Reducing Readmission using the Re-Engineered Discharge: A Quality Improvement Project—Evaluation and Analysis

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Abstract

Introduction/Purpose: One out of every five patients hospitalized for heart failure (HF)-related complications are readmitted within 30 days of previous admission. Readmission, as a healthcare quality index, provides a metric to investigate strategies to improve HF outcomes. The Re-Engineered Discharge (RED) protocol is a comprehensive transitional care tool created to improve overall patient outcomes and self-efficacy. The purpose of this quality improvement project was to evaluate the RED protocol's effect on readmission rates in patients admitted with HF at a small, Midwestern hospital.

Methods: This project used a convenience sample of adult patients, ages 18 years or older admitted to the hospital with HF during a 60-day period. All patients (N = 7) who met the sample criteria received the RED transitional care protocol delivered by a trained cardiac care nurse. Following the implementation, the researcher performed a chart audit over 30 days to identify readmission status, collect data, and verify the integrity of RED implementation.

Results: The readmission rate was 28.6% among the study group, which was above the hospital's baseline rate of 25.42% in August. The readmission index was 0.91 in the study group versus the hospital's overall index (1.07). The findings regarding the secondary data was consistent with the literature results that demonstrated increased HF incidence among older adults (age range, 58 - 91), females (four females versus three males), and increased occurrence in higher socio-economic status persons. The most common secondary diagnoses were hypertension (N = 7), osteoarthritis (N = 4), hyperlipidemia (N = 4), atrial fibrillation (N = 3), and diabetes mellitus (N = 3). The protocol fidelity was 100% for all steps, except for the follow-up phone call (78%), validated through self-report and chart audit.

Discussion: The project does not statistically support use of the RED protocol as a means of reducing readmission; however, the literature continues to support the individual steps of the

protocol. Further study is necessary to validate the protocol. This project sought to inform transitional care guidelines in acute care institutions to improve patient outcomes and reduce readmission.

Keywords: heart failure, readmission, transitional care, re-engineered discharge

Reducing Readmission using the Re-Engineered Discharge: A Quality Improvement Project

Background

According to the Centers for Medicare and Medicaid Services ([CMS], 2021), hospital readmission is an admission to the hospital within 30 days of a prior hospital stay for related problems. Hospital readmission is a significant healthcare issue because health risk increases as prevalence rises, including increased healthcare costs associated with the persistent disease complications and morbidity and mortality (CMS, 2021; Polsook & Aungsuroch, 2021). For this reason, readmission is identified as a key indicator of healthcare quality (CMS, 2021; Polsook & Aungsuroch, 2021). Based on current Medicare (2024) statistics, the national average hospital readmission rate is 14.6% for all conditions.

The most common reason for readmission is HF, with a national average of 20.2% (Medicare, 2024). Among those patients with HF, researchers report that up to 25% of patients will be readmitted to the hospital within 30 days of previous hospitalization, resulting in greater incidence of HF related-complications, including pulmonary hypertension, arrythmia, valvular disease, cardiac arrest, liver, and kidney damage (Lloyd et al., 2019; National Heart, Lung, and Blood Institute [NHLBI], 2022; Polsook & Aungsuroch, 2021). Additionally, hospital readmission affects healthcare systems by overburdening healthcare resources, increasing cost, and lowering reimbursement for services for reportable readmissions, despite ongoing care-related expenses to the hospitals (CMS, 2021). McDermott and Roemer (2021) indicate that HF accounted for 1,135,000 hospitalizations and 4.1% of total hospital non-maternal, non-neonatal admissions in 2018. Total cost of HF-related admission was $14.5 billion, with an average cost of $12,800 per admission in 2018 (McDermott &Roemer, 2021). Lloyd et al. (2019) reported that in 2012 HF cost up to $31 billion dollars. 80% of that cost was associated with HF-related

hospitalizations. Projections suggest that by 2030, HF-related costs will increase by 46% (DiPalo & Barone, 2020).

Readmission is a preventable issue by incorporating effective discharge planning, care coordination, and subsequent follow-up after discharge (AHRQ, 2016). The American College of Cardiology Foundation (ACCF)/American and Heart Association (AHA) Guideline for Management of Heart Failure (AHRQ, 2016) suggests that HF is best managed with through interdisciplinary care, medication, and discharge follow-up within 7-14 days. Studies have demonstrated that home health and phone support successfully reduce hospital readmission for HF (AHRQ, 2016). Arcilla et al. (2019) found that the number of readmissions dropped from 126 to 36 after patients participated in a comprehensive home-care program that incorporated patient education, including a grocery shopping activity with a dietitian, and participated in daily telehealth monitoring to identify risks or complications. Telemonitoring helps reduce readmission rates because it provides patients with phone support to answer questions regarding symptoms, medications, or HF-related questions and/or interactive vital signs and complication monitoring (Hall et al., 2020; Mizukawa et al. 2019; Rizzuto et al., 2022). Implementation of transitional care that integrates patient education with interdisciplinary providers while the patient is in the hospital, followed by home health visits, telephone support, and possible telemonitoring may help reduce readmissions (AHRQ, 2016; Son et al., 2021). Educational strategies should target lifestyle change, including a heart healthy diet, exercise, weight management, abstinence from tobacco or tobacco cessation, avoiding alcohol, stress management, and managing chronic conditions that lead to HF (Kaveh et al., 2017 ; Midjani et al., 2023; NHLBI, 2022). Not only will strengthening patient education and support reduce overall hospital admissions, the greater benefit is the reduction in complications associated with HF and morbidity and mortality (AHRQ, 2016; Chen et al., 2021; Son et al., 2021).

Hypertension has been indicted as the causative factor in 91% of patients who experience HF (DiPalo & Barone, 2020). Hospitalization and readmissions because of unmanaged hypertension result in complications of heart failure, myocardial infarction, and CABG procedures. With each subsequent readmission, many patients incur irreversible complications and disability, and increased risk of morbidity and mortality. Cardiovascular and other causative conditions are preventable or manageable with effective self-care (Polsook & Aungsuroch, 2021; Son, Choi, & Lee, 2020). Unfortunately, shortened hospital stays limit the time and attention of the staff on the acute problem rather than preparing the patient for effective self-care upon discharge (Chen et al., 2021; Lloyd et al., 2019). Hypertension and readmission are considered preventable issues using effective discharge planning, care coordination, and subsequent follow-up after discharge (AHRQ, 2016).

