Nurse Practitioner-Driven Interprofessional Heart Failure

Education: A Quality Improvement Project

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Abstract

Heart failure is a worldwide clinical concern, which has increased the healthcare expenditures, downgraded patient's quality of life, and contributed to a large number of deaths every year. HF is the most common cause of readmission for Medicare patients in the United States. The cost of HF readmissions and Emergency Room visits are potentially preventable. Effective HF education can decrease 30-day readmissions and promote early post-discharge follow-up adherence. The nurse practitioner (NP) -led HF quality (QI) initiative provided to HF patients a 60-minute education program based on the American Heart Association guidelines. This QI project incorporated interprofessional team support to the participants during 30 days of the timeframe in a large teaching hospital. The results revealed the positive outcomes for targeted project measures among participants. The organization continues the HF educational program on the cardiology units based on the success of the project.

Keywords: Heart failure, education, self-care, readmission, cost, follow-up

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Heart failure (HF) is defined as a complex clinical syndrome that is secondary to inadequate cardiac output. HF's pathophysiological process is characterized by elevated filling pressures within the heart in combination with a reduction in the heart's efficiency to pump blood to the rest of the body (Savarese & Lund, 2017). New York Heart Association (NYHA) and the level of B-natriuretic peptide (BNP) can help differentiate the severity of HF (Wu et al., 2016). HF is classified as Systolic Heart Failure (SHF) and Diastolic Heart failure (DHF) or HF with reduced ejection fraction and Heart Failure with Preserved Ejection Fraction. SHF occurs when the heart's lower chambers (ventricles) become too weak to contract and pump enough blood to meet the body's needs, resulting in shortness of breath and other HF symptoms. DHF is when the heart muscle becomes too stiff to relax and expand to fill with enough blood (American Heart Association [AHA], 2019). HF is a global pandemic prevalence that accounts for 1–3% of all U.S. hospital admissions (Savarese & Lund, 2017). Cox revealed that HF is the leading cause of 30-day readmission in the nation, about 22% of HF patients are readmitted to a hospital within 30 days of discharge (Cox et al., 2017).

Among the measures used by the Centers for Medicare & Medicaid Services (CMS) in determining CMS reimbursement rates, the Hospital Readmissions Reduction Program (HRRP) is a Medicare value-based purchasing program that reduces payments to hospitals with excess readmissions (CMS, gov). The program supports the national goal of improving health care for Americans by linking pay to the quality of hospital care. The CMS includes Acute Myocardial Infarction, Chronic Obstructive Pulmonary Disease, Heart Failure, Pneumonia, Coronary Artery Bypass Graft, and Elective Primary Total Hip Arthroplasty and Total Knee Arthroplasty as six conditions or procedure-specific 30-day risk-standardized unplanned readmission measures in the program (CMS, gov). HF patients' 30-day readmissions are costly. The United States Medicare system spends over $17 billion for 30-day readmissions every year (Cox et al., 2017). Thus, the Centers for Medicare & Medicaid Services (CMS, gov) selected the 30-day HF readmission rate for determining reimbursements.

There are three HF preventative strategies to deal with (a) high mortality, (b) high morbidity, and (c) frequent unplanned readmissions. To help improve patient care outcomes, quality of life, and rein in the growing costs of HF patients, the AHA has issued scientific guidelines. The "Get With The Guidelines Program for Heart Failure (GWTG-HF)" is an in-hospital program to help manage inpatients with HF (AHA, 2019). Following the guidelines to carefully manage the risk factors of hypertension, hyperglycemia, diabetes, and modified lifestyle has shown the benefits of HF management. Prescribed guideline-recommended drugs for HF patients, encouraged the post-discharge follow-up within seven days or less, and 60-minute HF education are targeted measures by GWTG-HF.

Among the quality indicators of HF management, reducing 30-day HF readmissions has become a national priority (Asthana et al., 2018). Advanced age, high disease severity, multiple comorbidities, and type of medication prescribed at discharge may be crucial for reducing the 30-day readmission rate. HF patient self-care competency and adherence to HF management regimen also play a significant role in HF readmission. Interim, effective HF education can provide the needed information and hands-on skills to HF patients and their caregivers for self-care at home. Moreover, HF patients with low health literacy, cognitive impairment (CI), and aging have a significantly higher 30-day readmission rate (Agarwal et al., 2016; Pudlo et al., 2015).

Numerous HF education efforts have helped to improve HF patient self-care competency, adherence to the complex HF management regimen, and to reduce HF 30-day readmission rates (Arthur et al., 2015; Asthana et al., 2018; Agarwal et al.). The HF education bundle includes nurse-led telephone follow-up, HF management clinics, home visits, multidisciplinary home-based interventions, and various remote-monitoring programs. The results of these teaching methods vary; some efforts did not result in measurable changes in HF management outcomes (Asthana et al., 2018).

Even though HF education is not the only way to impact HF management outcomes, studies show that improvement in HF 60-minute education reduces the HF 30-day readmission rate significantly (Arthur et al., 2015). A survey conducted by the American Association of Heart Failure Nurses (AAHFN)

to assess the status of inpatient education revealed that nearly 45% of the time, patients rarely or never

received 60-minute HF education (Rasmusson et al., 2015).

Background

Regardless of the advanced medical device and pharmacological interventions, HF is a poor

prognostic clinical syndrome (Rice & Betihavas, 2018). The intervention of HF is challenging, and the

improvement of HF management is ongoing. A short-time goal of HF treatment is supportive by

providing patients with relief from symptoms, pain, and stress associated with HF and palliative care. In

the long run, the treatment of HF is to implement a left ventricular-assisted device (LVAD) to help

improve the function of the left ventricle, thus increasing the cardiac output, or proceeding with the heart

transplant for those who failed to manage by medication.

Facing the challenges, the targeted organization continues to search for the best strategy to

manage HF inpatients. In 2016, the organization incorporated AHA's GWTG-HF program along with the

existing HF protocols. To follow the AHA HF management guidelines, the hospital Heart Failure

Management Committee wants to target five HF quality measures. The first three measures discuss HF

medication. The guidelines recommend that HF inpatients with reduced ejection fraction should be on an

angiotensin-converting enzyme inhibitor (ACEi) or angiotensin receptor blocker (ARB) or angiotensin

receptor/neprilysin inhibitor (ARNi), beta-blockers, and Aldosterone antagonist at discharge. The

Hospital Heart Failure Committee addresses the post-discharge follow-up visits within seven days or less,

and the 60-minute HF education before discharge home.

Study reported that up to 25% of HF patients were readmitted within 30 days of discharge with

various conditions (Feltner et al., 2014). Compared to this number, the QI implemented hospital is doing

a better job in the management of HF by looking at the HF readmission rate (20% readmission rate).

Proud to be the number-one hospital in Texas and among the top 20 hospitals in the nation, this hospital

continuously measures, assesses, and improves systems and processes to serve its patients better.

Organization

This HF education initiative developed by the Doctor of Nursing Practice (DNP) student took place in a private, not-for-profit organization, located in the Texas Medical Center. The organization is an academic teaching institution affiliated with Weill Cornell University and New York-Presbyterian Hospital. The clinical setting consists of 1000 licensed beds and over 6,000 personnel (Houston Methodist Hospital, 2019). The selected organization is part of a health care system in the Greater Houston Area that includes a network of community hospitals, a research institute, a physician employee organization, and an international entity organization. The organization is a Magnet-designated hospital and incorporated with AHA HF management guidelines for HF patients. For its popularity and specialty, this institute receives HF patients from all over the world. Therefore, the payer system is various, including Medicare, Medicaid, third-party payer, cash, and charity.

