

Preventing the rebound: improving care transition in hospital discharge processes

Ian A. Scott MBBS, FRACP, MHA, MEd, Director of Internal Medicine and Clinical Epidemiology – Princess Alexandra Hospital, Associate Professor – University of Queensland

Princess Alexandra Hospital, Level 5A, Ipswich Road, Brisbane, QLD 4102, Australia.
University of Queensland, Brisbane, QLD 4072, Australia. Email: ian_scott@health.qld.gov.au

Abstract

Background. Unplanned readmissions of recently discharged patients impose a significant burden on hospitals with limited bed capacity. Deficiencies in discharge processes contribute to such readmissions, which have prompted experimentation with multiple types of peridischarge interventions.

Objective. To determine the relative efficacy of peridischarge interventions categorised into two groups: (1) single component interventions (sole or predominant) implemented either before or after discharge; and (2) integrated multicomponent interventions which have pre- and postdischarge elements.

Design. Systematic metareview of controlled trials.

Data collection. Search of four electronic databases for controlled trials or systematic reviews of trials published between January 1990 and April 2009 that reported effects on readmissions.

Data synthesis. Among single-component interventions, only four (intense self-management and transition coaching of high-risk patients and nurse home visits and telephone support of patients with heart failure) were effective in reducing readmissions. Multicomponent interventions that featured early assessment of discharge needs, enhanced patient (and caregiver) education and counselling, and early postdischarge follow-up of high-risk patients were associated with evidence of benefit, especially in populations of older patients and those with heart failure.

Conclusion. Peridischarge interventions are highly heterogenous and reported outcomes show considerable variation. However, multicomponent interventions targeted at high-risk populations that include pre- and postdischarge elements seem to be more effective in reducing readmissions than most single-component interventions, which do not span the hospital–community interface.

What is known about this topic? Unplanned readmissions within 30 days of hospital discharge are common and may reflect deficiencies in discharge processes. Various peridischarge interventions have been evaluated, mostly single-component interventions that occur either before or after discharge, but failing to yield consistent evidence of benefit in reducing readmissions. More recent trials have assessed multicomponent interventions which involve pre- and postdischarge periods, but no formal review of such studies has been undertaken.

What does this paper add? With the exception of intense self-management and transition coaching of high-risk patients, and nurse home visits and telephonic support for patients with heart failure, single-component interventions were ineffective in reducing readmissions. Multicomponent interventions demonstrated evidence of benefit in reducing readmissions by as much as 28%, with best results achieved in populations of older patients and those with heart failure.

What are the implications for practitioners and managers? Hospital clinicians and managers should critically review and, where appropriate, modify their current discharge processes in accordance with these findings and negotiate the extra funding and personnel required to allow successful implementation of multicomponent discharge processes that transcend organisational boundaries.

Introduction

Hospitals worldwide are under pressure to meet increasing demands for acute care from aging populations in the face of decreased bed stock, high occupancy rates, and worsening access block. Clinicians and managers are in need of effective strategies that can enhance efficient use of hospital beds, including minimisation of the numbers of patients who are readmitted within a short time following discharge. Between 3 and 11% of all patients

discharged from hospital are readmitted within 30 days, of which 90% are unplanned and at least 80% relate to an acute medical complication.¹ Readmission rates as high as 24% are seen among older patients with heart failure, chronic obstructive pulmonary disease, or psychosis, or who have undergone recent vascular surgery.² Although progressive illness or deficiencies in primary care and community services may account for a sizeable fraction of this readmission burden, quality experts have highlighted the

lack of standardisation in discharge processes that may predispose to poor outcomes.³ Documented deficiencies include inadequate needs assessment, insufficient patient and carer education and support, conflicting perceptions of patient self-efficacy and health literacy, medication errors, poor communication and information transfer between providers, missed or delayed follow-up, and failure to arrange home assistance and community support.

Patients most at risk of unplanned readmission have the following characteristics:⁴⁻⁷ age ≥ 80 years; five or more comorbidities; history of depression; living alone with poor social support; cognitive impairment; impaired functionality; advanced-stage illness; and long-index hospital stay. However, investigators have also identified absence of patient and family education during hospital stay⁴ and lack of preparedness for discharge (or 'discharge readiness')⁸ as predictors of readmission.

