

Intensive Case Management to Reduce Hospital Readmissions

A Pilot Quality Improvement Project

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ABSTRACT

Purpose of Study: Hospital readmissions burden the U.S. health care system, and they have negative effects on patients and their families. The primary aim of this study was to pilot an intensive case management (ICM) intervention to reduce 30-day hospital readmissions. A secondary aim was to obtain patient- and caregiver-reported reasons for readmission.

Primary Practice Setting: The setting was a vertically integrated health care system located in Northern California.

Methodology and Sample: This pilot quality improvement project occurred over a 4-month period. The intervention was delivered by master's degree students in nurse case management through an academic-clinical partnership. Patients hospitalized with a 30-day readmission were offered the ICM intervention. A total of 36 patients were identified and 20 accepted. Patient and/or caregiver was interviewed to identify reasons for their readmission. Data were collected about pre-/post-health care utilization including subsequent 30-day readmission. Mixed methods were used to analyze the findings.

Results: Thirteen of 20 enrolled patients received the weekly ICM intervention for at least 30 days. Seven declined further contact before 30 days. Patient-reported reasons for readmission included being discharged too soon, poor communication among providers and with patients/families, lack of understanding about disease management and/or treatment options, and inadequate support. Several patients believed that their readmission was unavoidable due to the complexity of their illnesses. We compared 30-day readmissions for those who participated in and those who declined the ICM intervention, finding that those who received the ICM intervention had a lower readmission rate than those who did not receive the intervention (35% vs. 37.5%).

Key words: *academic-clinical partnership, hospital readmissions, intensive case management*

Implications for Case Management Practice

- Patients readmitted within 30 days averaged more chronic conditions (16 vs. 8) and more medications (22 vs. 14) than those who avoided a 30-day readmission. Intensive case management should be targeting this population to reduce 30-day hospital readmissions.
- On average, patients receiving intensive case management stayed out of the hospital longer (19.4 days) than patients not receiving intensive case management (15.9 days).
- An intensive case management intervention can be delivered through an academic-clinical partnership. This project provided valuable opportunities for nursing students to obtain real-world learning experiences with medically and socially complex patients.

PROBLEM OF HOSPITAL READMISSIONS

Hospital readmissions negatively affect the health care system, patients, and their families. In the United States, hospital readmission costs in 2016 were greater than the cost of the index hospitalization with an average readmission cost of US \$14,400 (Bailey et al., 2019). The majority of 30-day unplanned readmissions occurred among Medicare beneficiaries (Bailey et al., 2019; Berry et al., 2018).

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To reduce readmissions, the U.S. congress established the Hospital Readmissions Reduction Program in 2012, which penalizes hospitals for unplanned 30-day readmissions among Medicare patients (Centers for Medicare & Medicaid Services, 2021). As a result, hospitals with excess readmission ratios may have their reimbursements reduced by up to 3%. Although hospitals and health care systems have made significant progress in reducing readmissions, additional efforts are needed.

AVAILABLE KNOWLEDGE ABOUT HOSPITAL READMISSIONS

Hospital readmissions occur for several reasons. Often, patients readmit because they are discharged too soon (Auerbach et al., 2016; Howard-Anderson et al., 2016). Upon discharge, patients may be medically unstable or lack the support necessary to safely transition out of the hospital. In addition, patients who are readmitted report not fully understanding the discharge instructions or having difficulty following them (Auerbach et al., 2016; Howard-Anderson et al., 2016). Lack of agreement regarding care goals and an avoidable admission from the emergency department (ED) also contribute to hospital readmissions (Auerbach et al., 2016). In addition, self-care issues and social needs such as problems with medication adherence, financial difficulties, transportation issues, housing and food insecurity, and lack of social support put patients at higher risk for readmission (Emechebe et al., 2019; Greysen et al., 2017).

RATIONALE FOR USE OF INTENSIVE CASE MANAGEMENT TO REDUCE READMISSIONS

Intensive case management (ICM) has been offered to people with complex medical and social needs (Ponka et al., 2020). Intensive case management involves frequent and ongoing contact with a case manager who improves access to services for patients and families. An ICM case manager is often available every day by phone. The case manager identifies access to care barriers and works with the health care team to address the identified barriers. Often, barriers to care are related to social determinants of health (Finkelstein et al., 2020).