The organization has three cardiology patient units, A7, A8, and F11. The units selected for this QI project implementation were A7 and A8. Collectively, A7 and A8 have a total of 60 beds. The unit management is composed of a physician director, a nurse director, a day-shift manager, a nurse educator, and a night-shift manager. The managers are responsible for daily operation and working in the frontline with bedside staff. These units routinely hold a care coordination round (CCR) every morning before shift change. During the CCR, all HF patients in the units are identified and documented. The hospital schedulers try to set up a post-discharge follow-up appointment before discharge. A cardiology NP from the hospital HF Management Clinic assists with assessing needs and providing HF education before discharging the patient to home. However, HF specialists see only a small portion of HF patients, who consequently do not receive needed-to-know information for self-care at home. Also, the current HF teaching approach is not systematic because nurses and physicians provide it inconsistently. To provide better care to the HF patient population, the hospital continues to search for a standard HF education method.

Population

  HF affects people of all ages, from children and young adults to the middle-aged and the elderly. In the United States, there are more than 800,000 new cases of HF diagnosed each year. People 65 years old or older seem to be predominant (Cajita, & Han, 2016). HF patients admitted to this organization from all over the world. They have different levels in language, health literacy, payer, social status, and social determinants of health. Pediatric HF patients were excluded from this QI initiative.

Needs Assessment

  To provide the best care to the HF patient population, the organization incorporates AHA's guidelines in the direction of HF patient clinical management. AHA recommends the Target Honor Roll Measures, which cover the suggested HF medication, 7-day post-discharge follow-up, and the referral of 60-minute HF education. The DNP student collaborated with the hospital Heart Failure Management Committee to perform an internal assessment of existed HF patient management, and the finding shows that the organization has made an outstanding contribution to the recommended HF patient medication. Still, the rate of HF patients returned for a 7-day post-discharge follow-up appointment, and a 60-minute HF education referral did not meet the requirement of the guidelines. Therefore, the DNP student believes that it is an excellent opportunity to initiate a practical HF education approach to improve patients' understanding of HF and the compliance of early post-discharge follow-up. The educational approach will enhance HF management outcomes, including the reduction of 30-day readmissions. To plan for this QI project, the DNP student used the analysis tool of strengths, weaknesses, opportunities, and threats (SWOT) to evaluate all factors that may potentially impact the success of this HF education project. The SWOT analysis provides structure to eliciting internal organizational factors and external influences associated with this project (Davis-Ajami et al., 2014). Appendix K shows the results of the SWOT analysis.

Current Process

  The HF patient management process in hospitals is typically sophisticated and involves multiple components that require the leadership and cooperation of frontline staff from numerous disciplines to

implement. HF education regarding medication, diet, activity, medical follow-up, and self–care at home is an essential component of HF patient management.

There have been many HF education approaches tested, including video, navigator coordination, home visits, tablets, and easy-to-read material. The current HF education process in this organization is: (a) Information regarding HF medication, diet, activity, follow-up, and daily weight management provided to patients upon the new admissions included in a new admission package; (b) Ongoing HF education provided by the patient's care team when a new drug or a procedure is ordered; (c) Consulting cardiology NP from NP-led HF management clinic to assess and provide HF education to HF patients; (d) HF education provided as discharge instruction at the time of discharge; and (e) telemedicine. Variable success with current processes. To get with the GWTG-HF, the organization requires a different, more dynamic, interdisciplinary approach in HF education. This QI project will test the effectiveness of the interprofessional HF education approach.

Gap

There is a gap between the current HF education process and the recommendation of GWTG-HF. To consult a cardiology NP from the hospital HF Clinic who can assess and provide HF education to all HF patients before discharge home is unrealistic due to inadequate NP staff in the HF Clinic. HF education from nurses and physicians is inconsistent. Conditions not considered in preparing the HF education material included readability, CI, patient health literacy, and impaired sensory perception. Year to date, there were 23–40% of HF inpatients that have received and documented a session of 60-minute HF education, which is below the guideline recommendation. The percentage of 7-day HF patient post-discharge follow-ups does not meet the organization's goal of 80% or higher. Thus, HF 30-day readmission remains a top priority for the organization.

Stakeholders

For this QI project, the main stakeholders included the Board of Directors Life Members, Officers of the Board of Directors, Board of Directors, The Quality Improvement Committee, and The Heart

Failure Management Committee, selected implementation of cardiology units, patients, families, unit staff, and project team members.

Team and Delegation

This QI project focused on a collaborative education-based strategy designed to improve HF patient self-care competency, decrease HF 30-day readmissions for HF inpatient population. In particular, this QI was based on the characteristics and needs of HF patients to collaborate with services of clinical pharmacy, cardiac rehabilitation, nutrition, and cardiology to provide HF education holistically. This project brought different specialties together to provide a comprehensive HF education to participants.

Project-Driven Leader

The DNP student, a board-certified cardiology NP, led this interprofessional QI project. The role of the team leader was vital. The DNP student was responsible for the entire project, from formation to outcome dissemination. As a project leader, the DNP student effectively communicated with all levels of HF management services, had regular communication with the interprofessional team and the hospital Heart Failure Management Committee, and influenced other team members, and making team delegation appropriately.

Available Resources

This organization focuses on using rigorous scientific methods to explore nursing care, translate the latest evidence into nursing practice, and improve patient outcomes. This QI project followed the AHA HF management guidelines. The academic faculties, clinical preceptor, hospital Heart Failure Management Committee and nursing staff provided excellent support to this QI initiative. Multiple professions participated in this HF education program, including the departments of cardiology, cardiac rehabilitation, nutrition, and pharmacy. The unit nursing staff received training to assist the project implementation by distributing the flyers about the HF education class to patients and caregivers and assisted with patient transportation. The selected cardiology units supported the project's expense. The cardiology NPs endorsed the implementation of the entire project.

Cost/Return on Investment

Each year, there are 4500 HF patients admitted to this hospital, or about 400 HF admissions every month. The selected cardiology units receive about 200 HF patients every month, but only 125 patients were identified during the four weeks of implementation. During the holiday season, the patient census in the hospital is lower than usual. In the 60-minute HF education class, the class materials provided for each attendee included printed handouts, pen, and a folder for keeping all the HF information. The class occurred during office hours. As a result, there was no additional cost for labor. Based on this information, the estimated project budget was less than 600 dollars, actually cost was 562.50 dollars for the entire project (see Appendix M).

The return on this investment is hard to predict. Still, the recognition that HF education is one of the most potent interventions to improve patient knowledge and skills for self-care is well known (Rice & Betihavas, 2018). This QI project aimed to promote self-care behaviors and encourage compliance with treatment plans to decrease the rate of potentially avoidable 30-day readmissions. HF education, along with the follow-up calls, the engagement of nursing staff, and interprofessional team members, is essential to that end. Therefore, the successful implementation of this HF education project is highly rewarding.

Limitation

Factors such as the number of HF patients participated in the project, resistance to change, disease acuity, patient learning readiness, and the schedule conflicts between the HF education class and patient treatment activities that may influence the success of the project implementation. The predictor of low health literacy among HF patients was a disadvantage to the project outcome. Besides, the limited time to complete this QI project with only one cycle of the Plan, Do, Act Study (PDSA) project model may also be a limitation to address the electiveness of this HF education QI initiative.

Purpose

HF patients have a poor and undesirable level of quality of life, and there is a need to improve HF patient's self-care behavior and satisfaction (Akbari et al., 2019). There has been a growing interest in QI

with initiatives targeted at the HF population. This QI project aimed to incorporate the interprofessional team effort together with the teach-back approach to improving the overall outcomes of HF management in the project units. In line with the organization's goal, expectations of the QI included that at least 75% of the HF patients would receive 60 minutes of HF education; at least 70% of HF patients would adhere with 7-day post-discharge follow-up appointments, and there would be at least a 5% reduction in HF 30-day readmissions among the HF education participants.