Problem Statement

The purpose of this quality improvement project is to evaluate the RED protocol's effect on readmission rates in patients admitted with HF at a small, Midwest hospital.

Organizational "Gap" Analysis of Project Site

The city in which this facility is located is a small, rural city in south-central Illinois. Based on current census statistics, the ethnic distribution is: White, 97.5%; African-American, 0.6%; American Indian and Alaska Native, 0.2%; Asian, 0.7%; Two or more races, 0.9%; and Hispanic or Latino, 2.3% (County Health Rankings and Roadmaps, 2024).

The County Health Rankings and Roadmaps (2024) ranks the county as among the healthiest counties in Illinois. Two categories, "Health Outcomes" and "Health Factors" rank in the 75-100% percentile. Healthcare is accessible in the county with a ratio of 1 primary care provider (PCP) or every 1,260 persons, exceeding the state average of 1:1,230 persons. Six percent of the county population is uninsured, which is lower than the state average of 9%

(County Health Rankings and Roadmaps, 2024).

Diseases of the heart (N = 64) are the second leading cause of death in the county (Illinois Department of Public Health [IDPH], 2020). Despite these positive findings, in the county middle-income adults deviate 157% from the recommended blood pressure (BP) parameters, 204% from BP benchmarks in low-income patients, and 460% from BP benchmarks in impoverished patients (AHRQ, n.d.). The current American College of Cardiology (ACC)/American Heart Association (AHA) recommend that systolic pressures should be less than 130 mmHg and diastolic pressures less than 80 mmHg (Bakris et al., 2019).

County residents demonstrate risk for hypertension based on the documented health behaviors: adult smoking, 19%; adult obesity, 34%; physical inactivity, 26%; excessive drinking, 25% (County Health Rankings and Roadmaps, 2024; DiPalo & Barone, 2020). The County Health Rankings and Roadmaps (2024) website reports that the county experienced 3,773 preventable hospitalizations, which exceeds the high-performing counties that report 2,233 preventable hospitalizations.

The Commonwealth Fund (2022) provides national and state health outcomes data and information. In Illinois, 30-day readmissions were relatively low in the 18-64-year-old population at 3.1% in 2019 (The Commonwealth Fund, 2022). When evaluating the population over 65 years old, however, the 30-day readmission rate increases dramatically to 48.5% in 2020. In 2016 and 2017, respectively, only 51% and 52% of patients reported that they felt prepared to care for themselves after hospitalization. Additionally, 62% and 63% of patients reported communicating with their hospital staff about their medications in 2016 and 2017, respectively. However, 87% of patients reported receiving discharge information about managing their recovery at home both verbally and in written form between years, 2016-2018 (The Commonwealth Fund, 2022).

The facility in which the project was implemented is the primary source of acute care in the region. The hospital is a small, acute care hospital with multiple services, including emergency department, intensive care unit, inpatient and outpatient surgery, medical/surgical, and rehabilitative services are available (Illinois Hospital Report Card and Consumer Guide to Health Care, n.d.). Access to dental (600 persons : 1 provider) and mental health care (450 persons : 1 provider) is below the state averages (County Health Rankings and Roadmaps, 2024). Table 1 compares the data national and facility cardiovascular-related readmission data. Based on the literature and the readmission data, the facility would benefit from transitional care activities to reduce cardiovascular-related readmissions.

Review of the Literature

Heart failure is consistently identified as a leading cause of death internationally (Son et al., 2020). Heart failure is a secondary health condition associated with uncontrolled or exacerbated cardiovascular disease, including hypertension, valvular disorders, coronary arterial disease, rheumatic disease, myocarditis, and endocarditis (Lippi & Sanchis-Gomar, 2020; Roger, 2021). Other causative conditions include chronic obstructive pulmonary disease, hyperlipemia, diabetes mellitus, and smoking (Lippi and Sanchis-Gomar, 2020; Roger, 2021). Age, gender, race, and socioeconomic status trends suggest that certain individuals are at greater risk for HF. A positive relationship is seen between age (greater than 50), HF onset, and increased risk of death. Increased HF risk exists among females versus males, black and Hispanic persons versus Caucasian counterparts, and higher socioeconomic (SES) status versus low- to mid-socioeconomic status. Two alarming exceptions are the incidence of onset in black females is occurring in populations under 50 and increasing incidence among low- to mid-SES populations. For these reasons, healthcare practitioners must urgently address patients' discharges more comprehensively to prepare them to deliver self-care upon returning to home (Lippi and Sanchis-

Gomar, 2020; Roger, 2021).

A literature search regarding transitional care methods was conducted. To identify which transitional care strategies were most effective in reducing 30-day readmissions among heart failure patients, a literature search was performed using the databases: CINAHL, Medline, and PubMed. MeSH terms searched, with Boolean operands and truncation included: heart failure OR congestive heart failure OR CHF OR congestive failure AND reduc* (all forms of reduce) readmission AND re-engineered discharge.

In the United States, a related readmission is defined as within 30-days of previous hospitalization for the same reason (CMS, 2021). Transitional care plays a key role in readmission (Cui et al., 2019; Mesbahi, 2020; Son et al., 2020). Transitional care strategies are those healthcare services that prepare patients for subsequent care settings, including home. Transitional strategies in this literature search included traditional, verbally-administered patient teaching (Cui et al., 2019; Mesbahi et al., 2020), use of multimedia (Lloyd et al., 2019), structured patient education (Awoke et al., 2019) developed by the ACCF/AHA, teach-back evaluation of learning (2018; Cui et al., 2019, Mesbahi et al., 2020). Son, Choi, and Lee (2020) performed a systematic review and meta-analysis in which eight randomized control trials specifically evaluated nurse-led transitional care activities and their effect on health outcomes including, readmission, morbidity and mortality, and quality of life. Studies within the Son et al. (2020) analysis employed patient teaching, repetition of information, DVD, relaxation methods, exercise, symptom monitoring activities, lab monitoring, and physical exams. These transitional care strategies demonstrated significant improvement in knowledge, self-management, and/or confidence in self-management skills (Awoke et al., 2019; Cui et al., 2019; Mesbahi et al., 2020). In addition to patient teaching strategies, a post-education telephone follow-up to support education and mitigate any incorrect information or misunderstanding among the patients

(Awoke et al., 2019; Son et al., 2020). The Agency for Healthcare Research and Quality (AHRQ, 2016) suggests transitional care with follow-up as a standard of practice for preventions of readmission, which demonstrates the importance of these findings.