An example of ICM for patients with multiple, complex, and chronic health conditions is a transitions of care program. Kripalani et al. (2019) conducted a retrospective, quasi-experimental study, examining the effectiveness of a transition care coordinator (TCC) quality improvement (QI) program. Transition care coordinator nurses located hospitalized patients at risk for readmission, prioritizing Medicare patients, and initiated contact as soon as possible. The TCC nurses assessed for postdischarge

needs, provided anticipatory guidance, and educated patients about disease management. They made telephone contact after discharge to monitor symptoms, reviewed medication use, coordinated follow-up care, and made referrals to resources. Transition care coordinator nurses offered the intensive, full intervention or provided a partial intervention with no contact in hospital and only telephone follow-up after discharge. Intensive and partial TCC was compared with usual care with 30- and 90-day readmissions as the primary outcomes (Kripalani et al., 2019).

Kripalani et al. (2019) found lower odds of readmission for those who received the intensive and partial TCC compared with usual care. For patients who had a 30-day readmission, 18.8% were in the usual care group, 10.3% were in the partial TCC group, and 9.4% were in the intensive TCC group ($p < .001$). After adjusting for multiple confounding variables, the odds of readmission at 30 days were reduced in the intensive TCC group (odds ratio [OR]: 0.536, 95% confidence interval [CI]: 0.381-0.753) and the partial TCC group (OR: 0.482, 95% CI: 0.326-0.713) compared with usual care (Kripalani et al., 2019). Intensive case management reduced high utilization of health care services among those at high risk for readmission.

SPECIFIC AIMS

The specific aim of this 4-month QI project was to pilot ICM to reduce 30-day hospital readmissions among patients with an index 30-day readmission. Intensive case management was delivered through an academic-clinical partnership at no additional costs to the health care system. A secondary aim was to collect information from patients and family/caregivers about reasons for 30-day hospital readmissions. The authors used the Standards for Quality Improvement Reporting Excellence (SQUIRE) to outline this article (Ogrinc et al., 2016).

METHODS

Local Context for Delivery of the Intervention in the Health Care Setting

Case managers developed this QI project as part of an ongoing health care improvement initiative to reduce readmissions. As part of this broader health care improvement initiative, the case managers approached the university about piloting the project as an academic-clinical partnership. Students who were completing their final semester for a master's degree in nursing case management delivered the ICM intervention, supported by the clinical case managers and university faculty. During their graduate course work, the students learned about comprehensive assessment in case management. They were

trained in and practiced multiple types of assessments, including psychosocial strategies and motivational interviewing. Leadership members from several service lines and programs, such as home health, hospice, skilled nursing facilities, and an outpatient transitions program, provided guidance to the ICM students throughout the project.

Specific Intervention and Team Involvement

The academic and clinical teams partnered to deliver the ICM intervention. The academic team recommended students and two were selected after interviewing with the clinical team. The nurse case management (NCM) students received a comprehensive orientation to the health care system, specific clinical settings, and programs available to patients across the continuum of care.

Patients were identified by the clinical team as potential participants if readmitted to the hospital, either as inpatients or for observation, within 30 days of an index hospitalization. Patients were also identified using a daily readmissions report. The health care system used a predictive model to identify these patients at high risk for readmission based on acuity of illness, comorbidity, length of stay, full code status, and pattern of admissions in the previous 30 days (Escobar et al., 2015).

The NCM students approached identified patients and/or their caregivers and used a semistructured survey to obtain their perspectives on the reason(s) for their readmission. The survey questions included common reasons for readmission. These included being discharged too soon, poor communication with or between providers, lacking an understanding of signs and symptoms to look for or when to call an advice nurse, difficulty obtaining medications, and inability to obtain in-home help. The last question was open-ended, asking the patient/caregiver to suggest what they believed could have been done to prevent their readmission. After completion of the interview, the NCM students obtained verbal consent to initiate the ICM services.

After the patient was discharged, the NCM students conducted a thorough assessment to identify barriers, needs, and opportunities to mitigate future readmission risk. They also reviewed the electronic

health record (EHR) to further assess postdischarge needs. They provided follow-up via telephone for 30 days. Patients were contacted within 1 week of discharge and received additional calls, weekly or more often if needed during the 30-day period. Patients who declined ICM were offered a referral to the health care system's transitions program for follow-up.