Aim

By the completion of the HF QI initiative, the strategy of interprofessional HF education will improve the overall HF inpatient self-care competency. At least 75% of HF inpatients will receive a comprehensive HF education before discharge. There will be at least a 5% reduction in HF 30-day readmission. At least 70% of HF patients will comply with the early post-discharge follow-up recommendation.

PICOT

For adult HF patients, will the implementation of a nurse practitioner-driven interprofessional HF education project improve the deficit of HF patient education, compliance of 7-day post-discharge follow-up, and reduction of HF 30-day readmission?

Theoretical Framework

During the years 1959–2001, Dorothea Orem developed the Self-Care Deficit Nursing Theory, also known as the Orem Model of Nursing. Orem's Self-Care Nursing Theory is quite broad and widely applied in the nursing industry. Orem (2001) stated, "Nursing belongs to the family of health services organized to provide direct care to persons who have legitimate needs for states or the nature of their health care requirement" (p. 3). According to Orem, individuals would initiate and perform their self-care activities regularly to maximize their overall health and well-being. Orem believes that a better care outcome is from self-care. Orem suggests that nursing care and other external assistants should be reactive, not proactive, and support provided when individuals have lost their ability for self-care (Orem,

2001). In her Self-Care Theory, Orem addresses that everyone should be self-aware and responsible for their care and assist others if needed. Also, Orem pointed out that individuals are distinct (Orem, 2001).

The main points of Orem's theory are summarized as follows: (a) Individuals should be self-aware and maximize their capacity to perform their daily social and physical activities; (b) Nursing care or other external help should be reactive, not proactive; and (c) Individuals are distinct; therefore; the care provided should be specific.

Orem's concepts contributed significantly to the structure of this QI project. The DNP student used Orem's theory as the theoretical framework to initiate a collaborative HF education program to promote HF patients' self-care behavior, improve HF patients' quality of life, and decrease unplanned readmissions.

Quality Improvement Model

The PDSA Cycle (Plan-Do-Study-Act), known as Deming Cycle, initially used for manufactory improvement measurement, is a systematic process for gaining valuable learning and knowledge for the continual improvement of a product, process, or service (Demi.org, 2019). These four steps repeat as part of a never-ending cycle of constant learning and growth. PDSA finds a use for QI initiatives in the health care system, including nursing quality improvement projects. Zaccagnini and White (2014) noted that the use of a model could support the practice change through the systematic review of research and evidence to create a culture of using analysis in practice. Thus, the cyclical PDSA approach met the needs of a useful and practical QI model for this HF education program. Figure 1 is an illustration of the PDSA cyclical model.
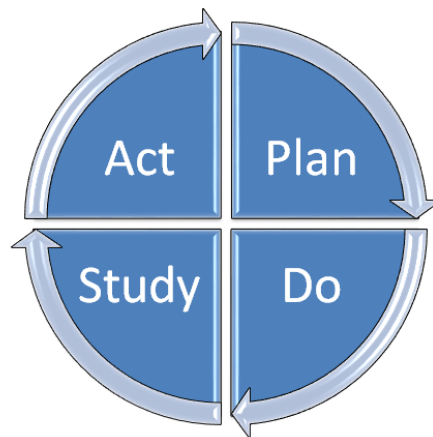
Figure 1. The PDSA cyclical model.

Presentation of Evidence

Review of Evidence

Methods

A selected literature review identified research sources about the outcomes of HF management through HF education. The databases used were from CINAHL, PubMed, and Google Scholar in the Texas Woman's University library. The database searches for articles were related to the topics of HF management, including HF education, post-discharge, follow-up adherence, and HF 30-day readmission rate. First, there was a process to streamline the search question into the main concepts by exploring separately the keywords and ideas.

When searching CINAHL, the application of the complete compound search term (heart failure AND education AND self-care) resulted in 582 returns. After removing the word (self-care) and replacing it with (30-day readmission), there was only one article shown. For searching in PubMed, (heart failure education AND readmission rate) were the search terms, resulting in 140 returns. Then, after customizing the text availability to full text, a publication within five years, language, and adult population on humans, the narrowed results identified 45 articles. In addition, supplementary Google and Google Scholar searches used only the internet domain sites with .edu and .org extensions.

In summary, a selected literature review helped to determine the best databases to use with relevant articles that discussed HF education and its outcomes. There were The keywords chosen to look for the studies were (heart failure, nurse education, discharge education, readmission or 30-day readmission, self-management, health literacy, Mini-Cog, cognitive impairment, heart failure knowledge deficits, transition programs, HF management, readmission, transitional care interventions, and mortality rates). The inclusion criteria for searching were randomized control trials, controlled trials, cohort studies, and case-control studies within five years of publication. The DNP student selected 26 articles, which related to the topic for further analyzing, citation, and the Literature Review Table (see Appendix P). The critical appraisal tool was used to determine these articles, which discussed the characteristics of HF patients, HF self-care, HF transition care, and current HF education approaches (Dearholt, 2012). Among

the 26 studies, eight were qualitative study or systematic review without meta-analysis, with an assignment to level III of evidence for implementation. There were six studies assigned to level I and level II, respectively, and there were experimental, randomized controlled trials (RCT) and quasi-experimental research. There were four studies identified as level IV and one as level V of evidence of practice, which provided clinical guidelines and expert opinion for HF patient quality improvement.

Patient Characteristics

HF patient characteristics is one of four themes summarized from the selective literature review. HF is challenging to manage and is associated with high readmission rates. While reducing HF patient readmission rates has become a national priority, it is valuable to examine the risk factors that are consistently associated with hospital readmissions. As a result, specific interventions can use those factors to target and improve HF care outcomes more efficiently. In a recent study, O'Connor et al. (2016) evaluated numerous patient characteristics and found variations in HF patient hospital readmission rates. The measured patient characteristics broadly include predisposing, enabling, and need factors. The predisposing factors cover sociodemographic and health beliefs, including gender, age, ethnicity, social network, and knowledge about health and healthcare services.

These are the enabling factors related to patients' financial and organization conditions, including income and health insurance. The need factors include prior health-care utilization and index-stay characteristics, comorbidities, health behavior, and other clinical factors. Studied in different depths, these some findings regarding their impacts on readmission, are not consistent or conclusive (for instance, sociodemographic factors). However, some well-studied factors, such as patients' need for medical care, have shown a consistent effect on hospital readmission rates. For example, the number of recent prior hospital admissions and a prior diagnosis of HF both raise the probability of readmission. On the other hand, the effect by many factors appear to be modest, and there is no single patient characteristic found to stand out as a critical contributor. The findings are consistent with the weak ability of existing models to predict readmissions. Meanwhile, it also highlights the challenge of developing successful interventions to reduce readmissions. To be both effective and efficient, the interventions may need to consider the

individual patient's clinical profile, incorporate as many as necessary patient characteristics, and customized based on generally designed practices.

       While it is evident that health behavior and comorbidities such as dementia contribute to HF patient care outcomes, it is also essential to review and address the effects of another closely related factor, cognitive impairment (CI). CI is highly prevalent among HF patients, and it significantly affects HF patient care outcomes, especially patient self-care (Agarwal et al., 2016). HF-related self-care involves behaviors intended to maintain healthy functioning, as well as decision-making about actions taken in response to symptoms and evaluation of the outcomes of those actions. The patients are independent individuals, and they should be self-reliant and responsible for their own care. Engaging in self-care makes patients learn about the condition and become active participants in the management of their illness, eventually leading to the improvement of HF outcomes (Orem, 2001)

       The self-care engagement requires a robust cognitive ability to learn, perceive, interpret, and make an appropriate decision (Hjelm et al., 2015). CI is associated with worse self-care, increased mortality risk, and increased hospital readmission risk. Consequently, it is crucial to identify CI in HF patients so that appropriate interventions can improve the patients' vulnerability. In practice, however, assessments performed during routine care are unlikely to detect cognitive dysfunction, which can impede HF self-management (Agarwal et al., 2016).

