Quality Improvement Project

Using Intern-Led Quality Improvement to Reduce Readmissions for Specialty Service Patients Within an Academic Medical Center

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ABSTRACT

Introduction: Postdischarge patient calls are an effective intervention to decrease unplanned readmissions. Despite its efficacy, calls are time consuming and compete with other clinical obligations. The purpose of this study was to evaluate the viability of intern-led quality improvement (QI) on conducting initial postdischarge calls to filter patients who require clinical or nurse follow-up. Methods: QI interns from an academic medical center’s QI program completed postdischarge patient calls within 72 hours of patient discharge from a neurosurgery service between June 2018 and July 2019. QI interns filtered patients who required follow-up calls from a clinical service or nurse department. The departments called patients within 48 hours of requests. Unplanned readmission rate was compared between the cohort of patients who requested and received a follow-up call versus a cohort of patients who requested and did not receive a follow-up call (control). Results: QI interns completed 83.8% postdischarge patient calls within 72 hours of discharge. Reasons for unsuccessful calls included patient unresponsiveness (74.6%), wrong phone number on file (13.9%), and request to be called at a different time (11.5%). Nurses completed 57.2% follow-up requests within the targeted 48 hours and completed remaining requests within 7 days. QI intern postdischarge follow-up calls, in conjunction with nurse follow-up intervention, showed a significant (risk ratio = 0.31, p = 0.012) preventive effect on unplanned readmission rate. Conclusions: QI interns are a viable alternative to nurses to conduct the first contact of postdischarge patient follow-up calls. This system of QI interns filtering calls to the correct clinical service or nurse department increased postdischarge patient follow-up calls success rate and decreased readmission rates.

Keywords: quality improvement, discharge follow-up, readmission, costs

INTRODUCTION

After 2010, the goal of decreasing hospital admissions quickly came to the forefront with the passing of the Affordable Care Act and the establishment of the Hospital Readmission Reduction Program. The creation of the Hospital Readmission Reduction Program incentivized hospitals to improve the quality of care to decrease hospital readmission rates and decrease additional costs.

Postdischarge follow-up call is an intervention that extends the continuum of care beyond the inpatient setting and addresses clinical concerns that may result in an unplanned (emergency department) readmission. Studies have demonstrated that postdischarge follow-up calls significantly reduce 30-day readmissions and increase the length of time between admissions. However, research reveals several barriers to nurses and/or clinical representatives conducting postdischarge calls in an academic medical center (AMC), including time constraints and other prioritized tasks (e.g., handling insurance issues). It could be feasible for quality improvement (QI) interns to initiate the postdischarge call and for nurses to follow up with patients who request additional support. This model can alleviate some time-based barriers, increase nurse compliance rate.

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with follow-up calls and optimize the patient continuum of care.

The primary goal of this Continuous Quality Improvement project was to assess whether postdischarge follow-up calls completed by QI interns, and overseen by nurse and clinical teams, reduced 30-day and unplanned readmission rates.

**METHODS**

**Participants and Setting**

This prospective cohort study evaluated a postdischarge patient call intervention for patients older than 18 years who were discharged between June 2018 and July 2019 from the department of neurosurgery at an AMC located in the southeastern United States. The study population received the prospective call intervention (N = 617) and were further categorized into a cohort group (patients who requested and received a nurse follow-up [n = 493]) and a control group (patients who requested but did not receive a nurse follow-up [n = 124]) as depicted in Figure 1. Patients less than 18 years of age and/or discharged to skilled nursing facility, hospice, federal law enforcement, psychiatric facility, or other hospital were excluded from the study because these patients receive continuum of care through these facilities. This study was an extension of existing QI work within the AMC and was approved by the quality improvement project registrar as a continuous quality improvement (ID 1170). Thus, informed consent was not required per our institutional policy.

**Postdischarge Patient Calls Quality Improvement Initiative**

QI interns from the AMC’s Quality Improvement internship performed postdischarge patient calls. This initiative was integrated into the larger QI internship structure, which is depicted in Figure 2. The QI internship is composed of undergraduate student QI interns and graduate student QI managers that are trained semestery, three times per year, in the development, execution, and management of various QI projects, including postdischarge patient calls.

