Early discharge of hip fracture patients from hospital: transfer of costs from hospital to nursing home

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 use of early discharge of hip fracture patients from hospital, to home or transfer to a special rehabilitation ward in a nursing home. The decision to discharge was assessed 5 days after surgery, and the type of care needed by the patients (either discharge to home or transfer to a rehabilitation ward of a nursing home) was indicated.

Type of intervention
Other: rehabilitation discharge protocol.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients over 65 years of age with hip fracture. Patients were excluded if they had metastatic cancer or multi-trauma.

Setting
The setting was a hospital. The economic study was performed at the university hospital and a general hospital in Rotterdam, The Netherlands.

Dates to which data relate
The effectiveness data were collected between October 1996 and February 1999. The authors did not report the date to which the costs related, but it appears to have been the same period as for the effectiveness data. The price year was 1998.

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

Link between effectiveness and cost data
The costing appears to have been carried out prospectively, but it was unclear whether it was carried out on the same sample population as that used in the effectiveness analysis.

Study sample
The authors stated that a sample size of 2 x 100 patients (100 patients in the conventional management group and 100 in the early discharge group) was needed in order to provide 80% power for a 5-day shorter hospital stay. The effectiveness analysis included patients aged over 65 years who were admitted to the hospitals. Among the 130 eligible
patients in the conventional group, 102 (78%) agreed to participate in the study. After the implementation of the policy, there were 124 eligible patients, with 106 (85%) of them agreeing to participate.

**Study design**
This was a multi-centred, prospective, historical cohort study (two hospitals were considered for the effectiveness analysis). The duration of follow-up was 4 months, or until death in cases where the patient died before the end of the 4-month follow-up period. The authors did not report any loss to follow-up.

**Analysis of effectiveness**
The primary health outcomes assessed in the analysis were:

- the mean and median (and 25th - 75th percentiles) number of days spent in hospital;
- the percentages of patients that died in hospital or were discharged either to their own home, a home for the elderly or a nursing home;
- the mean and median (and 25th - 75th percentiles) number of days spent in a nursing home;
- the number of discharged surviving patients;
- the mean and median (and 25th - 75th percentiles) number of days spent in an institution (including both hospital and nursing home days); and
- the percentage of patients that died or were at home, at a home for the elderly, in a nursing home or in hospital after one month and after 4 months.

The authors also reported the proportion of patients who had recovered their prefracture walking ability after 4 months, the quality of life scores (measured by the Nottingham Health Profile), and the number of patients that were readmitted to the hospital in each one of the groups.

The authors reported that there were no major differences between the baseline characteristics of the groups, although they did not provide any supporting evidence.

Logistic regression was used to analyse the differences in mortality and type of residence at one and 4 months. Linear regression was used to analyse differences in function (Rehabilitation Activities Profile score, RAP,) at one and 4 months after adjusting for age, gender, type of fracture, type of treatment, number of co-morbidities, presence or absence of the diagnosis ‘dementia’ on hospital admission, residence before fracture, and type of discharge arrangement (conventional or early). The data for the two groups of patients were analysed separately.

**Effectiveness results**
The mean and median number of days spent in hospital were, respectively, 26 and 18 (25th - 75th percentiles: 13 - 29) for the conventional management group, and 13 and 11 (25th - 75th percentiles: 9 - 15) for the early discharge group, (p<0.001).

In the conventional management group, 6% of the patients died in hospital, while 25% were discharged to their own home, 17% to a home for the elderly, and 53% to a nursing home.

No patients died in the early discharge group.

Among the early discharged patients, 14% were discharged to their own home, 9% to a home for the elderly, and 76% to a nursing home. These differences were statistically significant, (p=0.001).

The mean and median number of days spent in a nursing home were, respectively, 43 and 40 (25th - 75th percentiles:
27 - 52) among the conventionally managed patients, and 39 and 36 (25th - 75th percentiles: 22 - 57) for the early discharged patients.

The number of discharged surviving patients from the nursing home was 17 for the conventional management group and 42 for the early discharge group. These differences were not statistically significant, (p=0.6).

The mean and median number of days spent in an institution (including both hospital and nursing home days) were, respectively, 38 and 24 (25th - 75th percentiles: 14 - 53) for the conventional management group, and 34 and 27 (25th - 75th percentiles: 12 - 51) among the early discharged patients. These differences were not statistically significant, (p=0.5).

After one month, 4% of the patients in the conventional management group had died, 23% were at home, 15% were at a home for the elderly, 35% were in a nursing home, and 23% were in hospital. The corresponding numbers for the early discharge group were 3% (dead), 21% (at home), 8% (home for the elderly), 62% (nursing home), and 6% (hospital).

After 4 months, 20% of the patients in the conventional management group had died, 36% were at home, 17% were at a home for the elderly, and 28% were in a nursing home. The corresponding numbers for the early discharge group were 19% (dead), 41% (at home), 14% (home for the elderly), and 26% (nursing home).

The authors reported that there were no differences between the groups in terms of the proportion of patients who had recovered their prefracture walking ability after 4 months. This proportion was one third in both groups. They also reported that there were no differences in the quality of life scores. Eight patients in the conventional management group were readmitted to the hospital, compared with 16 in the early discharge group. This difference was not statistically significant, (p=0.2).