       HF management guidelines emphasize the need for routinely screening for CI (Patel et al., 2015). Nevertheless, there is a lack of a standard, brief, and sensitive screening instrument (Agarwal et al., 2016). The Mini-Cog assessment tool is among the multiple screening measures studied; the tool provides an ultrashort cognitive measurement of vital signs. Initially, the development and validation of this tool was a screening tool for dementia. However, the Mini-Cog assessment tool (Mini-Cog, 2019) also addresses cognitive domains of executive function and memory. There are three steps for this screening tool. Step 1: Three Word Registration; Step 2: Clock Drawing; and Step 3: Three Word Recall. The recommended cut point is less than 4 (< 4), as this value may indicate a need for further evaluation of cognitive status. Appendix O provides instructions for using the Mini-Cog screening tool. The results

suggested that the Mini-Cog tool might be useful for CI measurement in HF patients. Studies

demonstrated the usefulness of the Mini-Cog tool (Agarwal et al., 2016; Patel et al., 2015). Patel et al.

(2015) embedded the Mini-Cog as a part of routine clinical care during hospitalization for HF with

participating patients. As quantified by Mini-Cog's performance, there was a high prevalence of CI (23%

of cohort). In elderly patients, the prevalence is much higher (Agarwal et al., 2016). For example, 67.7%

of HF patients who scored lower than 4 in the Mini-Cog assessment demonstrated CI. During a mean

follow-up time of six months (range 0–16 months), patients with CI had significantly higher event rates:

48% of the patients were readmitted, and 3% died (Patel et al., 2015). Similarly, Agarwal and colleagues

found that HF patients with CI had a significantly higher 30-day readmission rate than did the other

groups in their study (Agarwal et al., 2016). By measuring the occurrence of readmission or mortality,

both studies have found that CI is associated with increased readmission or mortality risk.

   The Mini-Cog performance as an independent predictor of post-hospitalization risk in risk models

can improve both accuracy and risk reclassification. Still, CI seems to be under-documented in HF

patients (Agarwal et al., 2016). Fewer than 9% of the HF patients had documentation of cognitive

dysfunction in their medical records (Agarwal et al., 2016). Such under-documentation of CI in HF

patients may indicate a more significant risk of readmission for these individuals. Therefore,

incorporating CI screening by the Mini-Cog tool would be essential as part of HF patient management.

   Patients' health literacy level is a significant risk factor and potentially affects hospital

readmissions. Cajita and associates described that health literacy is the individual's capability to obtain,

process, and understand the necessary health information and services needed to make appropriate health

decisions (Cajita et al., 2016). Low health literacy affects millions of Americans. A retrospective analysis

conducted by Pudlo and his colleagues revealed that health knowledge deficiency is highly prevalent in

chronic HF patients (Pudlo et al., 2015). According to the findings by Cajita and colleagues, the

prevalence of low health literacy ranged from 17.5% to 97% in HF patients. On average, 39% of the study

participants had low health literacy (Cajita et al., 2016).

Importantly, by evaluating the impact of low health literacy on hospitalization in the HF population, studies have indicated that low health literacy is associated with an increased risk of readmission (Cox et al., 2017; Gilotra et al., 2017; Wu et al., 2016). Cox and colleagues used a simple tool, the 3-Question Brief Health Literacy Screen (BHLS), to evaluate the health literacy levels of HF patients. Their results demonstrated that patients with low health literacy had higher rates of 30-day unplanned health care service use after discharge (48.3%) compared to patients with adequate health literacy (34.9%). Gilotra's group investigated patient viewpoints on reasons for HF hospitalization and the preventability of admission and whether these factors play a role in HF management outcomes (Gilotra et al., 2017). Their study found that a patient's perception of the reason for the preventability of admission is related to 30-day readmission rates. Almost half of the patients thought their hospitalization was preventable, and these patients were less likely to be readmitted within 30 days. Factors such as family and social support, socioeconomic, patient comorbidities, and health literacy potentially impact patient hospitalization. The lack of knowledge was one of the most commonly noted reasons for HF patient 30-day readmission (Gilotra et al., 2017). Although this was a single-center study involving a potentially biased patient population, the unique perspective from the patients' side provides insights into patient-centric approaches for patient education and readmission prevention.

In consideration of the high prevalence of HF in the elderly population, Wu et al. (2016) further evaluated the interrelationship between age, health literacy, and health outcomes in HF patients. In their longitudinal study (Wu et al., 2016), collected baseline data, including clinical data and health literacy. Then, they tracked HF readmissions and cardiac mortality rates for two years. Results showed that health outcomes were significantly worse in patients who were 65 years or older and in those with low health literacy. This study also revealed that it was the health literacy, not the severity of an HF patient or which medications, mediated the effects of age on cardiac event-free survival (Wu et al., 2016). Even though there may be other unmeasured confounding factors, health literacy mediating the relationship between age and health outcomes in HF patients is undeniable. This finding suggests that in interventions for improving health outcomes in elderly adults with HF, consideration of a patient's level of health literacy

is appropriate. Hopefully, patients with low health literacy may benefit more, or at least the same, from educational counseling about self-care training.

Low health literacy contributes to worse health outcomes, and many variables could predict a patient's literacy level (Cajita et al., 2016). These variables include age, gender, race, and ethnicity, educational attainment, and cognitive function. However, there is currently no routine assessment of patient health literacy to guide discharge counseling and planning in HF patients (Cajita et al., 2016). The prevalence of low health literacy has a significant impact on care outcomes. It is essential to implement health literacy evaluation in HF patient care. Cox et al. (2017) have shown that BHLS is clinically useful and easily incorporated. This approach offers an example of the type of tool for potentially identifying high-risk patients who need clinical interventions.

Many patient characteristics are important risk factors, even though not each element has equal weight. Besides, there is no single patient characteristic found to stand out as a critical contributor. However, both cognitive impairment and low health literacy significantly affect patient self-care capability. Future HF management QI projects should address these issues. Considering the prevalence of low health literacy and CI among the aged HF patients, the QI project ensured the readability of teaching material at the maximum of 12th grade. The Mini-Cog screening tool was used to assess the cognitive function of aged 75 years old and older.

Self-Care Competencies

HF patient self-care competency was the second theme identified. HF is one of the most common causes of hospitalization and readmission; therefore, hospitals and professional societies are continually searching for successful programs for HF management, of which patient self-care/self-management is an essential part. Self-management is the mental and physical involvement in managing one's disease. Self-management includes problem-solving, early detection of signs of disease progression, and adjustment of medication and physical activity. HF patients often have many comorbidities that require different specialties involved in their care. The complicated health care instructions, medication regimen, and recommendations from various health care providers make the HF self-management more challenging. In

general, HF self-management includes many difficult and frustrating tasks, such as daily weight

monitoring, detection of worsening signs, medication adherence, and lifestyle adjustment.

Not surprisingly, HF patients' capability of self-care is closely associated with their readmissions

rate (Lin et al., 2016). Lin's study used two self-care assessment tools. One tool was the European Heart

Failure Self-care Behavior Scale (EHFScBS); the other one was the Self-Care Scale for Patients with

Heart Failure (EAC-IC). Among the studied sample, the lower the self-care score of HF patients, the

higher the number of hospitalizations. Incompetence in HF self-care resulted in 20% HF patient

readmissions. By way of contrast, improvement in self-management skills can decrease the chance of

readmission by 40% in one year. There was a correlation between self-care scores and the number of

hospital readmissions for decompensated HF. Also, of note, patient education and age were associated

with the self-care outcomes of HF patients (Albert et al., 2015; Lin et al., 2016; Rice et al., 2018).