The ICM intervention included coordination of care, anticipatory guidance, health education, and patient/caregiver support (Joo & Liu, 2017; Kripalani et al., 2019). A vital component was referral to resources in the health care system and in the community. Nurse case management students provided patients/caregivers with essential contact information for nurse advice lines, primary care physicians, and specialists. They helped patients obtain or replace equipment such as oxygen or continuous positive airway pressure delivery, glucometer and test strips, blood pressure monitors, or a hospital bed. Care coordination involved confirming and scheduling follow-up appointments and assisting with electronic communication between patients/caregivers and members of their care team.

Education for patients and caregivers was a key component of the ICM intervention. The students reviewed the discharge plans with patients/caregivers. They offered disease-specific education to improve management of disease. The students provided educational materials in the patient's preferred language. Stoplight charts were used to teach patients about monitoring signs and symptoms and to aid them in determining when to seek medical advice or emergency services. The students provided education about medication indications, dosages, interactions, contraindications, and recognition of side effects and adverse effects. They queried patients about barriers to adherence and asked about reasons for nonadherence. The students encouraged patients to follow their medication regimens and communicate with providers about side effects or poor symptom control.

If patients were readmitted during the 30-day period, the NCM students often had contact with family/caregivers. The plan of care was reevaluated on the basis of patient/caregiver perspectives about reason(s) for the subsequent readmission. Patients with no readmission during the 30-day period were referred to the transitions program for ongoing case management.

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Strategy and Rationale for Impact Evaluation

The authors chose 30-day readmissions as the primary outcome. This was a pilot project, and these data were measurable and easily obtainable. To determine whether the patients were readmitted within 30 days, we followed them prospectively and tracked admissions through the EHR. The team collected data about several predictors known to increase risk for readmission (Auerbach et al., 2016; Berry et al., 2018; Greysen et al., 2017) and used descriptive statistics to compare patients who had a 30-day readmission with those who did not.

Selected Structure, Process, and Outcome Measures

To evaluate the effectiveness of the pilot program, we selected specific structure, process, and outcome measures (Donabedian, 2005). The structure measure was patient referrals, which the team hoped would be an average of two per week. The process measures included patient enrollment, follow-up contact with patients/caregivers, and contact with clinical partners. The outcome measure was 30-day readmission. The team decided that the goal was to prevent 30-day readmissions for at least 90% of enrolled patients.

Plan for Assessment of Completeness and Accuracy of Data

The authors created a plan to ensure that the data obtained were complete and accurate. The team used a secured, password-protected shared drive to store all data. Information was accessible to NCM students and clinical partners. Patient data included age, gender, admission date, primary admission diagnosis, number of chronic conditions, and number of prescribed medications. Students collected data through EHR review to identify receipt of services such as home health and living situation prior to and following the index admission. They also determined the number of visits with a health care provider, number of visits to the ED, and number of hospitalizations in the 6 months prior to the index admission. Accuracy of data were subject to verification by clinical partners. The NCM students documented contacts with patients/caregivers and service providers. They recorded patient/caregiver responses to the initial interview about reasons for readmission in a shared document and did not include any patient-specific data.

Plan for Analysis of Data

Consistent with a pilot QI project, we used mixed methods to analyze the data (Goodman et al., 2016). The team examined patient/caregiver survey responses about reason(s) for readmission and used

content analysis methods to categorize the responses (Elo & Kyngäs, 2008). Descriptive statistics (counts, percentages, mean, and standard deviation) were used to examine the differences between patients who accepted the ICM intervention and those who did not and to describe 30-day readmissions.

Ethical Considerations

The data collected were limited but did include critical information. Direct patient identifiers were shared only between students and case managers. The data set included de-identified patient characteristics such as age and gender and some personal health information such as admission dates and diagnoses. The health care institution determined that we did not need to request institutional review board approval for the pilot QI project.

RESULTS

Delivery of the Intervention

During September–November 2021, the NCM students offered the ICM intervention to 36 patients and 20 patients accepted the offer. Characteristics of enrolled and nonenrolled patients can be found in Table 1. Thirteen patients remained in contact with the NCM students for at least 30 days, whereas seven patients declined ongoing contact. Patients declined because they were lost to follow-up. Others stated that they had received enough support and/or had contact with multiple service providers and were doing well.

Process Evaluation

The team met some of the process goals for this project. Nurse case management students received a total of 17 referrals from clinical partners. Unfortunately, only 56% of referred patients agreed to participate and just 70% of enrolled patients participated in weekly calls. When the NCM students needed assistance, program managers typically responded the same day.

