can't remember so relatives must be informed”, 48 agreed and 41 disagreed in the control group, while 95 agreed and 3 disagreed in the project group;
"Booklet helpful but need specific patient answers", 56 agreed and 19 disagreed in the control group, while 85 agreed and 3 disagreed in the project group;

"Communication between staff and relative mainly very good", 34 agreed and 54 disagreed in the control group, while 90 agreed and 5 disagreed in the project group.

**Clinical conclusions**
It was hypothesised that there would be no differences between control and project cohorts in terms of general satisfaction with neurosurgical inpatient care and general satisfaction with post-discharge care. These can be rejected as the SLN cohort had significantly better psychosocial outcomes than the control group.

**Measure of benefits used in the economic analysis**
The authors did not derive a summary measure of benefit. In effect, a cost-consequences analysis was performed.

**Direct costs**
The direct costs included in the analysis comprised SLN sister salary costs, including staff supervision, and the total costs of the neurosurgical unit. Other National Health Service (NHS) costs were also included, but it was unclear which prices or resources or estimation methods were used to derive "NHS savings" (apart from the number of problematic cases detected within the study). Discounting was not carried out, although it would not have been relevant as the follow-up was two years. The average and partial incremental costs were reported. The costs were expressed in 2003 prices. The costs and the quantities were not analysed separately.

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

**Indirect Costs**
Time off work for patients and carers was used for the indirect cost calculations. The derivation of the costs was based on actual data derived from questionnaires. The sources of the unit costs for the indirect cost calculations were not stated. Discounting was not carried out and was not relevant. The price year was 2003. The average and total costs were reported. The quantities and the costs were presented separately.

**Currency**
US dollars ($).

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

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

**Cost results**
The total cost was $1,383,000 for the control group and $753,000 for the project group. This resulted in savings of $315,000 per annum at 2003 prices. When considering further savings to the NHS ($22,400) and the annual cost of the SLN ($54,000, the total savings were about $280,000 (page 24 of paper).
Synthesis of costs and benefits
The costs and benefits were not combined

Authors' conclusions
The integrated treatment for aneurysmal subarachnoid haemorrhage (ASAH) yields major psychosocial and economic benefits. Dysfunctional stress after ASAH is not inevitable in the majority of patients. High-technology neurosurgery is not just a public cost, it also improves and saves lives and generates revenue.

CRD COMMENTARY - Selection of comparators
The selection of the comparator was based on current practice in the authors' setting. You should decide if the comparator represents current practice in your own setting.

Validity of estimate of measure of effectiveness
This was a time series study with an historical control. This design was not entirely appropriate for the study question. The study compared results between a prospective cohort (project group) and a retrospective cohort (control group). No methods of controlling for possible selection bias or confounding were stated, and these are likely to have been high. However, the authors reported that the patient groups were of a good clinical match and appear to have been representative of the study population. Potential biases in this type of study may result from changes in the way data have been collected between the groups, changes in the service or in the patients' expectations over time, and potential historical effects (e.g. events occurring at the time of the study might affect the participants and provide an alternative explanation for the changes observed). Moreover, there may also be experimental bias, as the previously recorded data available for the controls are likely to be inferior and subject to missing information.

The authors reported that the study was not blind and acknowledged this as a limitation of the study. This might have led to an overestimation of the treatment effect. Another acknowledged limitation was that the prospective SLN cohort was assessed at 6 months, while the control group was assessed at between 6 and 24 months. The authors reported this as a potential source of underestimation for the improvements associated with the SLN.

Validity of estimate of measure of benefit
The authors did not derive a measure of health benefit. The study was, in effect, a cost-consequences analysis.

Validity of estimate of costs
A societal perspective was adopted for the analysis and the relevant categories of costs (e.g. direct and indirect costs) were used. However, the costs and cost calculations were not presented clearly. The authors appear to have mixed the cost with incremental cost (savings) calculations. In this sense, it is difficult to know if all the relevant cost categories were included in the analysis. Moreover, it was unclear if the authors used only the indirect costs to reach their conclusions. The costs and the quantities were reported separately for the indirect costs. All costs were treated as deterministic and no sensitivity analysis was reported.

Other issues
The authors compared their results with those from other studies; their results appear to have been in agreement. The issue of generalisability was not addressed. The authors do not appear to have presented their results selectively. No further limitations of the study were reported.

Implications of the study
This prospective 2-year comparative study showed major clinical, psychosocial and fiscal benefits. It supports the drive for improved clinical governance that acknowledges that carers need to be considered, not only for long-term care but also in the acute sector. The authors stated that it should no longer be accepted that prolonged post-traumatic-stress
reaction after ASAH is inevitable for the majority of patients.

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