In studies of patient and carer perceptions of the discharge process, commonly reported complaints include poor communication and consultation by staff (10% not told purpose of medications; 44% not told of sentinel side effects; 41% not told of danger signs suggesting disease relapse),⁹ inadequate notice of discharge timing, inadequate assessment of home circumstances, lack of involvement in discharge arrangements, and uncertainty around coordination of postdischarge services.^{10,11} Although rating hospitals highly in terms of technical care and professional behaviour, multiple patient surveys consistently give a lower rating for discharge processes and predischARGE provision of information. In one US study, two-thirds of discharged patients reported that no one at the hospital talked to them about managing their care at home, and 80% of those requiring assistance with basic functional needs failed to receive a home care referral.¹² In other studies, many patients do not understand their discharge medications and cannot recall their chief diagnoses.¹³ Hospital staff also report dissatisfaction with discharge processes regarding lack of appropriate staff and patient and carer education about discharge, difficulty procuring community services, and an absence of feedback on outcomes of the discharge process.¹⁴ Primary care providers express frustration at not receiving discharge summaries that contain all critically important management data in a timely fashion¹⁵ and being unaware of test results that were pending at discharge,¹⁶ which lead to patients not receiving follow-up care and further evaluations recommended by the treating hospital team.¹⁷

In the US, the National Quality Forum has recently highlighted discharge processes and readmission rates as potential items for hospital performance measurement and quality improvement.¹⁸ In recognition of these problems, numerous peridischARGE interventions have attempted to improve discharge processes and postdischarge outcomes (see below). These have attracted multiple evaluative studies that, in turn, have been synthesised in several systematic reviews that yield conflicting results and conclusions. For example, O'Neill and Meade state that discharge planning and support teams are cost effective and should be in place universally,¹⁹ whereas Shepperd and colleagues conclude that the impact of discharge planning on readmission rates and health outcomes is uncertain.²⁰ A more recent review by Ali and Rasmussen suggests an explanation for this divergence of opinion, noting that, in general, the evidence is a mixture of benefit, deficit and uncertainty due to the complexity and variability of

patients, interventions and outcome measures, and methodological problems with evaluations.²¹

On the basis of literature and clinical experience, we theorised that an ideal set of peridischARGE interventions might demonstrate the following attributes: (1) predischARGE and postdischarge components being integrated in recognition of discharge being a care transition; (2) discharge processes coordinated by a single health professional (care coordinator) who takes responsibility for discharge of individual patients and formally assesses their risks and needs; (3) care coordinator having ready access to specialist expertise and assistance from other clinical disciplines as required; (4) strong focus given to patient and carer education, preparing them for discharge, and providing postdischarge support; and (5) systems for transferring clinical information about ongoing management to community-based providers at discharge. On the basis of these attributes, we decided, *a priori*, to categorise studies of discharge processes into those that evaluated single-component interventions (either sole or predominant) that occurred either before or after discharge, and those that evaluated integrated, multicomponent interventions that included both pre- and postdischarge elements.

Methods

We searched PubMed, Cochrane, EPOC and CINAHL databases for articles published between January 1990 and March 2009 using search terms 'discharge planning', 'hospital discharge', 'patient discharge' and 'discharge processes'. Eligible studies were controlled trials or systematic reviews that reported data on interventions targeting hospitalised patients and measured readmission rates. Excluded studies were those dealing with formal care programs that did not primarily target or involve discharge processes relating to acute hospital stays: formal comprehensive geriatric assessment; specialised in-patient or postdischarge rehabilitation programs; acute hospital in the home; day hospital care; postacute care programs for surgical patients; palliative care programs; or transitional care packages coupled with community-based allied health support. Studies that assessed interventions targeting specific single diseases or conditions such as disease-specific clinical pathways, early mobilisation strategies following orthopaedic surgery and home-based rehabilitation following acute stroke were also excluded. Formal meta-analysis was not applied in anticipation of considerable study heterogeneity in design and outcome measures. Emphasis was given to the extent to which study results were consistent and generalisable to general medical patients.