QI interns completed postdischarge calls by following a standardized specialty-specific checklist adapted from previous studies. The checklist is displayed in Figure 3 and the procedure in Figure 4. The standardized checklist included open-ended questions regarding six domains as follows: (1) pain management; (2) medication usage; (3) scheduling issues; (4) concerns to present to clinician; (5) clinic contact information; and (6) satisfaction with the postdischarge call. In addition to the six domains, QI interns identified and asked discharged stroke patients about their understanding of the signs and symptoms of stroke; they used the validated Balance, Eyes, Face, Arms, Speech, Time (BE-
FAST) screening too\textsuperscript{[9,10]} to evaluate patients’ understanding of stroke-specific symptoms and what to do if there were signs of a secondary stroke. Given the nature of the patient population, QI interns continued post-discharge calls with patient medical proxies if underlying neurologic conditions prohibited communication. In addition, QI interns used a medical translation phone service to communicate with non-English speakers.

After the postdischarge call, QI interns communicated patient-requested follow-ups to either the nurse or clinical service representative (CSR). All requests were vetted through the postdischarge follow-up checklist and communicated through a secured email server. Advance practice providers were responsible for delegating requested nurse follow-ups to their clinical team. Clinical providers and CSRs were expected to provide follow-ups within 48 hours from the time of QI intern call completion.

Furthermore, QI interns were expected to initiate all follow-up calls within 72 hours of patient discharge because literature indicates there is increased risk for rehospitalization shortly after discharge; one-fifth of Medicare beneficiaries are rehospitalized within 30 days\textsuperscript{[11]} and other hospital organizations have shown a 26\% unplanned readmission by day 3.\textsuperscript{[12]} If a patient did not answer the call, the QI interns attempted to call the patient up to three additional times. Afterward, the QI interns properly disposed of printed personal health information in personal health information discard bins.

**Data Collection and Analysis**

To study the impact of postdischarge calls on readmission rates, neurosurgery-service line data were retrospectively analyzed through the Vizient Clinical Database for the duration of the study period (June 2018 to July 2019). The aggregate level readmission data from the Vizient Clinical Database was compared with our cohort (patients who requested and received a nurse follow-up call) and control (patients who requested but did not receive a nurse follow-up call) to evaluate adjusted total readmission rate and readmission type (30-day all-cause readmission rate, unplanned readmis-
sion rate, planned readmission rate). QI managers completed data audits through the electronic health record to obtain the number of days between discharge and readmission, and to evaluate nurse follow-up compliance by evaluating nurse note entries and follow-up telephone call completions.

Total hours contributed by unpaid QI interns and paid QI managers were assessed (both intern and manager positions were filled by students). The direct cost for the project and indirect cost savings were also determined. Indirect cost savings included an evaluation of the average CSR and nurse salaries at the institution for which this study occurred.

We completed the data analysis using R statistical programming (Version 3.6.3) and Microsoft Excel (Version 16.43). Trends were assessed for nurse follow-up call compliance rates, 30-day readmission rates, and unplanned readmission rates. In addition, we calculated the Pearson correlation coefficient between the cohort and control groups for nurse follow-up call compliance rates, 30-day readmission rates, and unplanned readmission rates to assess the impact of the project. We conducted

Figure 3.—Postdischarge follow-up checklist. Adapted with permission from Ref. 6, using information from [7] and [8].
data integrity checks every 2 months to ascertain data accuracy, consistency, and display trends.

