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Review

# Transitional care interventions and hospital readmissions in surgical populations: a systematic review

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Hospital readmission;
Health services research;
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Patient-centered care;
Patient discharge

**Abstract**

**BACKGROUND:** Despite hospital readmission being a targeted quality metric, few studies have focused on the surgical patient population. We performed a systematic review of transitional care interventions and their effect on hospital readmissions after surgery.

**DATA SOURCES:** PubMed was searched for studies evaluating transitional care interventions in surgical populations within the years 1995 to 2015. Of 3,527 abstracts identified, 3 randomized controlled trials and 7 observational cohort studies met inclusion criteria.

**CONCLUSIONS:** Discharge planning programs reduced readmissions by 11.5% ($P = .001$), 12.5% ($P = .04$), and 23% ($P = .26$). Patient education interventions reduced readmissions by 14% ($P = .28$) and 23.5% ($P < .05$). Primary care follow-up reduced readmissions by 8.3% for patients after high-risk surgeries ($P < .001$). Home visits reduced readmissions by 7.69% ($P = .023$) and 4% ($P = .161$), respectively. Therefore, improving discharge planning, patient education, and follow-up communication may reduce readmissions.

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Since the Affordable Care Act implemented financial penalties for hospitals with high 30-day readmission rates, more than 2,500 of hospitals (54%) faced some type of penalty in 2014.[1] One in 7 surgical patients is readmitted within 30 days of a major operation.[2] To minimize financial penalties and improve quality of care, there is a pressing need to develop a feasible, cost-effective approach to reduce readmissions.[3]

Most available research has focused on risk factors associated with readmission. Many studies have proposed interventions that may prevent readmissions, but few have implemented and evaluated their effectiveness. Among published studies in medical patients, several have shown that improvements in patient-centered care transitions reduced readmissions[4–6]; a systematic review of 47 randomized controlled trials on heart failure patients

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concluded that home visits and multidisciplinary clinic visits reduced readmissions.[7] Whereas medical patients are usually readmitted for progression of disease, surgical patients are usually readmitted for complications related to their operation.[8] Some of the most common reasons for readmission in surgical patients are surgical infections, gastrointestinal complaints or complications, pain control, and failure to thrive or malnutrition.[9,10] An estimated 50% of these readmissions may be preventable through closer follow-up or improved education. Calls for broad patient-centered interventions after discharge of the surgical patient echo recommendations made to prevent readmission after medical discharges.[11–15]

To better understand which interventions may be effective at reducing readmissions across surgical specialties, we performed a systematic review of transitional care interventions after surgical procedures. By comparing different care transition programs and their components, it was our goal to find the most universal and effective elements for reducing surgical patient readmissions. We hypothesized that a coordinated discharge process is the most effective element of a transitional care program to reduce readmissions among those patients at highest risk.

## Methods

### Literature search

We identified studies of transitional care interventions in surgical populations using 2 separate PubMed database searches. First, a comprehensive search was performed in September 2015 to identify interventions associated with reduced hospital readmissions in surgical populations. Limits included years 1995 to 2015, English language, and adult population (18+). The search string was as follows: (readmission OR rehospitalization) AND surgery. A subset of these articles focusing on transitional care interventions was chosen. To identify additional studies evaluating transitional care measures in surgical populations, we then performed a second search using the same criteria but with the search string as follows: surgery AND readmission AND program AND (follow-up OR "care management" OR "case management"). Reference lists of included articles were reviewed for additional studies meeting criteria.

### Inclusion/exclusion criteria

A transitional care intervention was defined as any intervention that sought to improve postoperative care after discharge from the hospital. This included but was not limited to patient education, case management, discharge planning, and/or specific follow-up measures. For the purposes of this study, post discharge destination (eg, transfer to rehabilitation facility) was not evaluated as a transitional care intervention. We included studies that evaluated surgical patients, but excluded studies that were limited to patients who underwent transplantation or gastrostomy feeding tube placement because of the unique requirements of these patient populations. Randomized controlled trials, cohort, and case-control studies were selected; case series and case reports were excluded. Studies were limited to an outcome of hospital readmission within 3 months to increase the relevance of the readmission to the surgical procedure undergone.

### Data extraction

Abstracts from both PubMed searches were reviewed by 2 individuals, and any discrepancy regarding inclusion was decided on by a third individual. After initial abstract reviews, full articles were then assessed for study inclusion criteria. A data extraction tool was developed using REDCAP (Research Electronic Data Capture Data) to standardize abstracted information regarding study design, population, intervention, and outcomes. We examined bias in each study using the framework from AHRQ (Agency for Healthcare Research and Quality) for assessing bias in health care interventional studies.[16] We describe univariate and bivariate statistics as reported within each study. For our purposes, level of significance was set at an alpha value of .05. This systematic review was performed in accordance with PRISMA (Preferred Reporting Items for Systemic Reviews and Meta-Analyses) guidelines.[17]

## Results

### Study selection and characteristics

Our PubMed search identified 3,527 abstracts. After excluding 3,380 for not assessing an intervention and readmission in surgical patients, 147 full text articles were screened for eligibility. Ultimately, 10 articles met inclusion criteria for this systematic review. The included studies were heterogeneous by study design, study size, and surgical population (Table 1). Three studies were randomized controlled trials,[18–20] and the remaining were observational cohort studies, 2 prospective[21,22] and 5 retrospective.[23–27] Several surgical specialties were represented including general surgery (n = 5),[20,22,23,26,27] cardiac surgery (n = 4),[18,19,24,25] vascular surgery (n = 2),[26,27] and neurosurgery (n = 1).[21] Study size ranged from 34 to 52,807 participants with a median of 616.5 participants (Table 2).[19,26] The most frequently evaluated components were follow-up phone calls (n = 6),[18–21,23,24] patient education (n = 5),[18,19,21–23] coordinated discharge planning (n = 4),[18,21–23] home visits by specialized nurse practitioners (NPs) and physician assistants (Pas; n = 3),[18,24,25] surgeon postoperative follow-up visit (n = 2),[24,27] and primary care physician (PCP) follow-up (n = 1)[26] (Table 3).

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