

Breaking the Cycle

Care Coordination Interventions and Sick Cell Readmissions

Naph'tali B. Edge, DNP, MBA, MSN, BSN

ABSTRACT

Purpose/Objectives: Approximately 100,000 people in the United States are affected by sickle cell disease (SCD). Sickle cell disease represents one of the highest readmitting diagnoses at this organization. The purpose of this study is to determine the impact of implementing care coordination interventions to reduce hospital readmissions of patients with SCD.

Primary Practice Setting: The setting for conducting the interventions took place at the flagship hospital of a seven hospital system in Houston, TX. The hospital is a not-for-profit, faith-based, 907-bed academic facility that provides highly specialized health services to the community and the world. The population of focus was adult patients (18 years of age and older) admitted to the hospital with a primary diagnosis of SCD.

Findings/Conclusion: Two interventions were implemented: Disease-specific discharge education and scheduling postdischarge follow-up appointments prior to discharge. These interventions were conducted by bedside nurses, case managers, and SCD champions over a 6-month period. The 30-day readmission rate for SCD was reduced by 22%. There was also a 0.9-day reduction in length of stay and a 17% reduction in emergency, observation, and inpatient encounters of patients with SCD.

Implications for Case Management Practices: This project found that implementing evidence-based care coordination interventions can reduce the 30-day readmission rate for patients with SCD. Implementation of effective evidence-based care coordination is a key aspect to reducing hospital readmissions of patients with SCD. Partnering with community networks is also important in addressing readmission risk factors including management of social determinants of health that increase hospital visits. Consistent, patient-centered education using simple and convenient tools helps improve understanding, applicability, and self-care management.

Key words: *care coordination, case management, hospitalization, readmission, sickle cell*

Approximately 100,000 people in the United States are affected by sickle cell disease (SCD; Bulgin et al., 2018). One out of every 365 African Americans and one out of every 16,300 Hispanic-Americans are diagnosed with the disease at birth (Centers for Disease Control and Prevention, 2019). Sickle cell disease is characterized by chronic hemolytic anemia, increased susceptibility to infections, end organ damage, and intermittent episodes of vascular occlusion that result in acute and chronic pain (Centers for Disease Control and Prevention, 2019). Inadequate pain management decreases quality of life and patient satisfaction and increases hospital length of stay (LOS) and 30-day readmission rates (Ballas & Lusardi, 2005; Ezenwa et al., 2016; Treadwell et al., 2016).

Patients with SCD are hospitalized approximately eight times per year (Sickle Cell Association of Houston, 2018). The average cost per admission is \$27,700 and the average cost of health care expenditures over the lifespan is \$7.7 million (Sickle Cell Association

of Houston, 2018). Rehospitalization rates for SCD range from 30% to 47% and 22.1% for 30 days and 14 days, respectively (Leschke et al., 2011). People living with SCD face significant morbidity and early mortality (Wilkie et al., 2010). From 1975 to 2005, the mean age of death for people with SCD was 33.4 years for males and 36.6 years for females. The mortality rate for adults increased by 1% each year during the same period (Lanzkron & Haywood, 2015). Following the Food and Drug Administration approval

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Address correspondence to Naph'tali B. Edge, DNP, MBA, MSN, BSN, Grady Health System, 80 Jesse Hills Jr Dr, Atlanta, GA 30303 (nedge@gmh.edu).

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Approximately 100,000 people in the United States are affected by sickle cell disease (SCD). One out of every 365 African Americans and one out of every 16,300 Hispanic-Americans are diagnosed with the disease at birth.

of hydroxyurea, the life expectancy for patients with homozygous SCD increased to 42 years for males and 48 years for females (Okam et al., 2014).

Many patients with SCD struggle with psychosocial and economic barriers. Patients with SCD are generally of low socioeconomic status, have low health-related quality of life (Panepinto et al., 2007), and lack resources to adequately maintain self-care (Jenerette et al., 2015). They also are typically challenged by numerous social determinants of health (SDOH) and may suffer from a concomitant psychiatric illness (Adam et al., 2017). They frequently have poor social support and lack trust with a health care provider, thus contributing to strained relationships (Weisberg et al., 2013).

At a large academic medical center in Houston, TX, SCD was the one of the highest readmitting diagnoses with more than 46% of patients readmitted within 30 days of discharge (Vizient, 2018). Between June 2017 and December 2018, there were 391 inpatient encounters for SCD, where 13 patients accounted for 30% of the encounters and 322 emergency department (ED) encounters for SCD where eight patients accounted for 60% of the visits (Epic ED Universe, 2018). The average age of patients with SCD was 26 years. The average LOS was 7 days compared with an expected LOS of 4 days (Vizient, 2018). The cost of care per visit averaged around \$20,000.