The most significant issues associated with these studies is lack of statistical evidence that one transitional care method has better results at preventing readmission because of limitations of the studies and poor generalizability to the sample population as a whole. Cui et al. (2019) and Son et al. (2020) conducted studies using experimental design with randomized control trials. Sampling error existed in four studies (Awoke et al., 2019; Cui et al., 2019; Mesbahi et al., 2020; Son et al., 2020); all four study samples were regional, convenience samples and too small to be generalizable. Despite the sampling issues, the five studies represented an international cross section: two set in the United States (Awoke et al., 2019; Son et al., 2020), one in Iran (Mesbahi et al., 2020), and one set in China (Cui et al., 2019). Inter-rater reliability among the healthcare providers delivering the transitional care was only established in one study (Awoke et al., 2019), which diminishes the validity of the results because of the variance that exists in the transitional care. Baseline knowledge of the patients was not established with a reliable tool in Cui et al. (2019) and Son et al. (2020). Without an adequate measurement tool, patient's knowledge, self-management, and confidence level cannot be measured accurately (Cui et al., 2019; Son et al., 2020). Finally, the definition of readmission and/or the period in which readmission was measured varied widely.

Re-Engineered Discharge

The Re-Engineered Discharge (RED) protocol was created in cooperation with the AHRQ and Boston University Medical Center (BUMC). (Jack et al., 2023). The researchers identified that the lack of a standardized discharge process increased the risk of hospital readmission (Jack et al., 2009). Jack et al. (2009) surmised that a more comprehensive

transitional care process could mitigate patients' readmission risk and improve overall health outcomes. Most studies that addressed discharge preparation focused on singular interventions, rather than a standardized process. The (RED) protocol hinged on a comprehensive plan that incorporates patient-centered education, discharge planning, and follow-up evaluation. Jack et al. (2009) conducted a study to assess the effectiveness of the RED at BUMC. A nurse advocate and clinical pharmacist implemented the RED program components with success. The study outcomes demonstrated a statistically significant decrease in hospital utilization and demonstrated greater knowledge regarding their diagnosis. Additionally, BUMC realized an average cost-savings of $412 per patient (Jack et al., 2009).

The updated RED is composed of 12 steps (Jack et al., 2023): 1) Ascertain need for and obtain language assistance; 2) Make appointments for follow-up care; 3) Plan for the follow-up of results from tests or labs that are pending at discharge; 4) Organize post-discharge outpatient services and medical equipment; 5) Identify the correct medicines and a plan for the patient to obtain them; 6) Reconcile the discharge plan with national guidelines; 7) Teach a written discharge plan the patient can understand; 8) Educate the patient about his or her diagnosis and medicines; 9) Review with the patient what to do if a problem arises; 10) Assess the degree of the patient's understanding of the discharge plan; 11) Expedite transmission of the discharge summary to clinicians accepting care of the patient; 12) Provide telephone reinforcement of the discharge plan (Jack et al., 2023).

Since RED was created several studies evaluated the RED effects on discharge in a variety of settings, from traditional hospital settings, Veterans' Health Administration (VHA) facilities, skilled nursing facilities (SNFs), and to post-surgical settings. From 2009 to present, studies have implemented the RED protocol and found that it effectively reduced readmission rates (Jack et al., 2009; Mitchell et al., 2016; Patel & Dickerson, 2018; Popejoy et al., 2021).

Mitchell et al. (2016) implemented the RED in 10 hospitals across the United States (US). This study highlighted the protocol's improved sensitivity to language, culture and health literacy. All participating hospitals in the study experienced improved readmission outcomes. The secondary outcome of the project was an improved organizational culture (Mitchell et al., 2016). In a study that evaluated RED implementation among patients undergoing colorectal surgery, patients who received a RED reported a more positive discharge experience and feeling more prepared for post-operative care (Du et al., 2021). Popejoy et al. (2021) studied the implementation of RED in SNFs discharging patients to their home settings. This study demonstrated reduced readmission risk in patients who received the RED (Popejoy et al., 2021).

In Sullivan et al. (2018), the authors evaluated the feasibility, adaptability, and fidelity of implementation of RED in several VHA hospitals. The authors stated that the hospitals and staff who were motivated to initiate change and subsequently maintained good communication and collaboration contributed to successful implementation of the RED. The Roberts et al. (2019) study validates the importance of readiness to learn and/or motivation. The Roberts et al. (2019) study evaluated nursing staff readiness to learn preceding RED protocol training, demographic differences in RED usage, and difference between RED implementation following RED training. The study outcome demonstrated a relationship between motivation and quality of RED implementation (Roberts et al., 2019). The VHA implementation successfully adapted all components of RED either partially or fully (Sullivan et al., 2018). The authors noted one deterrent to implementation; RED requires considerable coordination, staff, and financial resources (Sullivan et al., 2018).

Because of the variety of transitional care methods, study limitations, and varied outcomes, more research is warranted to evaluate specific transitional care strategies, using evidenced-based instruments among a larger, diverse population. Studies that employ the same

transition strategies need to evaluate outcomes using a common definition for readmission to reliably and validly determine the effect of those strategies on readmission rates. Sampling error needs to be reduced through random, heterogeneous sampling.

Evidence-Based Practice: Verification of Chosen Option

The purpose of this quality improvement project is to evaluate the implementation of RED in adult patients with heart failure at a small, midwestern hospital. The PICOT question is: In patients with heart failure, aged 18 years or older, how does RED implementation affect hospital readmissions within a 60-day study period?

Theoretical Framework/Evidence-Based Practice Models

This quality improvement project is a secondary-level intervention to mitigate the effects of worsening HF (Hood, 2023). The Health Belief Model (HBM) guided this project because the model purports that behavioral change occurs through cognitive development (Butts & Rich, 2022). The HBM suggests that behavior change is mediated by six factors depicted in Figure 1 in Appendix A. The first factor is perceived susceptibility; which means the affected individual believes that a personal health risk exists. The second factor is perceived severity, meaning the person believes that negative effects exist if the behavior remains unchanged. The third factor is perceived benefit; which suggests that the person recognizes a health benefit may result from improved actions. The fourth factor is perceived barriers; in other words, the cost of changing behaviors is greater than the benefit. The fifth factor refers to “cues to action,” meaning environmental triggers or exposures may enhance the likelihood to change. The sixth factor is self-efficacy. Self-efficacy refers a level of self-confidence in ability to manage affairs, actions, and responsibilities (Butt & Rich, 2022).