It is essential to understand the critical factors in patient self-management so that better strategies

can improve patient self-management. Toback and associates report that both internal and external factors

influence HF self-management (Toback & Clark, 2017). According to Toback, internal factors are

intrinsic and more personal, including cognitive ability, health literacy, behavior change, and self-

efficacy. Thus, routinely screening patient's cognitive status, assessing patient's literacy, encourage

behavior change, and motivating self-efficacy should be helpful for HF patient management. The primary

external and general factors are the capability for knowledge and understanding, skill development,

socioeconomic status, therapy-related factors such as comorbid conditions, health care team factors, and

the health care system (Toback & Clark, 2017). Better self-management is the result of empowering

patients with knowledge; enhancing social support, screening, and treating comorbid conditions; engaging

with a multidisciplinary health care team, and providing supportive programs and resources (Lin et al.,

2016; Toback & Clark, 2017).

Most factors affect HF patients differently. However, to achieve better patient care outcomes,

there must be adequate consideration of both internal and external factors. Specific strategies can work by

changing multiple aspects at the same time. For example, patient education with support from

multidisciplinary specialists can address patients' needs for knowledge, help patients understand better about their disease and medication, and promote their adherence to a treatment regimen (Toback & Clark, 2017). Patient self-care is an essential part of HF management. It is also very challenging for HF patients because of its complicated nature, but the failure of self-care after discharge potentially increases the 30-day readmission (Oh et al., 2019). Thus, it is vital to consider the various factors so that the strategy applied can promote patient self-care effectively.

Transition Care and Alternative Interventions

Among the themes summarized from the literature review, the transition care and alternative interventions of HF management have been discussed widely. The design of transitional care interventions can prevent readmissions from one care setting to another. The levels of transition include hospital to home or hospital to other rehabilitation facilities. For HF patients, the level of care is essential in determining the effectiveness of disease management. Various transitional care interventions in practice have included home-visiting programs, structured telephone support (STS), remote telemonitoring, outpatient clinic-based interventions (both specialty and primary care clinics), and primarily educational interventions. A systemic review conducted by Feltner and her colleagues revealed that different programs had attained different efficacies and effectiveness in reducing readmission and mortality rates for HF patients (Feltner et al., 2014).

For example, a high-intensity home-visiting program conducted for 30 days reduced all-cause readmission rates. Over three to six months, home-visiting programs, and multidisciplinary heart failure (MDS-HF) clinic interventions reduced all-cause readmission. For HF-specific readmissions, home-visiting programs, and STS interventions are known to be effective. Further, there is insufficient evidence for the other programs. Home-visiting programs, MDS-HF clinics, and STS interventions produced a mortality benefit as well (Feltner et al., 2014). These results suggest that specific interventions such as a home-visiting program, MDS-HF clinics, and STS interventions should play significant roles in the design of transitional care interventions for HF patients.

The 30-day rehospitalization rate is a health care metric, and the requirement for value-based care calls to improve efficiency (CMS). Working to reduce the 30-day readmission rate, Palo et al. (2017) used the Patient Navigator Program to improve HF transition care outcomes. During this study, the monitoring of participants from admission to discharge occurred. There was at least one intervention tailored to meet patient health literacy and social needs given to the nurse telephone (NT) group. The study results showed that more HF patients returned for a post-discharge follow-up within 14 days of discharge and lowered the 30-day readmission rate in the intervention group (Palo et al., 2017). The study outcomes encourage the integration of NT into HF transition care and a personalized education approach to improve HF patient care outcomes.

Application of an integrated care approach for HF patients' transition care will improve HF patient transition care from hospital to home to avoid 30-day readmissions. However, according to Albert et al., current transitional care shows considerable heterogeneity or unevenly described in research designs, methods, study aims, and program targets. Bundled interventions are preferably selected. However, these methods demonstrate the shortcomings which prevent accurate evaluation of the efficiency and effectiveness of specific interventions. Therefore, there is a need for more HF transition care research to identify and establish best practices that can be broadly applied (Albert et al., 2015). Regardless, HF patient transitional care requires the effort from an interdisciplinary team. Transition care should include early identification of patient disposition, patient education, understandable discharge instruction, and timely follow-up after discharge. For the transitional care process to be productive, it requires both evidence-based interventions and quality improvement strategies for the continuum of patient care (Albert et al., 2015).

There have been tests of other attempts to improve HF patient clinical care outcomes. Among those tests, the most considered is motivational interviewing (MI), a person-centered communication skill set. This non-pharmacological approach addresses the challenge of health behavior changes and lifestyle modification for chronic disease management and prevention. As a non-pharmacological behavioral intervention, MI has become increasingly important because it involves patients as collaborative partners

and imparts a sense of support for those patients. Recently, a systematic review evaluated the impact of

MI on HF outcomes (Poudel et al., 2019). Many studies examined the effect on general self-care

behaviors (SCBs), specifically, physical activity, quality of life (QoL), and hospital readmission

prevention. Most studies have reported a positive impact of MI. Of note, readmission rates related to HF

numerically decreased for patients receiving MI, although statistically non-significant (Poudel et al.,

2019). Despite the heterogeneity in effect, the findings are consistent with other evidence suggesting the

potential of MI-based interventions to improve HF outcomes. The impact varies depending on sufficient

MI training and optimal application. Whether the ancillary condition of MI with other strategies, such as

improve patient health literacy by effective HF education, can result in more significant changes remains

a subject for further QI projects.

HF patients often undergo transitioning from one care setting to another, so the quality of

transitional care interventions is critical to prevent HF readmissions. Considering the significant variation

in transitional care approaches used in clinical practice, the use of practical HF education to help improve

self-care will have a positive impact on HF quality care and HF 30-day readmissions.

Heart Failure Education Approaches

The theme of HF education approaches is the last, but not least, that influenced this NP-driven QI

project. The chronic HF condition affects not only the patient's quality of life but also of their families

(Akbari et al., 2019). It is essential to educate and empower HF patients to engage themselves throughout

all the stages of care. There is significant data that supports the intervention of patient education. HF

education should provide to HF patients in any care situation for the same purpose of improving QoL and

reduction of cost. An HF education initiative focusing on HF patients who do not have health insurance in

the ED setting has shown optimal results in reducing HF 30-day readmission (Asrhana et al., 2018).

Nevertheless, the effectiveness of HF education recorded, there is a demand for a systematic,

more optimization approach needed. The American College of Cardiology Foundation (ACCF) and the

AHA have initiated the best practice guidelines, which recommend 60-minute comprehensive HF

education. This individualized HF education strategy includes diet, activity, weight monitoring, fluid

restriction, medication adherence, early post-discharge follow-up, and lifestyle modification reduces HF

30-day readmission (Rice et al., 2018).

There is still the need for an optimal method of educating HF patients, despite the recognition of

its importance. Most teaching approaches for HF education are verbal. Video education (VE), being cost-

effective and information consistent, may offer potential benefits. A recent study (Reid et al., 2019)

evaluated the effectiveness of supplementing general HF education with video education and patients'

satisfaction. Seventy recruited patients served as a convenience sample. These study participants

completed the Atlanta Heart Failure Knowledge Test and the Self-Care of Heart Failure Index. The study

subjects recorded their evaluations before and after receiving video education for measuring the HF

knowledge, self-efficacy, and self-care, respectively. The study collected data on the frequency of video

utilization and satisfaction with video education. There was a comparison of all-cause 30-day

readmissions data with a historical group. The results indicated that HF knowledge and self-care

maintenance scores increased significantly, and most HF patients were highly satisfied among the

participants (Reid et al., 2019). Another study similarly employed a multimedia approach for HF

education (Boyde et al., 2018). The multimedia intervention included viewing a digital video disc (DVD)

and verbal discussion supported by a written manual with a teach-back evaluation strategy, a method to

evaluate the effectiveness of teaching.