EVIDENCE AND SYNTHESIS

A systematic search of three electronic databases was conducted to identify evidence-based studies. The Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, and the Cochrane Database of Systematic Reviews were the databases searched. The key words search included the following terms: *sickle cell, care coordination, case manager, social work, coordination of care, continuity of care, and readmission*. Inclusion criteria and limits were used to narrow the results. The criteria comprised the following: human, English language, abstract available, peer reviewed, and inpatients. After critical appraisal of the evidence, 11 articles were retained: one randomized controlled trial, seven cohort studies, and three quality improvement projects.

An assessment of the principles of ethics was completed. Five principles of ethics were considered in the review: Beneficence, nonmaleficence, autonomy, justice, and fidelity. No ethical issues were noted. The hospital's research institute also

conducted a review of the project. The research institute determined that there was no need to obtain institutional review board approval. Two synthesis tables were developed to clarify similarities and differences across studies: interventions and outcomes (see Supplemental Digital Content Appendices A and B, available at: <http://links.lww.com/PCM/A13>). The body of evidence suggested implementation of two care coordination interventions: disease-specific discharge teaching and arrangement of postdischarge follow-up appointments with a primary care provider (PCP) or hematologist prior to patient discharge. The expected outcome was a 20% reduction in 30-day hospital readmissions for patients with SCD.

EVIDENCE-BASED PRACTICE, CHANGE, AND LEADERSHIP MODELS

The Johns Hopkins Nursing Evidence-Based Practice Model was utilized during project implementation. This model was chosen because of its strategic framework and focus on guiding nurses and ancillary staff in translating the best evidence into practice. The ADKAR change model was chosen to support change management throughout project implementation. The ADKAR methodology outlines five milestones in successful change: awareness, desire, knowledge, ability, and reinforcement (Prosci, 2018).

Transformational leadership is a leadership approach that causes a change in individuals and social systems with a potential result that followers will become the leaders (Kendrick, 2011). The transformational leadership model was utilized to support project implementation using four factors: Idealized influence, inspirational motivation, intellectual stimulation, and individual consideration. *Idealized influence* is founded on trust. An individual must exhibit high moral and ethical standards. *Inspirational motivation* is the ability to help followers clearly see the right thing to do. It creates the drive for shared goals and visions. *Intellectual stimulation* also challenges the follower to question basic assumptions and to generate a more creative solution to problems. *Individual consideration* treats each follower as a unique contributor and provides coaching, mentoring, feedback, and growth opportunities.

SETTING AND POPULATION

The setting for conducting the interventions took place at the flagship hospital of a seven hospital system in

Houston, TX. The hospital is a not-for-profit, faith-based, 907-bed hospital that provides highly specialized health services to the community and the world (Houston Methodist, 2019). The population of focus was adult patients (18 years of age and older) diagnosed with SCD admitted as inpatient during the time frame of August 2019 to January 2020. The number of patients admitted with SCD was 57 patients. Ninety-nine percent of this population was African-American with the average age being 26 years (see Table 1).

Seventy-five percent of these patients had a primary payer source of managed Medicaid. Seventy-five percent of the patients were considered high risk for readmission based on risk factors and SDOH. Forty percent had a moderate to severe severity of illness and risk for mortality index (Claro Health, 2018).

Process

Patients who presented to the ED for care were registered by the admissions clerk and triaged by an ED nurse. At triage, an ED provider screened patients and initiated a treatment plan. Patients deemed appropriate for discharge from the ED received discharge instructions on an after-visit summary (AVS), which included recommendations for follow-up and prescriptions. If the ED provider determined that admission was necessary, he or she contacted a hospitalist to admit the patient. The hospitalist entered the admission orders and nursing and the interdisciplinary team (IDT) initiated the plan of care. All patients received similar care while hospitalized.

An electronic report was created and distributed daily. This report included any patient newly admitted with a primary diagnosis of SCD. The report was distributed to the unit case manager or the social worker for communication and collaboration with the attending physician and the IDT. During the initial assessment, the unit case manager or the social worker informed the patient about the project and sought permission from each patient to proceed with the interventions. During daily interdisciplinary rounds, the team discussed the goals of care and anticipated discharge date with the patient. The primary nurse or the case manager conducted

patient education utilizing materials from the SCD tool kit (see Supplemental Digital Content Appendix C, available at: <http://links.lww.com/PCM/A13>) and documented education in the medical record. Patient education included general information on SCD, techniques to manage symptoms of SCDs and reduce stress, and completion of tools to track nutrition and hydration intake and daily pain. Education also encompassed completion of a personal health record including writing down questions to ask providers and what to do before going to the emergency department. The primary nurse or the case manager reviewed and discussed this information daily with each patient during a time most convenient to the patient. Health literacy was assessed by demonstration and return demonstration and by shifting from *repeat back* to successful completion of *teach back*. Teaching focused on ensuring patients could apply the skills learned postdischarge.

