Effects of a multicomponent intervention on functional outcomes and process of care in hospitalized older patients: a randomized controlled trial of Acute Care for Elders (ACE) in a community hospital


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 intervention examined in the study was acute care for elders (ACE) in a community hospital. This was intended to help patients maintain or achieve independence in basic activities of daily living (ADL) after hospitalisation. The key elements of the programme were a specially designed environment, patient-centred care, discharge planning with the goal of returning the patient to his or her home, and a review of medical care.

Type of intervention
Palliative care and rehabilitation.

Economic study type
Cost-effectiveness analysis.

Study population
The study population included community-dwelling persons aged 70 years or older that were admitted to a medicine or family practice service. Patients were excluded if they were transferred from a nursing facility or another hospital, or if they required speciality unit admission (i.e. intensive care unit). They were also excluded if they were admitted electively, had a length of stay less than two days, or had already been enrolled in the study.

Setting
The setting was secondary care. The economic study was carried out at the Akron City Hospital in Ohio, USA.

Dates to which data relate
The effectiveness and resource use data were gathered between November 1994 and May 1998. No price year was reported.

Source of effectiveness data
The effectiveness evidence came from a single study.

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

Study sample
Power calculations showed that a sample of 1,530 patients was required to provide greater than 90% power of detecting (alpha = 0.05) the difference expected between the intervention and usual care groups in the mean number of
independent ADL at discharge based on the results of an earlier study. Of the initial group of 6,609 eligible patients, 2,315 were excluded due to the lack of bed availability in the intervention unit (n=1,865) or due to administrative problems (n=450). After randomisation, a further 2,763 patients were not enrolled in the study using a block design formulated a priori to limit enrolment according to data collection constraints. Thus, the final sample size used in the effectiveness analysis comprised 1,531 patients. There were 767 patients in the intervention group and 764 patients in the usual care group. The mean age in the intervention group was 80 (+/- 7) years, 40% were men and 89% were white. The mean age in the usual care group was 79 (+/- 7) years, 39% were men and 87% were white. The authors stated that the characteristics of the patients included in the final sample were comparable to those of the initial eligible population.

Study design
This was a randomised controlled trial that was carried out in a single centre. Randomisation was performed at the time of admission using computer-generated random numbers. These were placed in numbered, opaque, sealed envelopes, which were opened sequentially by the admitting clerk. The baseline assessment was performed 2 weeks before admission, while follow-up assessments were carried out at discharge and 1, 3, 6 and 12 months after discharge.

There was no loss to follow-up for the discharge assessment, but 49 patients died in the hospital (21 in the intervention group and 28 in the control group). For the 1-month assessment, 24 patients were lost to follow-up (3 in the intervention group and 21 in the control group) and 106 died (48 in the intervention group and 58 in the control group). The research assistants were blinded to the main outcome measures but not to the patient’s group assignment. Interviews for assessing ADL, function and mobility were conducted on surrogates. Seventy-nine patients of the 1,531 included in the final sample were not admitted to the unit.

Analysis of effectiveness
Both intention to treat and per protocol analyses were conducted. The primary health outcome used in the study was the change in ADL from 2 weeks before admission to discharge. Two weeks before admission was considered the baseline, although there was no explanation for this. The change in ADL from admission to discharge was also calculated. The secondary health outcomes were change in mobility at discharge, physical performance and mobility examination (PPME) score at discharge, the number of nursing home residents and the cumulative death rate.

Other secondary outcomes were a set of process variables (number of nursing care plans, discharge planning, social work consult, bed rest order, physical therapy consult, urinary catheter, physical restraint, high-risk medication in the first 24 hours and in the day prior to discharge), and satisfaction scores for patients, caregivers, physicians and nurses. Likert scales were used to measure satisfaction. The study groups were shown to have been comparable at baseline in terms of demographics, clinical conditions, functional status, reason for admission, and coexisting conditions. The statistically significant differences were age (lower in the usual care group) and condition of chronic lung disease (more frequent among intervention patients).

Effectiveness results
Only the results of the intention to treat analysis will be reported here, as the results of the per protocol analysis were similar.

The change in ADL from baseline to discharge improved in 9% of patients in the intervention group and 10% of those in the usual care groups, was maintained in 61% (intervention) and 56% (control) of the patients, and declined in 20% (intervention) and 19% (control) of the patients, (p=0.33). The clinical effects were similar for the per protocol analysis, but they were more significantly different, (p=0.07). There was no significant difference between the groups for the change in ADL from admission to discharge.

As many secondary outcome measures were used in the effectiveness study, only those with statistically significant differences between the two study groups will be reported here.

The mean PPME score at discharge was 5.6 (+/- 4.3) in the intervention group and (5.0 +/- 4.3) in the usual care group, (p=0.022).
None of the patient outcomes assessed at follow-up were statistically different between the groups.

The following process of care variables were statistically different between the intervention and usual care groups:

- The number of nursing care plans, 1.5 (+/- 1.2) versus 0.7 (+/- 0.8);
- discharge planning, 2.4 (+/- 3.6) versus 3.5 (+/- 4.1) days to first mention;
- social work consult, 50% versus 43% of the patients;
- bed rest order, 1.7 (+/- 1.7) versus 2.5 (+/- 2.2) days to new activity order;
- physical therapy consult, 42% versus 36% of the patients and 2.6 (+/- 3.4) versus 3.2 (+/- 3.4) days to consult;
- physical restraint, 2% versus 6% of the patients and 3.1 (+/- 4.1) versus 10.5 (+/- 17.5) shifts with restraint; and
- high-risk medication in the first 24 hours, 6% versus 10% of the patients.