RESULTS

The AMC’s neurosurgery department discharged on average 261 ± 14 patients every month (range, 68–317). Average length of stay was 6.54 ± 0.14 days. Of patients, 87.2% were discharged to their homes and 12.8% were discharged to hospice or nursing facilities. QI interns completed a total of 2651 successful postdischarge calls between June 2018 and July 2019, including a sample population of 2519 patients. All patients discharged from the neurosurgery service during the duration of this study were reached within three call attempts (100% QI intern postdischarge call rate, excluding hospice). Interns completed 83.8% (n = 2222) of postdischarge calls within the specified 72-hour period, 10.3% (n = 273) between 6 and 15 days, and 5.9% (n = 156) between 15 days and 35 days postdischarge. Delays to postdischarge calls occurred in 16.2% of total calls (n = 429) due to patient unresponsiveness (n = 320, 74.6%), wrong number on file (n = 60, 13.9%), and patient’s preference to be called at another time (n = 49, 11.5%).

Reasons for patient-requested follow-up calls in our study population that received the prospective call intervention (N = 617) included pain (n = 317, 51.30%), medication issues (n = 116, 18.81%), scheduling issues (n = 132, 21.37%), and development of new symptoms (n = 52, 8.52%). Information on symptoms of stroke (BE-FAST tool) was also provided for high-risk stroke patients (n = 69) during these postdischarge calls. More than half (n = 353, 57.2%) of the requested nurse follow-up calls were completed within the protocol-based 48 hours of the original postdischarge call. The remaining calls (n = 264, 42.8%) were completed within 7 days from the time of QI intern call completion.

From the sample of 2519 patients, our study population (n = 617) experienced an overall raw, unadjusted readmission rate of 15.62% compared with overall readmission rate of 17.21% over the entire year (p = 0.002). In addition, we observed a similar encouraging trend in unplanned readmissions, in which our cohort population (i.e., those who requested and received nurse follow-up calls) experienced a 7.02% unplanned readmission rate compared with an overall 13.16% unplanned readmission rate in the control group (i.e., those who did not receive nurse follow-up call; p = 0.0041).

The study population (N = 617) was further stratified based on the readmission status. The comparison for 30-, 14-, and 7-day readmission rates between both cohort (n = 495) and control group (n = 122) as well as sample average and overall neurosurgery service line average for the study duration is shown in Table 1. Our study achieved an 80% nurse phone call completion compliance rate in which 495 (19.65% of sample) of 617 patients who requested nurse follow-ups were provided nurse follow-up calls. A comparison between the cohort and control population is shown in Table 2. The Pearson correlation coefficient showed a positive association correlation between nurse the follow-up rate and unplanned readmission rate (r² = 0.71, p = 0.045).

This initiative generated 18 hours of work per week by undergraduate QI interns for 56 weeks, replacing hours of work that would have been contributed by CSRs and nurses. By taking the average CSR pay as US $15/hour and average nurse pay as US $32/hour + 28% benefits (US $40.96/hour), this initiative estimates a direct cost (salary) savings of a range between US $15,120 and US $41,287.68. Considering the QI’s salary of US $12/hour and 1.5 hours/week contribution, the filtration system cost a total of US $1008, resulting in a range of net cost savings of US $14,112 to US $40,279.68. Furthermore, our study identified only 22% of patient concerns pertained to CSR with 78% of calls completed by nurses. This workload distribution would result in a total cost of US $35,530.79 and can be replaced by QI interns to...
generate a net cost savings of US $34,522.79 per year for one specialty service.

**DISCUSSION**

Overall, our model of tasking a QI intern for postdischarge follow-up calls displayed a positive impact on filtering calls to the correct entity for follow-up (CSR or nurse), follow-up rates, nurse follow-up phone call compliance rates, and overall hospital readmission rates. Patients who received follow-up calls from nurses had 7% lower readmission rate than those who did not, suggesting an influence of follow-up calls in decreasing readmission rates by providing timely access of care. Further, we were able to show that this model could provide a cost-saving alternative to traditional follow-up call systems in AMCs.

The first phase of this intervention focused on the use of the Health Insurance Portability and Accountability Act–certified and robustly trained QI interns for post-discharge calls coverage. Our QI interns achieved a nearly 84% successful call rate within the targeted 72-hour window. It is important to note that the QI interns initiated calls for all patients within 72 hours; however, 16% were unsuccessful because of patient reachability via phone calls or wrong phone number on file. These interns recorded patient information and only forwarded the forms with follow-up requests to nurse or CSR.