The case manager or the social worker discussed an ideal date and time for postdischarge appointments and scheduled the appointments based on the patient's preference. When patients were medically ready for discharge, the attending physician entered the discharge order and instructions for postdischarge care on the AVS. The discharging nurse completed the treatment plan and provided the patient with the AVS and prescriptions.

BUDGET

Estimated expenses for this project were approximately \$42,000 for labor, supply, and marketing costs. The return on investment (ROI) was determined by assessing the reduction in unnecessary readmissions as cost avoidance. A 20% reduction in avoidable readmissions was anticipated. The preintervention total number of readmissions was 95. The anticipated number of readmissions postintervention was 75 and less. The anticipated ROI expressed as cost avoidance was as follows:

Preimplementation readmissions cost \$20,000 cost/readmission × 95 = \$1.9M
Postimplementation readmissions cost \$20,000 cost/readmission × 75 = \$1.5M
\$1.9M to \$1.5M = \$400K savings
\$400,000 to \$42,000 implementation costs = \$358,000 ROI.

This figure represents the annualized ROI for the 1-year period after project implementation.

DATA COLLECTION AND ANALYSIS PLAN

Data management needs included compliance with process measures and the resulting impact on the outcomes measure. Process measures were as follows:

- 1. Percentage completion of at least one SCD-specific educational session divided by the total number of educational opportunities.

TABLE 1
Patient Demographics

Age, Years	Number of Patients
18–20	6
21–29	34
30–39	11
40–49	4
50–59	2
>60	0

2. Percentage of postdischarge appointments scheduled prior to discharge divided by the total number of SCD discharges.

These measures were chosen as a means of assessing and tracking compliance with the interventions. Data was based on documentation in the electronic medical record. The 30-day hospital readmission rate for patients with SCD was the outcome measure. This measure was chosen because it is a high-impact metric that reflects the quality of care and services provided.

Readmission data included inpatient to inpatient admissions within 30 days of the index admission (discharged in inpatient status and readmitted in inpatient status) for any diagnosis. Patients returning to the hospital within 30 days of discharge in observation status were not counted as a readmission.

Feedback was shared weekly with staff by unit champions during team huddles. Process and outcomes data were also shared at monthly department meetings and quarterly during our readmission reduction quality meetings.

Process measure compliance for SCD-specific educational sessions to patients was 100%. There were 178 encounters and documentation of SCD-specific education prior to patient discharge was present in the medical record of all encounters. Education was considered complete if documented in any of the following areas: nursing or case manager documentation in progress notes. Process measure compliance for scheduling of postdischarge follow-up appointments prior to discharge was 74%. Of the 178 encounters, documentation of postdischarge follow-up appointments prior to discharge was present in the medical record in 132 encounters. There were a total of 46 encounters where postdischarge follow-up appointments were not scheduled.

Root-cause analysis audits found the following causes: (a) 17 encounters of patient refusal or requests to self-schedule appointment; (b) 14 incomplete encounters (did not include date, time, location, or physician information); (c) six unplanned discharges (four patients self-discharged because of dissatisfaction with treatment plan and two patients recovered sooner than expected and were discharged early by the provider); (d) five encounters of staff omission (forgot to schedule); and (e) four late appointments (scheduled after patient discharge; see Supplemental Digital Content Appendix D, available at: <http://links.lww.com/PCM/A13>). Root causes of missed appointments were deemed preventable and secondary to people issues and system issues. People issues included lack of paying attention to detail, shortcuts, and lack of communication. System issues included lack of hard stops, system reminders, or flags in the electronic medical record.

OUTCOMES MEASURES, ANALYSIS, AND FINANCIAL IMPACT

As a result of these interventions, total readmissions for this population were reduced by 22% or 31 readmissions. The estimated cost of care per readmission was \$20,000; thus, cost savings or avoidance totaled \$620,000. Implementation costs were approximately \$42,000; thus, the annualized ROI was \$578,000. This is \$220,000 more savings than estimated (originated estimated savings were \$358,000). Also, average LOS was reduced by almost 1 day (7.7 down to 6.8) and ED and observation visits decreased by 18.7% and 23.5%, respectively (see Supplemental Digital Content Appendix E, available at: <http://links.lww.com/PCM/A13>). This ROI does not include revenue gained from LOS reduction or increased capacity. Increased capacity for patients needing acute care with higher paying diagnostic-related groups (DRGs) was observed. Further analysis is needed to determine the overall ROI to include the following: Reimbursement of other DRGs admitted minus that of SCD patients who would have been admitted; LOS savings; and improved ED and observation throughput.