Results

The search yielded 2776 articles, including 378 systematic reviews, of which seven were published after 2000 and served as key sources of data for this analysis.^{13-15,22-25}

Studies of single-component interventions provided before or after discharge

Screening of individuals at high risk of discharge failure

Several standardised screening tools can be used to assess risk of failing discharge on the basis of impaired cognitive function, limitations in basic or instrumental activities of daily living, depression, poor social support, incontinence, or other

comorbidities.²⁶ These include the Hospital Admission Risk Profile, Identification of Seniors at Risk, and Care Complexity Prediction Instrument. In three reviews,^{22,23,27} systematic use of these instruments exerted no significant effects on readmission rates.

Multidisciplinary teams and ward rounds

Mudge *et al.* undertook a controlled trial of enhanced access to allied health services coupled with proactive information sharing between disciplines and explicit discharge goals involving 1538 mostly older general medical patients.²⁸ Compared with usual care control medical wards, intervention wards demonstrated no difference in readmissions. Similar results were noted in a randomised trial of interdisciplinary ward rounds involving 1102 general medical patients.²⁹

Discharge planning protocols

In a review of 11 randomised trials involving 5351 patients,²⁰ discharge planning protocols exerted no impact on readmission rates. Observational studies have shown that in 40% of patients one or more items of the discharge plan were not implemented or followed, more so among low-income patients, which may explain the absence of efficacy.³⁰

Educational interventions and self-management approaches

Two reviews^{22,23} assessed educational interventions and found no effect on readmissions. A randomised trial involving 750 elderly patients compared transition coaching and self-management tuition in medication use, personal health record, timely follow-up with GPs and specialists, and knowledge of complications and how to respond, with usual care.³¹ This resulted in lower readmission rates, which were non-significant at 30 days (8 v. 12%; $P=0.05$) but significant at 90 days (17 v. 23%; $P=0.04$). Similarly, in a review of 6 trials involving 857 patients with heart failure, self-management teaching resulted in significant decreases in both all-cause readmission rates (41% decrease; $P=0.001$) and heart failure-related readmissions (56% decrease; $P=0.001$).³²

Discharge coordinators

These interventions were characterised by having one person assume responsibility for supervising and coordinating discharge processes for individual patients up to the point of discharge. In an early trial that included close liaison between nurses and case managers with medical teams, readmissions were not reduced.³³ In a review of 12 trials involving general medical patients, no effects were seen on readmissions;³⁴ similar results were seen in two other trials that recruited a total of 3557 patients.^{35,36}

Collaboration with primary care and general practitioners in discharge processes

Augmented and timely communication between hospital staff and primary care practitioners at the time of discharge and proactive attempts to seek input from general practitioners (GPs) in the discharge process have been assessed in several trials. One trial involving 189 patients assessed effects of a policy requiring a discharge plan to be issued to all community providers within 48 h

of discharge, and found no significant changes in readmissions.³⁷ A trial of GP input into discharge planning targeting 364 high-risk frail elderly patients also yielded a null result despite greater use of community services and more education of patients and carers before discharge.³⁸

Post-discharge home visits or telephonic follow-up

In a review of nine trials involving 2637 patients published to 1999, home visits shortly after discharge by nurses, allied health professionals, geriatricians or GPs demonstrated inconsistent effects on readmissions, with decreases being seen in two trials, an increase in one trial and no effect in three trials.³⁹ A more recent trial of nurse-led, home-based case management following discharge had no impact on readmissions.⁴⁰ Home visits by clinical pharmacists in one trial of 872 discharged patients 80 years or older, despite changes in management of 20% of participants, resulted in a 30% increase ($P=0.009$) in readmissions,⁴¹ whereas in another trial involving 362 medical patients, no impact on readmissions was noted.⁴² One trial reported significantly reduced adverse drug events as a consequence of pharmacist counselling of patients following discharge but no change in readmissions.⁴³ Two trials involving 334 patients with chronic lung disease failed to show any impact of nurse home visits on readmissions,^{44,45} in contrast to two trials involving 878 patients with cardiac disease that demonstrated a significant ($P<0.05$) one-third decrease in readmissions.^{46,47}

In a Cochrane review of 33 studies involving 5110 patients, telephone calls initiated by hospital staff to patients shortly after discharge failed to reduce readmissions.⁴⁸ In contrast, the use of sophisticated telephonic support that included telemonitoring in patients with chronic heart failure reduced readmissions by 21% overall in a recent review of 14 trials involving 4264 patients.⁴⁹

