Is case management effective in reducing the risk of unplanned hospital admissions for older people? A systematic review and meta-analysis

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CRD summary
This review found that case management for elderly people did not reduce unplanned hospital admissions, but it could shorten hospital stay. The main conclusion reflects the evidence presented, but may be overstated. No conclusions could be drawn on the cost-effectiveness of case management.

Authors' objectives
To review the evidence on the effectiveness of case management in reducing the risk of unplanned hospital admissions for older people.

Searching
Eighteen databases were searched, including CINAHL, EMBASE and MEDLINE, for articles included to June 2010. The websites of the Agency for Healthcare Research and Quality, the Centre for Reviews and Dissemination, the EPPI-Centre, and The King's Fund were searched; experts were contacted; and the reference lists of eligible studies were checked.

Study selection
Randomised controlled trials (RCTs) of case management for older people (aged 65 years or older) in hospital or after discharge, including in emergency departments, were included. RCTs of community case management for older people were included. Case management was defined as "the process of planning, coordinating and reviewing the care of an individual". Trials had to clearly report the number of unplanned hospital admissions or readmissions; be carried out in an Organisation for Economic Co-operation and Development country (broadly applicable to the UK); and be published in English or have an English abstract.

The delivery of case management varied between the included trials, with care being coordinated by advanced nurse practitioners, members of a geriatric team, general practitioners, guided-care nurses, or nurse community managers. The duration of case management, the frequency of home visits, and the number of multidisciplinary meetings varied between trials. The control in most trials was usual care. Trials were conducted in the USA (four), Denmark (two), Australia (two), Germany, Sweden or Canada.

Two reviewers independently screened titles and abstracts with disagreements resolved by a third reviewer. One of two reviewers then assessed the full texts of relevant articles. Exclusions were checked by a third reviewer.

Assessment of study quality
The Cochrane risk of bias tool was used to assess trial quality. The authors did not explicitly state the method, but it is likely that quality was assessed by one reviewer and checked by a second.

Data extraction
The numbers of admissions or readmissions were extracted and individual risk ratios were calculated. Total numbers of admissions (count data) were converted to relative rates. Mean numbers of people or admissions were used to calculate mean differences. All were estimated with 95% confidence intervals.

The data were extracted by one reviewer and checked by a second reviewer.

Methods of synthesis
Meta-analysis was performed where there were at least three trials reporting the outcome. A fixed-effect or random-effects model was used depending on the level of heterogeneity; a random-effects model was used if $I^2$ was over 50%.

Results of the review
Eleven RCTs (over 4,300 patients, plus 34 municipalities) were included. Six trials were of management initiated in hospital, and five were in the community. The risk of bias was judged to be generally low.

**Hospital-initiated case management**: There was no significant difference in readmissions with case management compared with usual care (RR 0.71, 95% CI 0.49 to 1.03; three RCTs; $I^2=72\%$), despite two trials reporting a statistically significant reduction in readmissions. Half the participants in one trial were electively admitted; sensitivity analysis without this trial showed that the non-significant reduction became smaller (RR 0.81, 95% CI 0.65 to 1.02; two RCTs; $I^2$ not reported). Three trials were not included in the meta-analysis; these showed no reduction in readmissions. Three trials showed a significant reduction in hospital stay with case management (data not pooled), and one showed a significant increase in the time to first readmission.

**Community-initiated case management**: None of the five trials showed a reduction in unplanned hospital admissions with case management, compared with usual care. Meta-analysis of three trials showed no difference in the mean number of patients being admitted. Other outcomes including emergency department visits, general practitioner visits, specialist or out-patient visits, and length of stay were not improved with case management, compared with usual care, except in one trial that found that case management reduced emergency department visits.

**Cost information**

All five trials that included cost outcomes reported reduced costs with case management, compared with usual care, despite all but one reporting a non-significant effect on hospital admissions or readmissions. The authors suggested that this could be due to the shorter stay, or time to first readmission, or fewer admissions to the emergency department.

**Authors’ conclusions**

Case management did not reduce unplanned hospital admissions for older people, but it could shorten hospital stay and reduce other resource use.

**CRD commentary**

The review question and inclusion criteria were clear. The authors conducted a thorough search of 18 databases and other resources. The restriction to trials in English, and those reporting unplanned admissions could have excluded relevant trials. Methods to minimise error and bias varied during the review. The authors used a broad definition of case management, which resulted in significant variation in the interventions, so a random-effects model was used to pool the rate ratios.

The use of rate ratios for total readmissions (count data) assumes that the risk of unplanned readmission is constant across participants and time, which may not have been the case. Appropriate sensitivity analysis was performed. The authors noted that the data were not sufficient to accurately assess the cost-effectiveness of case management.

On the whole this was a well-conducted review. While there was no evidence that case management reduced unplanned admissions, the authors’ conclusion that case management had no effect may be overstated, due to the differences in interventions, possible differences between patients in the trials, and the non-significant trend towards reduced admissions with hospital-initiated case management.

**Implications of the review for practice and research**

**Practice**: The authors stated that case management was being promoted to reduce unplanned hospital admissions, but their review did not support the policy or practice.

**Research**: The authors stated that improving the efficacy of case management, for example by changing the intensity of the intervention or using accurate case management tools to identify sufficiently high-risk patients, should be considered.

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