IMPLICATIONS OF PROJECT RESULTS

Organizationally, there is great opportunity to implement similar measures across the system as several of the system facilities provide care to patients with SCD. Although policy revisions were not made, the case management and social work department added these two interventions as part of their standard discharge planning process. As a result of this project, the department also reassessed and implemented other disease-specific discharge education tools for heart failure and diabetic patients. In addition, efforts are in progress to reengineer the current patient education platform. The intent is to boost patient awareness and understanding, enhance applicability and practicality of patient self-management and postdischarge care, increase consistency of patient education and documentation, and, ultimately, improve patient outcomes and satisfaction.

IMPLICATIONS FOR CASE MANAGEMENT

Implementation of effective care coordination is a key aspect to reducing 30-day hospital readmissions of patients with SCD. Standardized education using evidence-based tools was critical in project success. Daily IDT meetings and rounds that involve the patient and focus on mutually established care goals and a follow-up plan are important aspects of the case manager's role. Partnering with community

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networks is also important in addressing readmission risk factors including management of SDOH that increase hospital visits.

Limitations

The Centers for Medicare & Medicaid Services' (CMS) readmission data typically run a few months in arrears; thus, concurrent data were tracked using the hospital's patient documentation platform and the Vizient database. There were challenges with matching our internal data with the CMS readmission methodology. Internal data included only readmission back to the hospital and the CMS data included readmission to any hospital. In addition, though there is evidence that supports the benefits of prescribing medications such as hydroxyurea to reduce sickle cell crisis and complications, this project did not assess SCD treatment and its impact on 30-day hospital readmissions. Another limitation to this project is that we did not consistently follow up or collect data regarding patient adherence to postdischarge follow-up appointments. We also did not establish a standardized and consistent way to collect root causes of readmission for those patients who returned within 30 days of hospital discharge.

KEY LESSONS LEARNED

There were several key lessons learned. To successfully support comprehensive disease management for patients with SCD, community partnership is essential. The Sickle Cell Association of Houston's extensive knowledge and familiarity of caring for people with SCD helped foster trust and inspire altruism. Establishing a process for automatic social work consults based on provider and nursing assessment and identification of social determinations of health may also be useful.

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Ensuring that patient education platforms are patient-centered is another lesson learned. Reengineering the flow sheets for documentation of patient teaching to incorporate teach-back is advisable. Consideration of reading and comprehension levels and incorporation of adult learning strategies are critical. Leveraging smartphones and other types of technology is critical in connecting with young adults including those with SCD. Providing care coordination staff with direct access to schedule postdischarge follow-up appointments with PCPs or hematologists may have helped scheduling compliance. It would have been ideal to assign resources to follow up with the patient or clinics to confirm postdischarge follow-up compliance for patients accessing care outside of the system.

PROJECT RECOMMENDATIONS

Implementation of care coordination interventions to reduce the 30-day hospital readmission rate for patients with SCD is strongly recommended. Automating care coordination referrals and adding electronic flags, notifications, reminders, or hard stops regarding postdischarge follow-up appointment elements would be ideal. Implementation of a standard process to conduct root-cause analysis of readmissions, tracking and trending causes, and implementing additional readmission reduction strategies is necessary. Utilization of an electronic tool, app, or other platform to assess SDOH may also be beneficial. Furthermore, an assessment of baseline health literacy should be completed.

Collaborating with hematologists and leveraging evidence-based SCD tool kits should be part of a hospital's SCD management protocol. This may include standardized care protocols including prescribing hydroxyurea. Recruiting and embedding SCD case managers or champions may be beneficial. Partnering with community networks to establish a comprehensive plan is also advised. Although not explicitly addressed in this study, it is also important to consider the role of culture and patient's previous experience in SCD care management. Annual cultural diversity assessment and training should be required for all staff providing or involved in care of the patient with SCD.

Automating care coordination referrals and adding electronic flags, notifications, reminders, or hard stops regarding postdischarge follow-up appointment elements would be ideal.

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Naph’ tali B. Edge, DNP, MBA, MSN, BSN, is a vice president of care coordination & operations at a large academic, safety net, Level 1 trauma center in Atlanta, GA. His work includes case management and social work operations, transfer center, bed management, patient flow, and other aspects of hospital operations throughout the continuum of care. He is now on the Board and Board President for the Sickle Cell Association of Houston.



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