Comparing HF patients randomly allocated one-to-one to a general teaching approach or a

multimedia educational intervention, it has shown that the intervention group alone had reduced all-cause

unplanned readmissions. In the 365-day of post-intervention, 24 participants had unexpected hospital

readmission in the intervention group compared to 44 participants in the control group ($p = 0.005$). The

study demonstrated that a multimedia educational methodology is useful in lowering the all-cause

unplanned HF readmissions. When compared to the research conducted by Reid et al. (2019), which

tracked 30-day readmissions, there was no significant change. Boyde et al. (2018) took a longer-term (6–

12 months vs. 30 days) for the participants to change their behavior before tracking possible effects on

readmission rates. The difference between these two studies may be the result of enabling behavior

change through education, a behavioral change that usually takes time for realization. It will be helpful to understand further the mechanism that accounts for the impact.

Due to its poor prognosis, diverse problems, and complexity of treatment requirements, there is a need for a collaborative interprofessional approach to improve HF patient care outcomes. HF interprofessional education is a critical teaching approach for both care providers and patients. The collaborative environment provides practical skills and critical thinking from different professionals, thus effectively improving the learning experience.

Nursing care requires a team effort. A concept, TeamSTEPPS, is an evidence-based set of teamwork tools, aimed at optimizing patient outcomes by improving communication and teamwork skills among health care professionals (AHRQ, 2019). The application of TeamSTEPPS developed a simulation case scenario that targeted graduate students at the beginning of their clinical rotation. The intent was to engage learners from various health care professions in interprofessional teamwork. Using the designed team approach during the simulation, learners obtained the skills from their profession-specific education as well as theoretical knowledge while demonstrating interprofessional communication skills. The outcome of this approach was a positive acknowledgment from the participants. The participant learners affirmed that learning in a collaborative scene helped them increase their self-efficacy (Wilson & Vorvick, 2016).

The interprofessional approach can significantly improve patient education (Clarkson et al., 2017). Heart Failure University (HFU) designed an interprofessional outpatient educational program. The program aimed to provide HF patients with comprehensive education by a multidisciplinary team on subjects that included medications, nutrition, disease management, treatment options, stress management, and physical exercises. For the HF outpatients participating in HFU, there is a significant association between HFU attendees and 30-day hospital readmissions rates. The more HFU sessions attended, the fewer 30-day readmissions occurred (Clarkson et al., 2017). These findings emphasize the importance of interprofessional, education-based disease management programs for the HF population, which supported the DNP student's initiative in HF education.

Summary of Selective Literature Review

The completion of the selected literature review revealed that many factors potentially contribute to the outcomes of HF management. The characteristics of HF patients, competency of self-care, and levels of transition care, and HF education strategies have addressed ongoing HF management challenges. The literature recognizes the impact of HF education, and the importance of interprofessional and education-based HF education approach. In summary, patient education is an essential component in HF health management. As the first-line care provider, nurses usually lead the HF patient education; however, to ensure its maximal benefits, it requires engaging the multidisciplinary efforts. There is a need for more individualized and flexible methods that can deliver the education program more efficiently.

Patient education is worthy of the best efforts in inpatient care. Given the recognized significance of HF patient education, it is necessary to ensure the effectiveness and efficiency of the HF education method. While taking advantage of technological advances, such as multimedia and network, focus on engaging interprofessional support would be most beneficial. In conclusion, the selected literature research supports the QI initiative by the use of interprofessional HF education for improving HF patient care outcomes.

IRB Approval

The hospital and university Institutional Review Board (IRB) reviewed the project proposal. The IRB determined that the project did not involve human-subject research. Therefore, there was no requirement for a full IRB review or preparation of a consent form. The management of the selected units also approved the project proposal (see Appendices C, D, and E).

Methodological Framework

Model for Improvement

The purpose of this QI project was to provide a comprehensive HF education and practical skills to HF patients by the interdisciplinary team before discharging patients from a hospital setting. The PDSA model (see Figure 1) highlights the sequence of steps followed for the interprofessional HF education project at the selected organization. The PDSA model starting point begins a plan with the change idea and a series of hypotheses. These small-scale tests of change are central to iterative improvement in HF education as well as the overall bundled intervention in addressing HF readmissions and 7-day post-discharge follow-up appointments. PDSA cycles formed the foundation for the QI implementation and increased the chances of long-term success. Step 1: Plan, includes planning the details of the change to test and making predictions about the outcome. Step 2: Do, is an execution of the project, including the involvement of changes, data collection, and result analysis. Step 3: Study, the step of the study is a comparison between the collected data, and the anticipated outcomes. Any deviation from the expected data requires further evaluation. In this project, two out of three measures met the targets. The project improved the post-discharge follow-up adherence, and the number of HF patients received 60 minutes of HF education. However, the outcome of 30-day readmission was insignificant. Therefore, the QI initiative requires further investigation and revision. Step 4 Act, Act is the final step of PDSA. In this step, the decision to adopt, revise, or discard the change idea regarding this QI was determined. PDSA is a cyclical process; a new starting point based on an outcome is always the next step of the cycle. For its positive results, the organization adopted this QI project and continues to use it for HF inpatient education and other HF outcome management.

Integrated the Available Knowledge to Local Context

The review of the selected literature assessed the available knowledge on the nature of chronic HF, patient characteristics, transition care, HF self-management, and educational, behavioral, and psychosocial strategies. The literature revealed that effective HF education plays an essential role in HF patient management. Given the local problem of HF patient education, 30-day readmission rate, and 7-

day post-discharge follow-up, the DNP student integrated the current knowledge of HF management and

other available resources into the HF QI initiative. The project took the consideration of the uniqueness of

HF patient characteristics, provided understandable HF self-care information, practical skills, and ensured

the patients/caregivers retaining the HF knowledge, which was provided by the teach-back technique with

an interprofessional team effort over the four weeks of implementation.

Assessment of Barriers

The DNP student used the SWOT analysis tool to assess the strength, opportunity, weakness, and

threats of the initiative before the formation. Some barriers that identified over the implementation could

potentially influence the project outcomes. The DNP student believes that poor social support, families

/caregivers were not engaged in HF patient care made the difficulty of providing HF education. Besides,

there was a large portion of bedbound patients not able to participate in the HF class, thus missed the

advantage of interprofessional HF education. Moreover, the patient's schedules of other activities also

conflicted with the HF class. There were fewer admissions over the holiday season, which made the

project participant size smaller. A small number of post-discharge patients were able to reach out by using

the provided telephone number, which made the measures of the 30-day readmission and 7-day post-

discharge follow-up weak validated.

Implementation of Intervention

The intervention process of this QI project provided unique educational information to enhance

patients and caregivers with the knowledge, skills, and abilities in applying self-care at home. The

literature revealed that individualized HF education should be flexible, engaging, and include

multidisciplinary efforts in a collaborative scene to improve HF patient care outcomes (Clarkson et al.,

2017). This NP-driven QI project received support from multidisciplinary specialists, used a bundled

approach to addressing overall of HF management outcomes. The 60-minute interprofessional HF

teaching was a significant intervention; the teach-back technique and post-discharge follow-up phone

calls were also critical to the aims of the project. When HF patients are dealing with complex health

issues, such as chronic, co-morbidities, complex medical regimen, HF patients must understand the risk

of disease and the awareness of the need for significant lifestyle changes. To maximize the project

outcomes, the DNP student visited all HF patients and provided motivational interviewing to ensure their

learning readiness. Based on the interview with patients, the DNP student had a picture of individual

needs and modified the education content to promote patients' adherence to the recommendations of HF

management, which eventually resulted in changes in 30-day readmissions. The PDSA model guided the

entire project by linking the relationship between the steps of implementation. The DNP student followed

each step of the project algorithm, starting with the project planning to the project dissemination (see

Appendix I).

Plan: The first step of PDSA is Plan. Planning for a change, the DNP student collaborated

with the hospital Heart Failure Committee to perform an internal audit to identify and analyze the

existed problems related to inpatient heart failure management. The intent was to finalize the aim

statement and clarify project measurements. The SWOT analysis, project proposal, cost estimate,

assembly of the interprofessional project team, the team members' roles and responsibilities, and the

project timelines were completed during this step.