Post-discharge community-based care coordination and access to primary care

Interventions aimed at optimising coordination of care provided in community settings appear to be ineffective in reducing readmissions. In a review of 15 trials involving 18 309 patients for whom community-based nurses provided education, telephone support and care coordination, no effects on hospitalisation were noted in 14 trials.⁵⁰ In another trial in which 1396 recently admitted high-risk older patients with multiple comorbidities were targeted for home assessments and fast-track access to primary care services, readmission rates actually increased from 0.14 to 0.19 per month per patient.⁵¹

Nurse-led intermediate care units

Having patients spend time before discharge in a nurse-led step-down or intermediate care unit in which nurses focus on preparing patients for discharge had no effect on readmissions in 10 trials involving 1896 patients, despite improvement in functional status.⁵²

Studies of integrated pre- and postdischarge multicomponent interventions

In the first study of its type, involving 363 patients aged 65 years and above, Naylor and colleagues described a program

comprising specialist nurse-led assessment, discharge planning, and patient–carer education; written care plans and medication lists; discharge summaries; coordination of postdischarge services; and home visits (at 24 h and 7–10 days) with telephonic follow-up. At 6 months, readmissions were significantly reduced from 37 to 20% ($P < 0.001$) with a reduction in total care costs of US\$600 000.⁵³

In a meta-analysis of 18 trials involving 3304 older patients (mean age ≥ 70 years) with heart failure published to 2003, the same multicomponent intervention used by Naylor *et al.* supplemented by early clinic follow-up and enhanced communication between providers, led to a significant reduction in readmissions from 43 to 35% ($P = 0.001$).⁵⁴ Similar results were noted in more recent trials evaluating comprehensive discharge planning and immediate outpatient reinforcement in heart-failure patients. Anderson *et al.* report a decrease in 6-month readmissions from 44 to 11% ($P = 0.01$),⁵⁵ whereas Naylor *et al.* reported a decrease in 12-month readmissions from 55 to 45% ($P = 0.12$), which translated to a significant decrease ($P = 0.047$) in the total number of readmissions.⁵⁶

One trial involving 122 patients discharged from a community hospital assessed the effects of an intervention comprising a comprehensive discharge form electronically transferred to the primary care practitioner (listing discharge diagnosis, dietary and activity instructions, home services, scheduled appointments, pending investigations, discharge medications, postdischarge follow-up and recommendations, nursing comments and patient reminders), telephone contact by a primary care nurse after discharge, and a scheduled clinic review. Although this led to a significant decrease in the proportion of patients who were lost to follow-up within three weeks of discharge (from 41 to 15%; $P = 0.005$), there was no impact on readmission rates.⁵⁷ A similar negative result was noted in an Australian trial involving 166 high-risk older medical patients who were reviewed by a chronic disease nurse consultant before discharge and then seen again at a nurse-led clinic within two weeks of discharge.⁵⁸

Another trial evaluated a re-engineered hospital discharge program which centred on a nurse advocate who closely liaised with patients and carers during hospital stay, arranged follow-up appointments, undertook medication reconciliation, conducted patient education with an individualised instruction booklet (that was also sent to their primary care provider), and provided a written discharge plan combined with a telephone call from a clinical pharmacist 2–4 days after discharge to reinforce the discharge plan and review medications.⁵⁹ This resulted in a significant 30% decrease in hospital utilisation (ED visits and readmissions) at 30 days after discharge ($P = 0.009$), with a non-significant trend towards lower readmissions (28% decrease, $P = 0.09$).

An Australian trial evaluated the effects of a comprehensive nursing and physiotherapy assessment, nurse-led education and self-management strategies, individualised program of exercise strategies, written guidelines for postdischarge care, arrangement of community services and social support, and nurse-conducted home visit and telephone follow-up commencing in hospital and continuing for 24 weeks after discharge.⁶⁰ At 6 months this intervention within a cohort of 128 frail older patients resulted in significantly fewer readmissions (22 v. 47%; $P = 0.007$) and emergency visits to GPs (25 v. 67%; $P < 0.001$).