The mean satisfaction scores were:

- for patients, 75 (+/- 16) in the intervention group (480 responders) and 72 (+/- 17) in the usual care group (478 responders);
- for caregivers, 62 (+/- 9) in the intervention group (160 responders) and 59 (+/- 10) in the usual care group (173 responders);
- for physicians, 77 (+/- 14) in the intervention group (99 responders) and 66 (+/- 18) in the usual care group (99 responders); and
- for nurses, 66 (+/- 15) in the intervention group (33 responders) and 51 (+/- 17) in the usual care group (78 responders).

All satisfaction scores differed significantly between the groups.

**Clinical conclusions**

The effectiveness analysis showed that the ACE intervention was similar to usual care in many respects, but several secondary outcomes (process variables and patient satisfaction) performed better with ACE.

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

The health outcomes were left disaggregated and no summary benefit measure was used in the analysis. A cost-consequences analysis was therefore performed.

**Direct costs**

Discounting was not applied since the costs for each patient were incurred in one year. The unit costs were not reported separately from the quantities of resources. The health services included in the economic evaluation were length of hospitalisation, geriatric clinical nurse specialist, geriatric medical director, and unit renovations attributable to intervention patients. The proportion of patients reporting at least one home health care visit within one month of discharge and the proportion of patients readmitted within one month of discharge were also reported, but were not included in the cost analysis. The cost/resource boundary adopted was not reported. Both the cost and resource use data were obtained from hospital financial records. No price year was reported.

**Statistical analysis of costs**

Standard statistical analyses of costs were conducted to test the statistical significance of the difference in the total
costs.

**Indirect Costs**
The indirect costs were not included.

**Currency**
US dollars ($).

**Sensitivity analysis**
No sensitivity analyses were performed.

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

**Cost results**
The average length of hospital stay was 6.1 days in the intervention group and 6.3 days in the usual care group, (p=0.26).

The total costs were $5,640 in the intervention group and $5,754 in the usual care group, (p=0.68).

The proportions of patients reporting at least one home health care visit within one month of discharge were 44% (intervention) and 47% (usual care), respectively, (p=0.29).

The proportions of patients readmitted within one month of discharge were 21% (intervention) and 18% (usual care), respectively, (p=0.14).

**Synthesis of costs and benefits**
Not relevant as a cost-consequences analysis was carried out.

**Authors' conclusions**
The acute care for elders (ACE) intervention performed in a community hospital improved patient, physician and caregiver satisfaction, reduced nursing home placement at discharge, and possibly prevented ADL decline without adverse effects or increased costs in comparison with usual care.

**CRD COMMENTARY - Selection of comparators**
The rationale for the choice of the comparator was clear. Usual care was selected since it represented the standard care delivered to the population of elderly considered in the study. However, usual care was not described in detail. You should decide whether it represents a valid comparator in your own setting.

**Validity of estimate of measure of effectiveness**
The analysis of effectiveness used a randomised controlled trial, which was appropriate for the study question. The method of randomisation was good. The study was carried out in a single centre and details were provided. The study sample appears to have been representative of the study population. The study groups were generally comparable at baseline. Power calculations were performed on the basis of an earlier study, thus enhancing the internal validity of the study. The analysis of the clinical study was conducted on an intention to treat basis, but a per protocol analysis was also performed. There were high follow-up rates, but the study was partially blinded as neither the patients nor the data
collectors could be blinded to treatment assignment. This may have introduced bias. A further potential limitation was
the fact that reports of health status were based on surrogate evaluations when a patient's evaluation was not feasible.

Validity of estimate of measure of benefit
No summary benefit measure was used in the economic analysis. The analysis was therefore categorised as a cost-
consequences study.

Validity of estimate of costs
The perspective adopted in the analysis was not reported. The main category of costs included in the economic
evaluation was the length of hospitalisation. The unit costs were not reported separately from the quantities of resources
and no price year was given. These factors limit the possibility of replicating the study in other settings. Overall, few
details were reported and a detailed breakdown of the costs was not given. Standard statistical analyses were performed
to compare the estimated costs in the two study groups, but no sensitivity analyses were conducted. The cost estimates
were fairly specific to the study setting.

Other issues
The authors noted that an earlier ACE study showed a short-term improvement in functional outcomes contrary to this
study. Most studies of similar interventions had failed to show any improvement of functional outcomes. The authors
stated that the study was carried out in a large community hospital, thus there is some potential for generalising the
study results to other settings. The authors commented on some strengths and drawbacks of their analysis.

Implications of the study
The study suggests that the ACE intervention is effective in improving patient satisfaction and reducing nursing home
placement at discharge, without increasing the length of hospital stay and subsequent hospitalisation costs. The authors
suggest that the provision of ACE to a sub-group of patients having a greater likelihood of experiencing benefits in
functional outcome may represent a more pragmatic approach for many community hospitals.

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