The RED protocol is a tool that facilitates self-awareness, knowledge, and understanding regarding any illness, including HF, through patient education, enhanced hand-off

communication with primary and consulting care, and post-discharge support (Butts & Rich, 2022; Jack et al., 2023). Patient education in the patient's primary language addresses perceived susceptibility, severity, benefits, and barriers. RED seeks to remove perceived barriers through education and transitional care support. Education regarding medication self-administration, assistive devices, diet, activity, and symptom management provides information regarding effective health behaviors to introduce new cues to action. Patient follow-up at the primary care providers office and through a post-discharge phone call provides an opportunity to reassess perceived susceptibility, severity, benefits, barriers, and offers additional cues to action. Collectively, these actions promote the patient's ability to self-manage health behaviors, leading to self-efficacy (Butts & Rich, 2022; Jack et al., 2020).

In the literature, three studies demonstrated a positive relationship between behavioral change consistent with the HBM (Kaveh et al., 2017; Midjani et al., 2023; Nadrian et al., 2018). Nadrian et al. (2018) initiated a secondary analysis of a data set from a previous study of HF patients. The study outcomes suggested that improving knowledge and understanding of susceptibility to risks and complications of HF and mitigating perceived barriers are the best predictors of self-efficacy (Nadrian et al., 2018). Two studies evaluated a HF-patient education program guided by the HBM (Kaveh et al., 2017; Midjani et al., 2023). In Kaveh et al. (2017), patients with HF received education on exercise, healthy diet and weight control, medication adherence, and illness and HF-symptom management. The results of this study demonstrated significant differences in knowledge, perceived severity, perceived benefits, perceived barriers, self-efficacy, cues to action, and finally, improved self-care in the HBM-guided intervention group (Kaveh et al., 2017). Midjani et al. (2023) targeted all individuals over 30 years old who were at risk for cardiovascular disease. The study provided nutritional education to reduce risk of obesity and subsequent cardiovascular disease guided by the HBM precepts. Patients aged 30 –

59 demonstrated statistically significant improvement in knowledge, perceived susceptibility, severity, benefits, barriers, and practice over the control group (Midjani et al., 2023). These studies support the importance of encouraging patient-specific behavioral changes to develop self-efficacy. The comprehensive RED protocol contributes to cognitive and behavioral change by emphasizing the important of patient-centered care and patient education.

Goals, Objectives, and Expected Outcomes

The goal of this project was to reduce excess readmission ratio (ERR) to less than 1.0 in 8 weeks by implementing the RED protocol in the HF patients at the facility. Implementing the RED protocol required identification of evidence-based patient education materials, training staff in implementation, and coordination of the interdisciplinary team, including staff Registered Nurses (RNs), case management, and other interprofessional personnel. Evidence-based teaching materials incorporated the AHA recommendations for general HF education, signs and symptoms, diet, exercise, exacerbation warning signs, and when to contact the physician. A patient information folder was created to include all of the elements in the RED After-Hospital Care Plan (Jack et al., 2020). Each patient received a HF education folder to facilitate teaching and to keep at home to reinforce education provided. One RN from the cardiac catheterization lab was trained to deliver the HF education packet according to recommended health literacy standards. Post-implementation, the primary investigator (PI) evaluated the readmission rates among the patients in the study. The expected outcome was a reduction in HF readmission rates and the ERR compared to baseline data preceding the implementation period. Secondary data was collected including medical record number, age, gender, city and state of residence, dates of admission and discharge, readmission date(s), primary and secondary diagnoses, primary language, socioeconomic status, race/ethnic group, and the highest level of education completed and fidelity of the implementation, which was evaluated through a chart audit to ensure that all

steps of RED were incorporated.

Methods

Project Design

The implementation of RED protocol was a quality improvement project designed to reduce HF-related readmissions at the facility. The RED-trained RN (RED-RN) reviewed the inpatient census every Monday, Wednesday, and Friday to identify whether any patients were admitted to the hospital with HF as the primary diagnosis. All patients admitted with CHF on the assigned days received the enhanced RED protocol. After discharge, each patient's chart was audited after 30 days to identify whether the patient was readmitted to the facility in either the Emergency Department (ED) or inpatient setting. Demographics, readmission rates, and the readmission index were evaluated to identify patient trends and readmission data to identify whether the enhanced discharge process improved readmission outcomes.

Project Site and Population

Between 2018-2019, the facility (Illinois Hospital Report Card and Consumer Guide to Health Care, n.d.) reported a 133-bed capacity distributed among the medical/surgical (100 beds), intensive care (10 beds), pediatrics (6 beds), and obstetrics/gynecology (17 beds). The majority of patient care provided at the facility is provided by RNs as evidenced by the 7.14 RN nursing hours per patient day compared to the 10.7 total nursing hours per patient day, which includes RNs, licensed practical nurses (LPNs), and Unlicensed Assistive Personnel (UAPs) (Illinois Hospital Report Card and Consumer Guide to Health Care, n.d.). Furthermore, the facility reports 58.63% of nurses are hospital employed versus 8.11% of contractual employees.

The study population included all adult patients aged 18-years or older admitted to the facility with a primary admitting diagnosis of HF. The only exclusion criterion was a diagnosis of dementia, cognitive impairment, or pregnancy. Illinois Hospital Report Card and Consumer

Guide to Health Care (n.d.) reported that the facility admitted 255 patients with HF from October 2019 through September 2020. To ensure an adequate sample size, all patients who meet the study criteria will receive the RED protocol.

Barriers to implementation were the availability of the RED-RN, identifying patients admitted with HF, and the length of hospital admission. The RED-RN was only available on Mondays, Wednesdays, and Fridays, which potentially reduced the likelihood that she was able to provide education to patients admitted on alternate days or discharged on the weekends. No formal notification system was available to ensure the RED-RN was aware that a patient with HF was admitted. Finally, the length of hospital stays was variable precluding adequate time to educate and coordinate follow-up services. These barriers were mitigated by securing an order for home health services when indicated to ensure the successful implementation of the RED protocol. Table 2 (Appendix B) summarizes the strengths, barriers, and opportunities for improvement that this project sought to influence.