In addition, the use of QI interns helped alleviate barriers and maximize nurses’ clinical skills while maintaining patient continuum of care, which is a need that organizations have expressed.[6,13,14] This filtration system resulted in much higher nurse phone call completion compliance rate (85%) within the targeted 72-hour window as compared with other studies (e.g., 45%).[6] Of note, QI intern postdischarge follow-up calls, in conjunction with nurse follow-up intervention, showed a statistically significant (risk ratio = −3.31, \( p = 0.012 \)) preventive effect on unplanned readmission rate. This result showing promising effects for reduced hospital costs and increased quality of patient care.

Implementation of this initiative across only a neurosurgery specialty service line for just 1-year duration led to direct cost savings of US$34,522.79 and its implementation across multiple service lines has a potential of saving major costs for hospitals and clinic systems. In addition to potential cost savings, the intern-led filtration system for providing patient calls may help in better workload distribution for the clinical staff. The QI intern training can be tailored to include the most common nonclinical issues encountered during these calls for a better patient experience and faster resolution of patient issues. A deeper understanding of clinical issues encountered during these calls can differ from organization to organization and from one service line to another. This understanding can provide some common themes, which can be analyzed for system improvements and aid in allocation of patient resources with the goal of improving patient outcomes. We recommend future areas of research in different specialty service lines to investigate and improve long-term care follow-up plans.

**Limitations**

This study only included readmissions to the hospital from which the patient was discharged. It is possible that our team omitted data from readmissions that occurred in other hospitals, so the total readmission rates as well as unplanned and 30-day readmission rates could be underestimated. Another limitation includes the identification of a small proportion of patients who requested

| Table 1.—Readmission rates difference between patients who were provided nurse follow-up calls versus patients who were not |
|--------------------------------------------------|
| Follow-up (cohort \( n = 495 \)) | No follow-up (control \( n = 122 \)) | \( p \)-value |
| Readmission rate (adjusted) | 12.07 | 19.18 | 0.0041** |
| Planned readmission rate | 5.05 | 6.02 | 0.16 |
| Unplanned readmission rate | 7.02 | 13.16 | 0.0451* |
| 30-day readmission rate | 6.14 | 11.91 | 0.0173* |

\*\( p < 0.05 \).
**\( p < 0.01 \).

| Table 2.—Comparison of readmission rates between cohort, control group, and average neurosurgery readmission rates June 2018 to July 2019 calculated using Vizient data |
|----------------------------------|
| Cohort Group \( (n = 495) \) | Control Group \( (n = 122) \) | Overall Study Average \( (n = 617) \) | Overall Neurosurgery Average; Vizient data \( (n = 2519) \) | \( p \)-value |
| Readmission rate | 12.07 | 19.18 | 15.62 | 17.21 | 0.0017** |
| 30-day readmission rate | 6.14 | 11.91 | 9.02 | 10.36 | 0.038* |
| 14-day readmission rate | 4.08 | 8.14 | 6.11 | 6.83 | 0.0402* |
| 7-day readmission rate | 1.97 | 5.11 | 3.54 | 3.94 | 0.069 |

\*\( p < 0.05 \).
**\( p < 0.01 \).
but did not receive nurse follow-up calls, which highlights ethical concerns for patient health outcomes in addition to hospital readmissions. Although QI interns prompted increased nurse compliance in the completion of patient follow-up requests, there is room for error during the transmission of information from the advance practice providers and the designated nurse or CSR. It is presumed that errors in incomplete requested follow-up calls may result in patients’ seeking further clinical assistance and possible readmission. Increased quality assurance checks are recommended to identify and prevent such errors in practice.

