The care transitions intervention: the results of a randomized controlled trial
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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 study examined care interventions designed to provide patients and their caregivers with tools and support to encourage them to more actively participate during their care transitions. The intervention package consisted of the following:

- assistance with medication self-management;
- a patient-centred record owned and maintained by the patient to facilitate cross-site information transfer;
- timely follow-up with primary or specialty care; and
- a list of red flags indicative of a worsening condition and instructions on how to respond to them.

To enable patients to be more assertive and play an active role, and to foster care coordination and continuity across settings, a personal health record and a series of visits and telephone calls with a transitional coach were provided. This package was compared with usual care in the authors’ setting.

Type of intervention
Other: Information and education in health.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients aged 65 years or older. The inclusion criteria included:

- admission to the participating delivery system's contract hospital during the study period for a non-psychiatric condition;
- community dwelling;
- residing within a pre-defined geographic radius of the hospital;
- a working telephone;
- English speaking;
- no documentation of dementia in the medical record;
- no plans to enter a hospice;
- not participating in another research protocol; and

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documentation in the medical record of at least 1 of 11 diagnoses, including stroke, congestive heart failure, coronary artery disease, cardiac arrhythmias, chronic obstructive pulmonary disease, diabetes mellitus, spinal stenosis, hip fracture, peripheral vascular disease, deep venous thrombosis and pulmonary embolism.

**Setting**
The setting was secondary care. The economic study was carried out in Colorado, USA.

**Dates to which data relate**
The effectiveness and resource data were collected between 1 September 2002 and 31 August 2003. The price year was not reported.

**Link between effectiveness and cost data**
The costing was undertaken prospectively on the same patient sample that provided the effectiveness data.

**Study sample**
It was unclear whether power calculations were used to determine the sample size. Of the 2,338 patients assessed for eligibility, 1,351 did not meet the inclusion criteria and 237 refused to participate. Thus, the study sample consisted of 750 patients randomly allocated to either the intervention group (n=379) or the usual care group (n=371). The mean age of the patients was 76.0 years (standard deviation, SD=7.1) in the intervention group and 76.4 years (SD=6.8) in the usual care group.

**Study design**
This was a randomised controlled trial. Randomisation was conducted using a random number generator. Research assistants were not blinded to the study groups, but those who performed the follow-up telephone survey at 30 days after discharge were blinded to the participant's allocation status. The duration of follow-up was 180 days after discharge from the index hospitalisation. Nineteen patients in each group were lost to follow-up ([14 deceased, 4 no data available and 1 withdrawn in the intervention group, and 10 deceased, 8 no data available and 1 withdrawn in the control group).

**Analysis of effectiveness**
The analysis of effectiveness was conducted on an intention to treat basis. The primary outcome was the rate of nonelective rehospitalisation. Other outcomes included the rate of rehospitalisation for the same condition that prompted the index hospitalisation. The study groups were comparable in terms of their sociodemographic and baseline health features. Logistic regression was used to adjust for possible imbalances in the randomisation.

**Effectiveness results**
The rates of rehospitalisation amongst the intervention patients versus the control patients were:

- 8.3 versus 11.9 (odds ratio, OR=0.59, 95% confidence interval, CI: 0.35 to 1.00; adjusted 2-sided p=0.048) at 30 days,
- 16.7 versus 22.5 (OR 0.64, 95% CI: 0.42 to 0.99; adjusted 2-sided p=0.04) at 90 days, and
- 25.6 versus 30.7 (OR 0.80, 95% CI: 0.54 to 1.19; adjusted 2-sided p=0.28) at 180 days.

The rates of rehospitalisation for the same diagnosis as the index hospitalisation amongst the intervention versus control patients were:

- 2.8 versus 4.6 (OR 0.56, 95% CI: 0.24 to 1.31; adjusted 2-sided p=0.18) at 30 days,
Clinical conclusions
The clinical results suggested that the care transitions intervention reduced the rates of subsequent rehospitalisation.

Measure of benefits used in the economic analysis
The authors did not derive a summary measure of health benefit. In effect, a cost-consequences analysis was undertaken. See the 'Analysis of Effectiveness' section for the clinical outcomes measured.

Direct costs
The cost analysis included the costs of hospital stay, salary and benefits for the transition coach, costs of cell phone and pager, mileage reimbursement for the transition coach, and photocopying costs for the personal health records and other supplies. The quantities of resources used were not reported separately from the costs. It appears that the perspective adopted in the cost analysis was that of public sector, although this was not explicitly reported. Discounting was not conducted, nor was it likely to be relevant given the short time horizon of the study. The price year was not explicitly specified.

Statistical analysis of costs
The costs were treated stochastically. Mean (SD) values and 2-sided p-values (unadjusted and log transformed) were reported for the difference between the costs in the intervention and control groups.

Indirect Costs
The productivity costs were not considered.

Currency
US dollars ($).

Sensitivity analysis
No analysis of uncertainty was conducted.

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

Cost results
The mean hospital costs for intervention versus control patients were:

- $784 (SD=3,916) versus $918 (SD=2,971) (log-transformed p=0.06) at 30 days,
- $1,519 (SD=4,914) versus $2,016 (SD=4,872) (log-transformed p=0.02) at 90 days, and
- $2,058 (SD=5,452) versus $2,546 (SD=5,466) (log-transformed p=0.049) at 180 days.

The annual cost of the care transitions intervention was estimated at $74,310. The care transitions intervention was projected to achieve an annual cost-savings of $295,594.
Synthesis of costs and benefits
The costs and benefits were not combined.

Authors' conclusions
Coaching chronically ill older patients and their caregivers may reduce the rates of subsequent rehospitalisation. The results from the economic analysis also indicated that the care transitions intervention realised a saving in total costs.

CRD COMMENTARY - Selection of comparators
Selecting usual care as the comparator was appropriate as it represented common practice in the authors' setting. You should decide whether this is a valid comparator in your own setting.

Validity of estimate of measure of effectiveness
The clinical effectiveness data were derived from a randomised controlled trial, which was an appropriate study design. The trial details were well reported and it appears to have been well conducted, which suggests a high internal validity. However, it was unclear whether power calculations were used to justify the sample size. Therefore, it is difficult to know if the study findings were due to chance or to the intervention. Appropriate statistical analyses were undertaken to any confounding that was not dealt with by randomisation into account.

Validity of estimate of measure of benefit
The authors did not derive a summary measure of benefit. In effect, a cost-consequences analysis was performed. The reader is referred to the comments in the 'Validity of estimate of measure of effectiveness' field (above).

Validity of estimate of costs
The perspective adopted in the economic study appears to have been that of the public sector, although this was not explicit. However, as only direct intervention costs relevant to this perspective were included in the analysis, it would seem that this was the perspective used. Resource consumption was not reported, which may limit the possibility of replicating the cost analysis in other settings. The cost estimates were specific to the study setting so, consequently, caution will be required when extrapolating the cost results to other contexts. The price year was not reported, which will make reflation exercises in other time periods difficult. Discounting was not carried out although it might not have been appropriate given the time horizon.

Other issues
The authors made extensive comparisons of their findings with those from other studies. The external validity of the analysis is likely to be low, as the issue of the generalisability of the study results to other settings was not addressed and no sensitivity analyses were conducted. The authors stated that a formal cost-effectiveness analysis was beyond the scope of this study and, as such, limited information on the costing was provided. The authors did not discuss the limitations of their study.

Implications of the study
The study suggests that coaching chronically ill older patients and their caregivers to ensure that their needs are met during care transitions is the preferred option. The authors did not make any recommendations for further research.

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