Contextual Elements That Interacted With the Intervention

A few contextual factors affected delivery of the intervention. The NCM students spent 4 weeks orienting to the health care system and learning about the service lines and case management contacts designed to reduce readmissions. Because of the NCM students' class schedules, initial outreach and follow-up were not always completed in a timely manner. Some referred patients were contacted by the transitions program before the NCM students could contact them. Unfortunately, one patient was

TABLE 1

Characteristics of Referred Patients (Number Unless Otherwise Indicated)

	Enrolled	Not Enrolled
Total	20	16
Age (mean), years	67.3	69.6
Sex		
Male	6	12
Female	14	4
Insurance coverage		
Health Maintenance Organization	7	6
Medicare	10	9
Medicaid	0	1
Medicare/Medicaid	2	0
Other	1	0
Discharge disposition		
Home	6	8
Home health	9	5
Skilled nursing facility	5	1
Substance use treatment program	0	1
Died in hospital	0	1
Chronic conditions		
<3	3	0
>3	17	16
Chronic conditions (mean)	10.7	12.5
30-day readmission		
Yes	7	6
No	13	10
Percentage with 30-day readmission	35	37.5

readmitted before the NCM student conducted the initial assessment. The NCM students also found that patients were less willing to accept the offer of

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enrollment if they had not met them in person during their index admission. In addition, language barriers and difficulty obtaining the appropriate language services hindered their ability to reach all patients in a timely manner.

Observed Associations

Seven patients (35%) who received the ICM intervention had a 30-day readmission (see Table 2). We compared 30-day readmissions for patients who were enrolled to patients who were not. Those who received the ICM intervention had lower readmission rates than those who did not receive the intervention (35% vs. 37.5%). We also found that, on average, those who received the ICM intervention took longer to readmit than those who did not receive the intervention (19.4 days vs. 15.9 days). This finding suggests that ICM may help keep patients out of the hospital longer.

There were differences between patients who had a 30-day readmission and patients who did not. Those who readmitted within 30 days averaged more chronic conditions (16 vs. 8) and more medications (22 vs. 14) than those who avoided a 30-day readmission. Three of the seven (42.85%) patients who readmitted did so after declining further contact with the NCM student. If they had completed the 30-day

TABLE 2

Characteristics of Patients With and Without a 30-Day Readmission (Number With Percentage or Mean With Standard Deviation)^a

	Readmitted	Not Readmitted
Total	7 (35%)	13 (65%)
Age (years)	68.57 (9.54)	66.62 (10.67)
Sex		
Male	1 (5%)	5 (25%)
Female	6 (30%)	8 (40%)
Chronic conditions	15.57 (6.78)	8.08 (6.55)
Prescribed medications	22.43 (7.61)	14.08 (7.18)
Visits with provider in last 6 months	11.71 (4.50)	10.23 (7.58)
Hospitalizations and ED visits in last 6 months	5.86 (2.85)	3.85 (1.99)
Length of stay during index admission	4.86 (2.19)	3.31 (1.93)
Contacts with NCM students during 30 days	4 (1.30)	4.38 (1.19)

Note. ED = emergency department; NCM = nurse case management.

^aAll values without % are means with SDs.

When considering the reasons for readmission, patients and/or caregivers commonly attributed their return to the hospital to being discharged too soon, poor communication between providers and with patients/families, lack of understanding about disease management and treatment options, and inadequate support. Several patients also believed their readmission to be unavoidable due to the complexity of their illnesses.

intervention, they may have also been able to avoid a readmission.

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Missing Data

The team was able to collect 30-day readmission data for all participants after thorough review of patients' EHR. If the patients were readmitted to a hospital in another health care system, the search for data was more time-consuming. In some cases, we were not

able to interview patients or caregivers about their self-reported reasons for their index readmission.

DISCUSSION

Summary

The ICM intervention did not lead to a significant reduction in 30-day readmissions. Although this was unexpected, given the effectiveness of nurse case manager–delivered interventions in reducing readmissions (Baldino et al., 2021; Facchinetti et al., 2020; Joo & Liu, 2017; Van Spall et al., 2017), it was consistent with mixed results reported in other studies (Joo & Huber, 2019; Joo & Liu, 2017). Despite a lack of significant results, we found that it was feasible to implement a QI project delivered by NCM students in the context of an academic–clinical partnership. There was no added cost to the health care system; further steps may include an analysis of potential labor costs. There were promising initial results for those who were maintained in the 30-day intervention, suggesting that the project should be continued.