Do: The second step of PDSA is Do. In this stage, the project implementation, modification, data

collection, and documentation began to take place. In implementing this project, the DNP student first

identified all HF patients in the selected units by looking at the patients' problem lists in the Electronic

Medical Record (EMR) EPIC system and by attending the daily CCR in the units. An HF patient's

anticipated discharge day activities should ensure that the HF patient receives HF education before

discharge home. After identifying all HF patients, the DNP student met with every HF patient to assess

the learning readiness, needs, and to perform the Mini-Cog assessment for those patients who were aged

75 or older. During the individual meeting, the motivational interview promoted participation and

learning readiness. The purpose of the Mini-Cog screening was to identify the possibility of cognitive

impairment before giving HF education. However, most aged HF patients declined to perform this

screening test due to the intrinsic factor, such as fatigue, shortness of breath, and pain. For those who

completed this CI assessment, the results demonstrated a significant percentage of CI.

A 60-minute HF education was held in units A7 and A8 on Tuesdays and Thursdays. Schedule conflict was one of the barriers. To avoid the schedule conflicting, the teaching class was at 1:00 p.m. for unit A7 and 2:30 p.m. for unit A8. The day before the HF education class took place, patients and caregivers at the bedside received a flyer (see Appendix F) with the HF class information. To maximize project outcomes, the DNP student invited HF patients, their families, and their caregivers to attend this HF education, especially for those HF patients with cognitive impairment, to ensure both obtaining and understanding the HF information provided. Staff nurses assisted with additional needs, such as portable oxygen tanks or wheelchairs. The teach-back approach evaluated the effectiveness of HF education. Participants were asked to repeat and demonstrate back the information and skill provided to them. HF patients can absorb the information provided by proactively asking questions and demonstrating again the knowledge they received. Using a teach-back process facilitates the evaluation of learning and information retention.

The length of each HF education class was 60 minutes, and the QI project team provided a total of eight teaching sessions over the 30 days of project implementation. Project participants must attend at least one teaching class for 30 days of the project. Some HF patients attended more than once, but only one time counted for the data analysis. Each 60-minute team-teaching process consisted of a brief introductory course and four education sessions. The opening session took 10 minutes to welcome, introduce, and sign in with a validated phone number for post-discharge follow-up. As part of the sign-in process, attendees answered three questions to help identify their HF knowledge baseline: (a) How long have you had a diagnosis of heart failure? (b) Can you describe what heart failure means to you? (c) What do you usually do at home to take care of your heart failure issues? Answers to these questions provided helpful feedback so that the content and level of education presentation would more closely meet the individuals' needs.

In Session 2, a clinical pharmacist taught about the importance of a prescribed medical regimen. Beta-blockers, blood-thinners, angiotensin-converting enzyme inhibitors, antiarrhythmic, and some new heart failure medication are commonly prescribed drugs for HF patients. It is critical to address each category of HF medication for HF patients and their caregivers. The clinical pharmacist emphasized the

actions and adverse effects of each type of HF medication regimen to patients and their caregivers during

this session. HF patients and their families learned that medication helps to stabilize HF, improve

symptoms, and slow progression of the disease. They also learned about medication's side effects and that

these effects may be mild or more noticeable. Strategies for managing emergent situations, such as

bleeding from the prescription of warfarin and a fall incident from orthostatic hypotension, were

addressed by the clinical pharmacist.

A certified dietitian described what a heart-healthy diet is and why HF patients should be on a

low salt diet. The purpose of this session is to ensure that patients and their caregivers understand that

eating salty food can cause water retention, which increases heart workload and lung congestion; thus,

they can better understand how to change behavior. The dietitian educated HF patients to follow a diet

prescription, read food labels, prepare foods with less salt, and choose low-salt foods when dining out.

Participants received the information of the heart-healthy diet, knowledge of how to read food labels, and

why it is so important to prevent fluid buildup and control swelling in the body. Finally, the dietitian

provided tips regarding balancing nutrition intake while prevention worsening HF conditions from

inappropriate eating style with useful readability handouts to HF class participants.

After the nutrition session, it was a 10-minute cardiac rehabilitation teaching, which was provided

by a cardiac rehabilitation therapist. Exercise can improve HF's clinical signs and symptoms by helping

reduce high blood pressure, as well as stress and anxiety, all of which contribute to heart failure. The goal

for HF patients is to be active for at least 30 minutes per day most days of the week. When doing physical

activity, the HF patients should use the Borg Scale to rate their feeling and measure how heavy and how

strenuous the exercise is. The perception of exercising is based on physical sensations during physical

activity, including increased heart rate, respiration rate, sweating, and muscle fatigue. The Borg Scale is a

subjective measure and rating from 6 to 20, and the optimal level is 10-12 (CDC, 2019). The cardiac

therapist provided some reading material regarding the physical activity and demonstration of indoor and

outdoor exercises to HF patients and their caregivers during this session. A baseline blood pressure

should be measured before exercising. For HF patients with diabetes, the cardiac therapist suggested that

patients check the glucose levels before performing the activity.

The final session of this 60 minutes HF education class discussed the HF self-care knowledge and hands-on skills for HF patients use at home. The ability to perform the HF self-care is critical. After discharge from a hospital, HF patients should be able to identify the swelling, cough, fatigue, shortness of breath, and any abnormal feels and report these signs and symptoms to their care providers promptly. Daily weight is a vital component of HF self-care. HF patients and their caregivers should understand that a daily weighing can provide a guide to keeping body fluid balance stable. Keeping a log of regular weight, blood pressure, and symptoms will help their healthcare team evaluate the treatment. It will also help in making adjustments as needed. According to American Heart Association guidelines, a weight gain of 2 to 3 pounds in 1 day or 5 pounds in 1 week is critical. Over this session, the HF education attendees learned how to use a one-step scale for daily weight tracking. HF patients learned how to use the same One-Step Scale, keep the same amount of clothing, empty their bladder, and weigh themselves before eating breakfast. Maintaining an active lifestyle, avoid cigarettes, alcohol, recreational drugs, and adhere to prescribed medication is an essential part of HF management.

The class used the teach-back approach to validate attendees' understanding of the provided information and skills in a non-threatening way. While in the classroom, the educators addressed misunderstandings and concerns. For example, one HF patient stated that his diuretics disturbed his sleep, and he stopped taking his medication. During the conversation, the instructor learned this patient's prescription was for Furosemide 40 mg oral, twice a day. He scheduled his morning dose of Lasix at 04:00 a.m. and the evening dose at 10:00 p.m. after returning from work. The effectiveness of Lasix disturbs his sleep from the frequency of urination. Then, he stopped taking his medication and subsequently admitted to the hospital for shortness of breath from body fluid overloading.

As take-home information, all HF attendees received the handout "Self-Check Plan for HF management Colored Zone" (see Appendix B). The laminated color-coded printed information was convenient and intended for home use. There are three different colored zones, including green, yellow, and red, in this laminated color-coded printed handout. Each zone described the most commonly seen of HF signs and symptoms. The green one indicates that a patient maintains a stable condition without issues of gaining weight, shortness of breath, swelling, poor appetite, and daily activity. When moving to the

yellow-colored zone, an HF patient demonstrates the signs of activity intolerance, cough, weight gain, the difficulty of sleeping requiring additional pillow. When these symptoms occur, HF patients should examine themselves to see if the problem is too much fluid and salt intake or if they have skipped a dose of prescribed medication. The red zone shows the above concerns getting worse. HF patients suffer from shortness of breath, gaining a significant amount of weight, poor appetite, chest pain, not able to tolerate activity, and not able to lie flat due to the shortness of breath. At this point, HF patients should be aware that it is an emergent situation and should report it to their healthcare providers. HF patients reported the benefit of this self-check plan information, and they mentioned that the self-check plan was easy for them to use by attaching it to the refrigerators, where it is seen every day. By looking at the signs and symptoms described in the colored zones, the HF patients can quickly realize their worsening signs and contact their cardiologist or make an ER visit.