**Clinical conclusions**
Patients in the conventional management group spent more days in an institution. However, after 4 months, there were no statistically significant differences in walking ability or in the quality of life scores. Therefore, it would seem that the type of rehabilitation protocol did not have any effect on the outcome. The mortality was higher among the conventionally managed patients.

**Measure of benefits used in the economic analysis**
No summary measure of benefit was used in the economic analysis. A cost-consequences analysis was therefore performed.

**Direct costs**
Some, but not all, of the resource quantities were reported separately from the costs. The direct costs included in the analysis were those of the hospital. Six categories of direct costs were established. These were inpatient day (hospitals, nursing homes and homes for the elderly), nursing (hospital, nursing homes, homes for the elderly, and at home), health practitioners (physicians, therapists and others), medical procedures (therapeutic, diagnostic and laboratory), travelling (ambulance, taxi, other), and informal care and other costs (e.g. meal service at home and adjustment of the housing conditions).

The authors reported that the hotel costs for inpatient days were included. These considered overhead and indirect costs, but excluded all the direct costs noted previously. They did not state what the indirect costs referred to.

The cost data were provided by the hospital administration. Discounting was not performed, but was irrelevant because the costs considered at analysis were incurred over a short period of time (less than 2 years). The study reported the average costs. The price year was 1998.

**Statistical analysis of costs**
The authors reported that Student’s t-test, analysis of variance, Wilcoxon matched pairs signed rank test, Mann-Whitney U-tests, and chi-squared tests were performed. A linear regression model was used to estimate the total costs after adjusting for several factors. These included age, gender, type of fracture, type of treatment, number of co-morbidities, presence or absence of the diagnosis dementia on hospital admission, residence before fracture, type of discharge arrangement (conventional or early), function before fracture (RAP score) and cognitive status (Mini-Mental State Examination score). The data were analysed separately in the groups of patients.

**Indirect Costs**
No indirect costs were reported.

**Currency**
Euros (Eur).

**Sensitivity analysis**
No sensitivity analysis was reported.

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

**Cost results**
The average cost per hip fracture patient up to 4 months after hospital admission was Eur 15,338 (standard deviation, SD=7,765; 25th - 75th percentile: 8,203 - 20,947) for the conventional management group, and Eur 14,281 (SD=7,647; 25th - 75th percentile: 7,742 - 19,177) for the early discharge group. The difference in the average cost per patient was not statistically significant between the groups, (p=0.3).

**Synthesis of costs and benefits**
The costs and the benefits were not combined, as a cost-consequences approach was taken.

**Authors' conclusions**
There were no differences in the health outcomes depending on the type of rehabilitation protocol used (either conventional management or early discharge). In terms of the costs of the interventions, the authors concluded that early discharge did not mean less costs, but a transfer of the costs from the hospital to the nursing home.

**CRD COMMENTARY - Selection of comparators**
The comparator was justified on the grounds that it was the conventional practice in the authors’ setting. You should decide if the conventional management of hip fracture patients, as presented in this study, is used in your own setting.

**Validity of estimate of measure of effectiveness**
The analysis used a prospective historical cohort study. The authors reported that no randomisation was performed. Therefore, there may have been some confounding variables that were not controlled in the study. These may have influenced the effectiveness results obtained. Some patients did not agree to participate in the study, and this may have introduced uncertainty into the reliability of the effectiveness results if there was a systematic pattern that led these patients to decide not to participate, for example, if they had a worst state of health. The higher mortality among the conventionally managed patients may have reflected a worst health state among these patients, which may favour the results obtained for early discharged patients. The authors stated that the sample size was relatively small. More differences may have been found had a larger sample size been used. The authors did not provide any evidence that the
study sample was representative of the study population. They also did not provide any evidence to support their statement that there were no major differences between the characteristics of the two groups. No statistical analyses were conducted to take account of the potential biases and confounding factors.

Validity of estimate of measure of benefit
The authors did not derive a summary measure of health benefit. The analysis was therefore categorised as a cost-consequences study.

Validity of estimate of costs
The authors reported at some point that societal costs were considered in the study, but they did not report any lost income or productivity. In addition, the perspective adopted appears to have been more the perspective of the health service, rather than societal. Consequently, it cannot be clearly stated whether all the costs relevant to the perspective adopted were included in the analysis. The price year was given, but the quantities and the costs were not reported separately. This fact hinders reflation exercises to other settings. Discounting was not performed, but was not necessary because the costs were incurred in less than 2 years.

Other issues
The authors made some comparisons of their results with those from other studies. They found some differences in relation to the results obtained by other studies. For instance, they could not confirm the cost-savings derived from early discharge, as found by one study. Neither could they find an increase in the costs due to the discharge to geriatric wards, as shown by another study. The issue of generalisability to other settings was not addressed. Some of the results seem to have been reported selectively, as not all the effectiveness results were reported in the study. The authors’ conclusions reflected the scope of the analysis.

Implications of the study
The authors stated that, although they could not show that cost-savings are gained by means of early discharge, this protocol allows the freeing of orthopaedic and surgical beds, which may reduce the waiting lists for orthopaedic surgery.

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