Measurement Instruments

Tools that were used to evaluate project outcomes included readmission rates, the ERR, and the RED checklist.

The primary measures for this project were the ERR and the readmission rate. The ERR and readmission rate calculations were established by CMS (2021). The ERR is the predicted readmission rate (based on past metric-specific hospital performance) to the expected readmission rate (a readmission average of a different hospital with a similar patients and characteristics) (QualityNet, n.d.). The CMS operational definition of readmission rate is the number of readmissions divided by number of discharges (CMS, 2021).

Fidelity of the RED implementation was a secondary outcome. Currently, no objective tool exists to analyze RED fidelity. Du et al. (2021) performed a chart audit to identify whether

all of the RED steps were followed and created an average completion rate for each step. Mitchell et al. (2016) evaluated fidelity through qualitative data. The PI created a RED Checklist by Responsibility shown in Table 2, Appendix B.

The principal investigator (PI) collected all data in a Microsoft Excel spreadsheet, including medical record number, age, gender, city and state of residence, dates of admission and discharge, readmission date(s), primary and secondary diagnoses, primary language, socioeconomic status, race/ethnic group, and the highest level of education completed, and fulfillment of RED steps (yes or no for each step). The PI stored the information in a two-factor authenticated, password-protected Box account to which only the PI has access. Data was analyzed by comparing the readmission rates and ERRs to the baseline data at the start of the project. The project was vetted by hospital administration and the Quality Council at the hospital. The project was approved by the hospital in March 2023 (see Figure 2, Appendix B).

Data Collection Procedures

Phases of implementation were divided into pre-intervention, intervention, and post-intervention phases.

Pre-Intervention Phase

The pre-intervention phase was the period of time from patient admission until informed consent was given. The RED-RN implemented the patient education. A Nurse Navigator completed the post-hospitalization follow-up call; a RN or clinical pharmacist performed the medication reconciliation and some medication teaching; a case manager acquired assistive devices and/or secured financial or other assistance as needed; and, the charge RN notified the appropriate staff of a HF admission, prepared the hospital's Discharge Summary, and scheduled patient follow-up appointments. During the pre-intervention phase, the RED-RN was notified that a patient was admitted with HF. The RED-RN assessed whether the patient met participation

criteria. If criteria were met, the PI was notified to visit the patient to obtain informed consent.

Intervention Phase

The intervention phase began after informed consent was obtained and continued through the post-discharge follow-up phone call. The RED-RN notified appropriate staff members that medication reconciliation and discharge planning should follow the RED protocol. The interdisciplinary group, led by the RED-RN, collaborated to ensure that the RED protocol steps were completed. Table 3 (Appendix B) outlined the protocol steps and designated responsibility. The RED-RN used a checklist (shown in Figure 3, Appendix B) to identify that priority actions were completed. Each patients checklist in the RED-RN's locked office.

The PI collected the informed consent and privacy documents and maintained a roster of participating patients using de-identified patient numbers in the project spreadsheet. All paper documentation was stored in a sealed envelope in the researcher's personal safe.

Post-Intervention Phase

The post-intervention phase began after the patient received a post-discharge follow-up phone call and continued until the end of the 30-day readmission window. During this phase, the PI performed a chart audit to identify whether the patient had been readmitted to the facility for HF or a related problem. Additionally, the PI performed a chart audit to determine if all elements of the RED protocol were documented in the patient's chart. During this phase, additional demographic data was collected to identify patient trends, including length of stay, age, gender, primary language, socioeconomic status, race/ethnic group, highest level of education, and additional comorbidities.

Data Analysis

The project implementation period was August 15 to October 15, 2023. The project goal was 15 patients. Twelve patients received the RED protocol and seven patients (N = 7) consented

to participate in the project's follow-up group. One patient declined participation in the study; the other four patients were discharged before they could be consented. The challenges associated with project recruitment included lack of availability of the RED-RN and the PI. The RED-RN only implemented the RED protocol three days per week. The PI was only available after 4 p.m. to consent. Collectively, the limited availability of the RED-RN and PI reduced the number of patients that could have been enrolled into the intervention group and study cohort. Two out of seven patients were readmitted from the study group, resulting in a readmission rate of 28.6%. The baseline readmission rate in August 2023 was 25.42% resulting in greater incidence of readmission in the study group participants (difference of 3.08%, 12% higher than baseline readmission rate) The hospital was not able to provide the ERR. The alternative readmission index was reported as the observed readmission compared to the expected readmission (OER). The expected number of admissions during the study time period was 8.4763 among a total HF-patient population (N = 27); the number of readmissions in the study group was 2 out of 7 patients. The study group OER was calculated by performing a proportional analysis to determine the expected readmission number for a patient population of seven (equivalent expected number of readmissions, 2.1976). The result was an OER of 0.91. The target ERR was less than 1.0. Because the OER and ERR are two different indices, the project goal was not met. The data are summarized in Table 4 in Appendix C.

Secondary data that was collected included age, gender, city and state of residence, dates of admission and discharge, readmission date(s), primary and secondary diagnoses, primary language, socioeconomic status, race/ethnic group, and the highest level of education. The average length of stay was 3.43 days (range, 2 – 9). The age range of the study group (58 – 91) demonstrated that all patients were among the older adult population. No significant differences existed in lengths of hospital stay, primary language, socioeconomic status, racial/ethnic group.

The level of education was not reported in the electronic medical record or by the RED-RN. Secondary diagnoses demonstrated a relationship between other cardiovascular illness and HF, including hypertension (N = 7), hyperlipidemia (N = 4), atrial fibrillation (N = 3), coronary artery disease (N = 2), aortic stenosis (N = 2), mitral regurgitation (N = 1), cardiomyopathy (N = 1), and transient ischemic attack (N = 1). Other secondary diagnoses reported included osteoarthritis, diabetes mellitus, gastroesophageal reflux disease, hypothyroidism, chronic kidney disease, depression, diverticulosis, liver disease, and obesity. The data are summarized in Table 5 found in Appendix C.

Table 3 (Appendix B) summarized each of the RED protocol's 12 steps and which staff member was responsible for each one. The RED-RN and interdisciplinary hospital team demonstrated a high level of compliance. Steps 1 through 11 were completed for all 7 patients. The follow-up phone call was completed in 78% of the patients. Table 6 in Appendix C outlines the RED team fidelity to each step. Compliance was validated through RED-RN self report and through a chart audit by the PI.