In a small randomised pilot study involving 41 high-risk medical patients, an intervention comprising medication counselling and reconciliation by a clinical pharmacist, education and discharge planning from a care coordinator, and phone follow-up reduced readmission and emergency visits combined at 30 days compared with usual care (10 v. 38%; $P = 0.04$), although this was not maintained at 60 days (30 v. 43%; $P = 0.52$).⁶¹

In a recent metareview, Mistiaen and colleagues²⁴ retrieved systematic reviews published between 1994 and 2004 that assessed effectiveness of peridischage interventions aimed at reducing postdischarge problems in adults discharged home from acute general hospital care. Of 15 reviews selected, only three showed reductions in readmissions and all three^{22,54,62} were characterised by the combination of patient education and pre- and postdischarge support.

Discussion

Study limitations

This analysis has several limitations. First, it is not an exhaustive systematic review of all individual trials of clinical interventions that relate to discharge processes in some way. Such a work was beyond the scope of this article and detailed critiques of single studies were not possible. What was intended instead was to provide an indicative metareview of interventions that directly targeted discharge processes independently of other care interventions with broader objectives (such as geriatric assessment and advanced care plans). Second, it included non-randomised studies, which are less rigorous than randomised designs but which were considered given the paucity of data and small sample sizes for some interventions. Third, the categorisation scheme used here to group interventions for the purposes of analysis may have simplified or ignored important differences between studies, which may have led to misclassification of some studies and masking or nullification of intervention effects that might otherwise have been discerned. This is a risk of any categorisation scheme applied to studies of complex interventions with inherent heterogeneity, but we feel that the scheme used was faithful to the prime elements of each study included.

Summary of findings

On the basis of evidence presented, intense self-management and transition coaching of patients at high risk of readmission, and the use of home visits or telephone support for patients with heart failure, appear to be the only single-component strategies that demonstrated consistent evidence of efficacy in reducing readmissions. Evidence for other single-component interventions was either lacking or varied considerably between studies. The number of trials involving integrated multicomponent strategies that span the predischage–postdischarge continuum are limited in number but appear, in general, to show positive outcomes in reducing readmissions. Care models for specific populations such as older patients or those with heart failure can potentially apply to a broader population of patients with a range of chronic diseases. The evidence suggests that discharge processes are effective in reducing readmissions if they include the components listed in Box 1, and which are provided and coordinated by one, or at most two, clinicians assigned to that patient for both predischage and postdischarge phases.

Box 1. Essential attributes of peridischarge interventions that can potentially reduce readmissions

- Early and complete assessment of discharge needs and medication reconciliation.
- Enhanced patient (and care-giver) education and counselling specifically focussed on gaining an understanding of the patient's condition and its self-management.
- Timely and complete communication of management plan between clinicians at discharge when patient care is transferred from hospital staff to primary care teams.
- Early postacute follow-up within 24–72 h for high-risk patients with either doctor or nurse.
- Early postdischarge nurse (or pharmacist) phone calls or home visits to confirm understanding of management and follow-up plans in high-risk patients.
- Appropriate referral for home care and community support services when needed.

Practice implications

More examples are appearing of reconfigured discharge processes that have adopted and enhanced such strategies outside the context of controlled studies. One gaining increasing prominence is the *Ideal Transition Home Model* (ITHM) that features in the *Transforming Care at the Bedside* (TCAB) program pioneered by the Institute of Healthcare Improvement in collaboration with the Robert Wood Johnson Foundation.⁶³ The model promotes the four key elements of enhanced assessment of discharge needs, patient education, communication at discharge, and timely postdischarge follow-up. In one hospital in Iowa, USA, which implemented TCAB and ITHM targeted at patients with heart failure, 30-day readmission rates, which were already low (12%), decreased to between 3 and 9% over the 3 months after implementation.⁶⁴

Although the available evidence is difficult to analyse and more rigorous trials are needed, this evidence review substantiates the call for hospitals to critically review and, where appropriate, reconfigure their current discharge processes towards interventions that are more likely to reduce readmissions. This could include integrated, multicomponent programs that include pre- and postdischarge interventions. Hospital clinical directors and managers will need to negotiate the extra funding, personnel and stakeholder buy-in required to allow such programs to operate successfully.⁵⁸

Competing interests

The author declares that he has no competing interests.

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