Furthermore, this study was carried out in only one specific service line; hence, results are not generalizable to other nonsurgical service lines of other specialties. A more generalized, larger sample size, and longer study duration is needed to see if the effect of this intervention in decreasing clinician workload and unplanned readmission rate will hold true in other specialties and over time. In addition, this filtration system requires a hierarchy or formal structure of QI interns. In this study the interns were undergraduate students, supervised and trained continuously by graduate student QI managers to ensure accurate data collection, compliance with the Health Insurance Portability and Accountability Act regulations, and quality assurance. Such programs are not available in all AMCs; however, a similar approach of using intern-led temporary staff to complete postdischarge calls can be incorporated in any healthcare system. The tradeoff between sustaining an intern-led QI internship compared with the time and amount of clinical and administrative staff who could otherwise perform these tasks may require additional research in areas with different resources (e.g., AMC, private systems). Last, organization and sustaining such a program is best embedded in a robust quality program.

CONCLUSION

This study shows a strong preventive effect of implementing a filtration system of QI interns to improve the compliance of nurse-performed postdischarge follow-up calls and reduce 30-day readmission rates and unplanned readmission rates. This study also showed that this filtration system has the potential for saving direct (salary costs) and indirect (patient care costs for readmitted patients) costs for the hospital. This study demonstrates a novel approach to reducing readmissions patients within a specialty service in a large AMC.

References

1. CMS launches tools and initiatives to help improve American health care. Centers for Medicare & Medicaid Services. Accessed Jul 9, 2020. www.cms.gov/newsroom/press-releases/cms-launches-tools-and-initiatives-help-improve-american-health-care-quality
2. McIvlennan CK, Eapen ZJ, Allen LA. Hospital Readmissions Reduction Program. Circulation. 2015;131:1796–1803.
3. Zuckerman RB, Sheingold SH, Orav EJ, Ruhter J, Epstein AM. Readmissions, observation, and the hospital readmissions reduction program. N Engl J Med. 2016;374:1543–1551.
4. Dudas V, Bookwalter T, Kerr KM, Pantilat SZ. The impact of follow-up telephone calls to patients after hospitalization. Am J Med. 2001;111:265–30D.
5. Harrison PL, Hara PA, Pope JE, Young MC, Rula EY. The impact of postdischarge telephonic follow-up on hospital readmissions. Popul Health Manag. 2011;14:27–32.
6. Mwachiro DM, Baron-Lee J, Kates FR. The impact of postdischarge follow-up calls on 30-day hospital readmissions in neurosurgery. Global J Qual Saf Healthcare. 2019;2:46.
7. Boutwell, A. Jencks, S. Nielsen, GA. Rutherford, P. State Action on Avoidable Rehospitalizations (STAAR) Initiative: Applying Early Evidence and Experience in Front-Line Process Improvements to Develop a State-Based Strategy. Institute for Healthcare Improvement; 2009.
8. Vaziri S, Cox JB, Friedman WA. Readmissions in neurosurgery: a qualitative inquiry. World Neurosurg. 2014;82:376–379.
9. Ammar FE, Ardelt A, BruttonVJD, Loggini A, et al. BE-FAST: a sensitive screening tool to identify in-hospital acute ischemic stroke. J Stroke and Cerebrovasc Dis. 2020;29:104821.
10. Aroor S, Singh R, Goldstein LB. BE-FAST (Balance, Eyes, Face, Arm, Speech, Time). Stroke. 2017;48:479–481.
11. Jencks SE, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. N Engl J Med. 2009;360:1418–1428.
12. Miller DA, Schaper AM. Implementation of a follow-up telephone call process for patients at high risk for readmission. J Nurs Care Qual. 2015;30:63–70.
13. Meek KL, Williams P, Unterscheutz Cj. Outsourcing an effective postdischarge call program. Nurs Adm Q. 2018;42:175–179.
14. Kirsch SD, Wilson LS, Harkins M, Albin D, Beccaro MA. Feasibility of using a pediatric call center as part of a quality improvement effort to prevent hospital readmission. J Pediatr Nurs. 2015;30:333–337.
15. Ogrinc G, Davies L, Goodman D, Batalden PB, Davidoff F, Stevens D. SQUIRE 2.0 (Standards for Quality Improvement Reporting Excellence): revised publication guidelines from a detailed consensus process. BMJ Qual Saf. 2016, 25:986–992.