Cost-Benefit Analysis

The primary benefits of this project were improved patient outcomes and increased reimbursement for care delivered. Hospitals incur up to a 3% reimbursement reduction for readmissions within 30 days (Hospital Readmission Reduction Program [HRRP], n.d.). From October 2020 through September 2021, the average cost of hospitalization for HF patients was $11,109.07, for patients with HF and complications, $16,574.90, and for patients who had HF with multiple complications, $21,938.38 (Illinois Hospital Report Card and Consumer Guide to Health Care, n.d.). The facility can prevent financial losses of as much as $658.15 per patient based on the HRRP guidelines. Additionally, reducing readmission rates can help the facility restore its quality of care ratings to the 2021 four-star level, as rated by CMS (Medicare, 2024)

and grade of A by The Leapfrog Group (Leapfrog Hospital Safety Grade, 2022), respectively. Cost-benefit savings are summarized in Table 7 (Appendix C).

Costs of completing this project were minimal. The PI received academic credit for participation in the study rather than traditional reimbursement. Staff participating in this project were paid by the facility. The project staff were responsible for delivering care and identifying strategies to reduce readmissions based on their current employment responsibilities whether they were involved in the project or not. Patient education and additional support materials, such as health applications for mobile devices were developed by the American Heart Association based on current clinical practice standards for the treatment of HF. The cost of preparing patient education manuals was minimal because the hospital provides education materials for all patient within the discharge summary, which was generated for all patients discharged from the facility.

Timeline

The timeline for this project began in April 2023 with training of the RED-RN on implementation of RED protocol, which was performed by the PI. Implementation of the project occurred from August 15 through October 15, 2023, during which time the RED-RN and staff implemented the RED protocol for all adult patients age 18 years or older admitted with HF, unless exceptions were documented in the patient's chart. August 15, 2023 through February 12, 2024, the PI consented eligible patients and performed ongoing chart audits of all study patients to identify readmission status and collect data. The chart audit process was protracted because the facility experienced computer downtime for two and a half weeks during August and September associated with a cybersecurity issue. The process was further delayed as all patient documentation required transcription from paper chart into the corresponding electronic medical record over the months following the event.

Ethical Considerations/Protection of Human Subjects

The University of Alabama (UA) Institutional Review Board (IRB) approved this project in July 2023. All participants were protected by the Health Insurance Portability and Accountability Act of 1996 (HIPAA), which details how privacy of all patients' health information and records must be protected (National Archives, n.d.). Additionally, all patient education and RED protocols complied with standards of care for the treatment of patients with HF. The risk to patients who participated in this project was minimal; not significantly different than patients who received traditional discharge protocols.

All information used to evaluate the impact of this project was aggregated data from the project participants and did not include any potential patient identifiers. Participant confidentiality was ensured by coding the participants using unique identification numbers. The list of participants and their identifying numbers were kept in locked filing cabinets in the PI's office, only accessible to the PI. All electronic files containing identifiable information were stored on the HIPPA secure UA Box.

Interpretation/Discussion

Heart failure is a common health problem that leads to readmission in the US. The goal of this study was to reduce the overall readmission rate of patients who were diagnosed with HF through a comprehensive transitional care and discharge process. The literature suggested that individual transitional care methods, such as interdisciplinary care, comprehensive patient teaching (i.e., diet, activity, medications, signs and symptoms of HF and HF complications, and when to notify the physician) with teach-back, communication with primary and consulting care providers, coordination of follow-up appointments and equipment, and telephone and telemedicine follow-up to identify questions, were effective methods of reducing readmissions. The RED protocol sought to aggregate these methods into one seamless protocol. The findings failed to demonstrate a reduced readmission rate, despite a reduced readmission index. The

small, convenience sample used in this study and lack of reliability and validity of the RED protocol fail to validate use of the RED protocol, despite its success in reducing readmission in previous studies. More research in multiple institutions with larger sample sizes is necessary to support the use of the RED protocol and its benefits. Additionally, an instrument to validate RED fidelity needs to be developed to demonstrate reliability and validity of RED implementation. Self-report and chart audits are not reliable measures of the protocol's fidelity.

The secondary data included the dates of admission, age, city and state of residence, gender, race/ethnicity, primary and secondary diagnoses, SES, level of education, and primary language. The city and state of residence showed that the individuals in the study lived in the same city as the facility or within a 15-mile radius. An overwhelming majority of the area population are Caucasian and speak English as the primary language, which was consistent with the project participants (County Health Rankings and Roadmaps, 2024). Other data that were consistent with the literature included: more women than men were admitted with HF; and, all of the patients demonstrated low financial risk suggesting that they were within the higher SES. Patients' secondary diagnoses were also consistent with current literature. Most of the patients' secondary diagnoses were known conditions that predispose patient to HF, including hypertension, coronary artery disease, valvular disease, atrial fibrillation, hyperlipidemia, chronic kidney disease, and diabetes mellitus. Given the increased probability of uncorrected cardiovascular disease contributing to HF development, further research needs to address the type of illness-specific education a patient receives when first diagnosed with an illness, how compliant a patient is regarding diet, activity, and medication usage, and identifying tools to measure these behaviors effectively. Early intervention to prevent HF should begin when patients are diagnosed with illnesses likely to cause HF. Additionally, the patient needs greater follow-up care to identify onset of HF early to prevent life-threatening complications. Presuming

early intervention is successful, the incidence of HF should decline. Finally, the role of alternate residences is important to consider. Some of the participants in the study were living in assisted living or long-term care facilities that prepare all meals. All dietary instruction provided in the RED interventions were nullified because the instruction was not oriented to the individuals preparing the patients' meals. HF readmission prevention is a multifactorial problem that requires an interdisciplinary team delivering patient-centered strategies for the unique characteristics of each patient.

Conclusion

Heart failure continues to be a pervasive health problem, not only in Illinois counties, but globally (County Health Rankings and Roadmaps, 2024; Illinois Department of Public Health, 2020). Further study of RED and similar protocols is necessary to identify the potential improvements in continuity of care and advocacy services as patients transition to home or other facilities. Although the primary aim of this project was to reduce readmissions, the greater benefit was to improve patient health outcomes. Improved transitional care has the ability to reduce the physical and psychological damage associated with HF and the resulting complications of the disease if HF remains uncontrolled. Whether using the RED protocol or other method to ensure coordination of care, primary and consulting physicians know the patient's current health situation and how it was addressed.