Interpretation

The ICM intervention delivered in this pilot project did not significantly reduce hospital readmission. Still, the effectiveness of NCM transitional care interventions varies per the models employed and across different populations. Baldwin et al. (2018) reduced readmissions using a case management coordinated posthospitalization discharge clinic. For a population at risk of or experiencing homelessness, ICM reduced visits to the ED compared with standard care but did not reduce hospital readmissions (Ponka et al., 2020). High utilizers of health care services who received the hot-spotting ICM intervention experienced a 38% decrease in readmission at 180 days. Still, compared with a control group, there was no significant difference in readmissions (treatment group: 62.5% vs. control group: 61.7%; adjusted between-group difference 0.82 percentage points, 95% CI, –5.97% to 7.61%; Finkelstein et al., 2020). Although ICM may successfully reduce readmissions for some, those with significant health and social challenges or difficulties

TABLE 3

Patient- or Caregiver-Reported Reasons for Index Readmission

Reason	Count
Discharged too soon	6
Poor communication among providers and with patient/family	6
Expected decline in health, believed that hospitalization was unavoidable	6
Lack of understanding about disease management, treatment options	6
Inadequate support (e.g., not enough HH visits, no HH referral, inadequate caregiver support)	5
Lack of or inadequate number of visits with PCP and/or video/telephone with PCP not useful	3
Inadequate pain management	3
Housing instability	3
Issues with medications (e.g., inability to obtain, too complex to manage, lack of understanding about when/how to use)	3
Language barrier	2
Timeliness of follow-up after discharge (i.e., not soon enough)	2
Too difficult or took too much time to reach provider	2

Note. HH = home health; PCP = primary care provider.

Although ICM may successfully reduce readmissions for some, those with significant health and social challenges or difficulties maintaining contact with case managers do not obtain similar benefits.

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There were several potential reasons this pilot QI project did not achieve the reduction in 30-day readmissions that was expected. Patients enrolled in the program who readmitted had more complex medical histories and potentially worse health, with an average of 14 chronic conditions and 20 medications, than participants who did not readmit. In addition, nearly half of the patients who enrolled did not maintain contact with the NCM students for 30 days. It may be that patients needed ongoing, at least weekly contact to remain out of the hospital. Kripalani et al. (2019) found similar differences in 30-day readmissions based on intensive versus partial delivery of their intervention.

Consistent with the Kripalani et al. (2019) model, the students needed to meet with the patient/caregiver during their hospitalization. Intensive case management would likely be improved if students were onboarded during the semester prior to implementation. This would provide additional time in their schedules to make face-to-face contact when offering the ICM intervention prior to discharge. The students reported that the patients were more engaged during telephone contact when they had an initial hospital visit.

Although the use of students to implement the project limited financial costs, both partners still incurred opportunity costs. Case managers and university faculty both recognized that they needed to provide more time and attention to the project than they had anticipated. Although the selected students were able to work independently with patients/family, it took significant time for them to learn how to work within the health care system. Positive impacts for the clinical partners included gaining new insights about patient readmissions from nurses outside their organization. This project strengthened the relationship between the university and health care system and created a stronger foundation for future collaborations.

Limitations

This study had some limitations. The team intended to obtain preliminary evidence of the feasibility and

effectiveness of ICM services delivered by nursing students to reduce readmissions for at-risk patients using a pre-/postdesign without a randomized controlled group. Although we compared the readmission rates of program participants and nonparticipants, the study design did not allow us to conclude that the observed effects were due to the intervention. The study was implemented with patients in a vertically integrated health care system, with a broad continuum of care network, so we cannot generalize about the applicability of results to other populations and settings.

CONCLUSIONS/IMPLICATIONS FOR CASE MANAGEMENT

This pilot project has implications for case management. The patients who were referred had significant and complex health care needs. Those who received 30 days of ICM, compared with those who did not, stayed out of the hospital longer. Intensive case management delivered by master's degree nursing students has the potential to reduce 30-day readmissions at little cost to health care systems. Academic-clinical partnerships provide a sustainable way to reduce readmissions among medically and socially complex populations. This pilot QI project offers a model for future initiatives to support patients at risk of readmission.

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