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Appendix A

Table 1

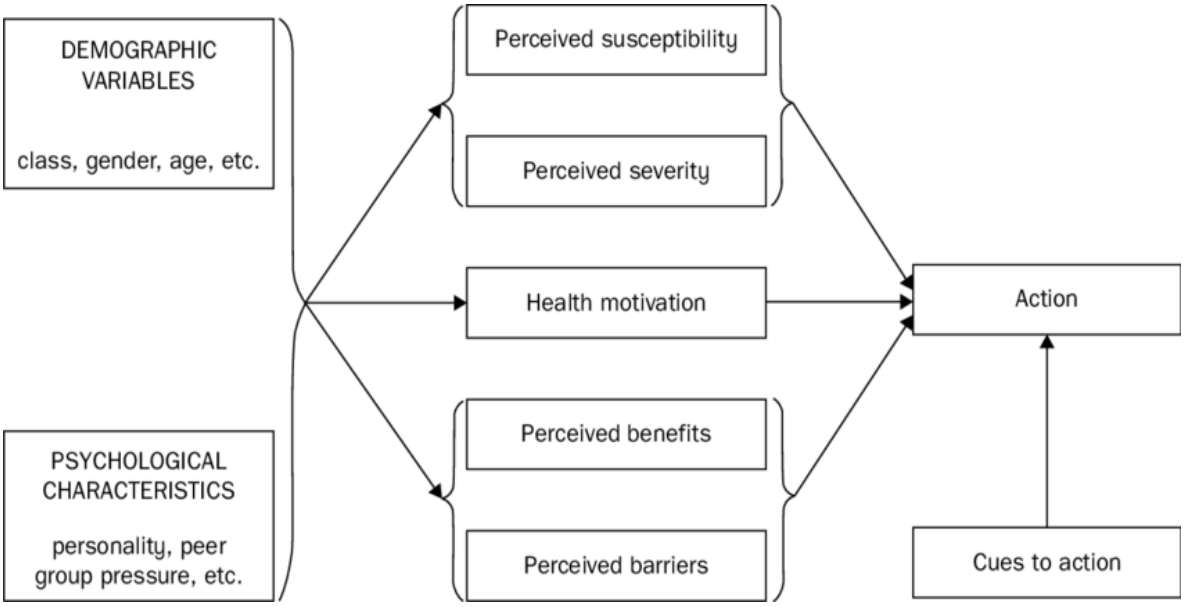
Readmission Statistics

National Readmission Rates		Facility Readmission Rates	
Overall readmission rates	14.6%	Overall readmission rate	14.4%
Condition-specific readmission rates:		Condition-specific readmission rates:	
• Heart Failure	20.2%	• Heart Failure	22.2%
• Myocardial infarction	14%	• Myocardial infarction	14.6%
• S/P CABG surgery	11%	• S/P CABG surgery	N/A

(Medicare, 2024).

Figure 1

Health Belief Model Diagram



(Abraham & Sheeran, 2015)

Appendix B—Project Methods

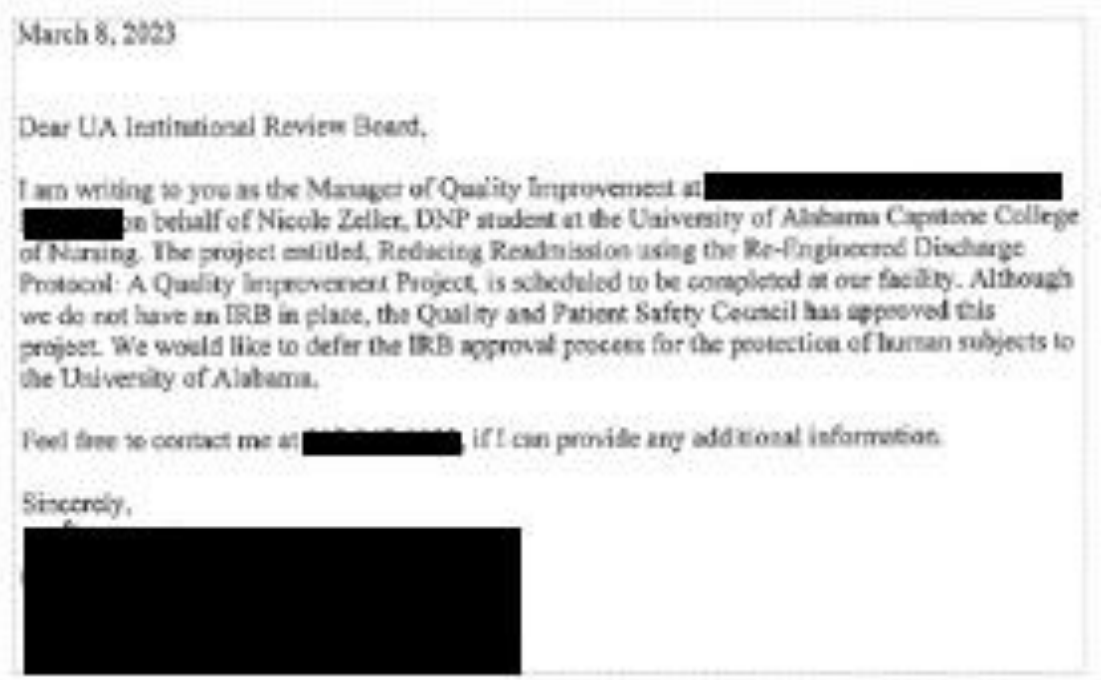
Table 2

Strengths, Barriers, and Opportunities of Project Implementation

Project Implementation Analysis	
Strengths	• The Re-Engineered Discharge (RED) is a validated, organized evidence-based, comprehensive discharge tool. • Hospital administration and staff fully support the implementation of RED. • Strong support and constructive feedback from my University of Alabama advisor. • The hospital is proactive in addressing internal issues and below-average outcomes. • The hospital uses Team Strategies to Enhance Performance and Patient Safety (TeamSTEPPS), which focuses on quality communication and interdisciplinary teamwork. • The RED planning team at the hospital is a diverse group, including members from leadership, cardiac care, surgery, home health, and Information Technology. • The hospital uses EPIC, which is a user-friendly tool that will allow a smooth chart audit.
Barriers	• RED is a multi-step tool; the hospital struggled with identifying which steps to implement fully. • Nursing care is not a reimbursable expense; RED adds more responsibility to nursing time. • The average length of stay for each patient with heart failure is 3 days, which limits contact time for quality patient education. • Coordinating time between the Principal Investigator and the hospital staff was challenging with competing individual schedules.
Opportunities	• St. Anthony hospital was assigned a lower quality score by the Centers for Medicare and Medicaid and the LeapFrog Group, in part because of readmission-related problems. • The hospital identified unused resources that could be allocated to the RED implementation. • RED challenges the interdisciplinary care delivery team to increase the quality of patient education. • RED seeks to ensure greater continuity of care from the hospital through the post-discharge process.

Figure 2

Letter of Support



March 8, 2023

Dear UA Institutional Review Board,

I am writing to you as the Manager of Quality Improvement at [redacted] on behalf of Nicole Zeller, DNP student at the University of Alabama Capstone College of Nursing. The project entitled, Reducing Readmission using the Re-Engineered Discharge Protocol: A Quality Improvement Project, is scheduled to be completed at our facility. Although we do not have an IRB in place, the Quality and Patient Safety Council has approved this project. We would like to defer the IRB approval process for the protection of human subjects to the University of Alabama.

Feel free to contact me at [redacted], if I can provide any additional information.

Sincerely,

[redacted]

Table 3

RED Steps and Staff Responsibility

RED Step	Staff Responsibility
Ascertain need for and obtain language assistance	RED-RN or Charge nurse
Make appointments for follow-up care	RED-RN Charge nurse
Plan for the follow-up of results from tests or labs that are pending at discharge	RED-RN
Organize post-discharge outpatient services and medical equipment	Case Manager
Identify the correct medicines Plan for the patient to obtain them	Clinical pharmacist Case Manager or RED-RN
Reconcile the discharge plan with national guidelines	RED-RN
Teach a written discharge plan the patient can understand	RED-RN
Educate the patient about his or her diagnosis and medicines	RED-RN Clinical pharmacist
Review with the patient what to do if a problem arises	RED-RN
Assess the degree of the patient's understanding of the discharge plan	RED-RN
Expedite transmission of the discharge summary to clinicians accepting care of the patient	RED-RN
Provide telephone reinforcement of the discharge plan	RED-RN

Figure 3

RED Checklist by Responsibility

Patient MRN:

Date of Admission:

Date of Discharge:

Charge Nurse

□ Obtain languages assistance, if English is a second language
□ Make appointments for follow-up care (primary care, consulting physicians, labs/diagnostics)

Case Manager

□ Organize post-discharge outpatient services and medical equipment
- Scale at home (Yes/No)
- Scale provided (Yes/No)
- Other equipment coordinated (Yes/No)
- Obtained financial assistance for medications (check for ARNIs) (Yes/No)

Clinical Pharmacist

□ Medication reconciliation performed
□ Medication education provided

RED-RN

□ Heart failure education provided
- Causes of heart failure (Yes/No)
- Symptoms of heart failure (Yes/No)
- Salt intake recommendations (Yes/No)
- Fluid intake recommendations (Yes/No)
- Importance of daily weights (Yes/No)
- Activity recommendations (Yes/No)
- Rest recommendations (Yes/No)
- Medication recommendations (Yes/No)
- Importance of going to follow-up visits (Yes/No)
- Tracking symptoms daily (Yes/No)
- Notifying who to call based on the symptoms (Yes/No)

□ Teach-back used

Approximate teaching time: _____

□ Hospital Discharge Summary generated and sent

□ Follow-up phone call made

Date: _____

Appendix C —Data Analysis

Table 4

Readmission Rates

Date	Overall HF-Related Readmission Rate	Overall Readmission Index	Study Group-Related Readmission Rate	Study Group Readmission Index
August 2023	25.42%	1.18	--	--
October 2023	23.39%	1.07	28.6%	0.91

Table 5

Secondary Data

Item of Study	Occurrence
Number of Patients Readmitted	2
Range of Days in Hospital	2-9
Average Number of Days in Hospital	3.43
Range of Patient Age	58 - 91
Average Age of Patients	76.57
Number of Men	3
Number of Women	4
Primary Language of Patients	English (N = 7)
Place of Residence	Same City as Facility (N = 3) City #1 (N = 2) City #2 (N = 1) City #3 (N = 1)
Socioeconomic Status	Low Risk (N = 7)
Level of Education	Not Reported
Racial/Ethnic Group	Caucasian (N = 7)
Secondary Diagnosis, Ranked High to Low	Hypertension (N = 7) Osteoarthritis (N = 4) Hyperlipidemia (N = 4) Atrial Fibrillation (N = 3) Diabetes Mellitus (N = 3) Aortic Stenosis (N = 2) Coronary Artery Disease (N = 2) Gastroesophageal Reflux Disease (N = 2) Hypothyroidism (N = 2) Cardiomyopathy (N = 1) Chronic Kidney Disease (N = 1) Depression (N = 1) Diverticulosis (N = 1) Liver Disease (N = 1) Mitral Regurgitation (N = 1) Obesity (N = 1) Transient Ischemic Attack (N = 1)

Table 6

RED Protocol Fidelity

RED Step	Completion Rate
Ascertain need for and obtain language assistance	100%
Make appointments for follow-up care	100%
Plan for the follow-up of results from tests or labs that are pending at discharge	100%
Organize post-discharge outpatient services and medical equipment	100%
Identify the correct medicines. Plan for the patient to obtain them	100%
Reconcile the discharge plan with national guidelines	100%
Teach a written discharge plan the patient can understand	100%
Educate the patient about his or her diagnosis and medicines	100%
Review with the patient what to do if a problem arises	100%
Assess the degree of the patient's understanding of the discharge plan	100%
Expedite transmission of the discharge summary to clinicians accepting care of the patient	100%
Provide telephone reinforcement of the discharge plan	78%

Table 7

Cost-Benefit Analysis

Patient Type	Cost Per Patient	Cost Savings Per Patient
Heart Failure Patient	$11,109.07	333.21
Heart Failure Patient with Complications	$16,574.90	497.25
Heart Failure Patient with Multiple Complications	$21,938.38	658.15