Over the Do stage of PDSA, the completion of each class was charted to EPIC in the designated site. The total of HF patients identified, and the number of participants in the HF teaching classes was summarized into a table form. Participants from the first two weeks of implementation were followed by using the telephone numbers they provided when HF patients signed in for the class to assess the effectiveness of the multidisciplinary HF education. A "post-discharge call script" guided the telephone follow-up (see Appendix H). The data collected from the telephone calls were completed and summarized on January 12, 2020 (see Appendix J). Due to the holidays, the QI team had difficulty performing the post-discharge follow-up. Only eight patients were able to reach out by using a telephone call. The DNP student used the data and the feedback from the eight patients to evaluate the HF patient 30-day readmission rate, and the 7-day post-discharge follow –up appointment analysis.

Study: In the Study phase of PDSA, analysis of the collected data occurred. The DNP student selected the chi-square test, pie, table, and graph to review and evaluate the project outcomes visually. Through the analysis, if the project achieved the expectations or any barriers during the project implementation were assessed. The final evaluation decided if the QI initiative was worth the investment, revise, discard, or adoption for HF inpatient management.

Act: During the Act phase, discussion of the project's dissemination and sustainability occurred. The QI team presented the project outcomes to the hospital Heart Failure Committee in March 2020. The project brought positive results in HF education, improved the 7-day post-discharge follow-up adherence, and reduced the HF 30-day readmission among the HF education participants. The Heart Failure Committee and cardiology unit management determined the project resulted in success and standardize the HF management improvement.

Following the pilot implementation in this QI project, the cardiology NP took over the HF education initiative to provide HF education on two of the cardiology units. 60-minute of HF education is held every Thursday at 1:00 p.m. and 2:30 p.m. in units A7 and A8, respectively. Every new HF patient admitted to these cardiology units will receive a new hospital inpatient admission package, and a flyer, which has the information about the HF education class regarding the time, location, and content that will be covered is inside the new patient package. The HF teaching class is in the unit conference room, which is next to the unit nurse station; therefore, participants find it easy to locate the classroom. The nursing staff supports the NP to help set up the class, including the preparation of the printed material, class setting, and patient transportation. The HF education participant's primary care nurse will help document the completion of HF attendance to the EPIC system, and the hospital HF management coordinator will locate and integrate this information to the data of hospital HF core measurement. A scheduler helps set up the post-discharge appointment with the hospital NP led HF management clinic. The NP led HF management clinic is free service to HF patients for post-discharge follow-up. The NP in the clinic reviews a patient's medication, lab results, and communicates with cardiologists if treatment adjustment is needed. This project does not replace other methods of HF education in this organization. The unit certified HF educator should continue to provide HF education at the bedside to benefit HF patients with impaired mobility. The RNs, physicians, and NPs provide and document ongoing HF education to HF according to the needs. For example, an HF patient is ordered for the invasive cardiac procedure with the left heart catheterization; thus, the physician and the patient's nurse should provide the information regarding the benefit and potential risk of this procedure to the patient as episodic HF education.

It will require some modification of this HF education approach before using it other medical-surgical patient units. The information regarding HF self-care with the left ventricular assist device should be added on to the project to benefit HF patients with LVAD implementation.

Proposed Cost, Time, and Resources Distribution

The QI project was implemented for 30 days and provided eight classes on selected units. The total cost for this QI project was $562.50. Each class cost about $70.00 and the money was mainly spent on patient teaching material. The number of participants in the HF education class determined the supplies and affected the total balance of the budget. With more participants, higher costs are necessary for the project, but in turn, additional participants proved the success of this project. The HF education schedules matched with the team member's working hours, so there was no extra cost for labor. Other resources, such as oxygen tanks and wheelchairs, were within the patients' admission expenses. Overall, the total estimated cost to complete this QI project was minimal (see Appendix M). It is essential to know what expenses might be incurred to continue these project outcomes. Therefore, the DNP student had a discussion with the unit director and the Hospital Heart Failure Committee regarding the potential cost, resources, and project sustainability. The implemented unit director believes that the project showed the desired outcomes, and the project will continue to improve the HF patient population. The reduction of the HF patient 30-day readmission will reduce preventable cost and improve HF patient satisfaction. Therefore, the unit management decided to adopt and provide financial resources to sustain the project on their units.

The timeframe for this QI project was from August 2019 to March 2020. Appendix L provides a detailed project timeline. The project team followed the schedules, prioritized the tasks, and completed the project promptly.

Measurement Methods

There were three quality measures set for this HF QI project (see Appendix N). HF patients will improve the awareness of HF risk and self-care skills after participating in the 60-minute HF education before leaving the inpatient care environment. As a result, the QI project will achieve the target measures:

- 75 % of HF patients will receive a 60-minute HF education before discharge.

- 70 % of HF patients will complete the 7-day post-discharge follow-up.

- At least a 5% reduction in 30-day readmission rate.

Data Collection

The DNP student used a secure method for saving the collected teaching information, and only the DNP student had access to the data files. A locker room with limited access secured the collected individuals' information. Charting to the designated site in EPIC occurred upon completion of the 60-minute HF education. The hospital HF management quality coordinator summarized and included the information to the overall hospital HF core measurements. Data collection began during the first HF class in November 2019 and continued until the completion of follow-up phone calls on January 12, 2020. For each teaching class, the DNP student identified the number of HF patients admitted to the units by reviewing the admission diagnosis, echocardiogram, and laboratory results. The DNP student collected data about the number of HF education attendees. The EPIC system documented the information about completing the 60-minute education and charted the individuals. For example, an 82-year-old Black female patient attended the HF teaching class. Based on her situation, the documentation for her was "Assessed patient's existing heart failure knowledge. The patient demonstrated appropriate heart failure knowledge and skills for self-care at home. Assessment of patient cognitive function used the Mini-Cog tool, which scored 4/5, thereby indicating there was no cognitive impairment for learning. The patient received a reinforcement of heart failure education regarding medication, diet, daily weight, activity, and medical follow-up. The use of the teach-back technique ensured that the patient was competent to adhere to post-discharge directives."

Participants from the first two weeks of HF class received the callbacks. After multiple attempts, only eight patients were able to reach out by the telephone calls and discussed the feedback of post-discharge. These measures provided statistical values to evaluate the effectiveness of this QI project. The information included patient mobility, CI, refused to participate in the HF class were included for the project evaluation.

Findings

Data Analysis

The data collected during this project included 7-day post-discharge follow-up adherence and reduction of 30-day readmissions. The HF patient's attendance rate in the interprofessional education program was also recorded. The project outcomes were compared with data collected before the project implementation, respectively. A chi-square test evaluated the association between the NP-driven 60-minute interprofessional HF education and the HF patient care outcomes (attendance, 7-day post-discharge follow-up adherence, 30-day readmission). The chi-square test is suitable to determine whether there is a significant statistical difference between the data before and post-implementation of the project. There were two categories of data classification: (a) One category was related to timing, i.e., pre-implementation versus post-implementation of the project. (b) The other category was related to each outcome, where attendees and non-attendees participated in the interprofessional education program, i.e., adhered versus non-adhered for 7-day post-discharge follow-up and readmitted versus not readmitted for 30-day readmission. Since the comparison was to examine the association between the two categorical data for each measurement, Fisher's exact test using a simple 2 x 2 contingency table was applied to carry out the calculation of each measured outcome. A p-value ≤ 0.05 was considered as significant.

Sample Size

The first HF education class took place on November 12, 2019, and the last teaching class completed on December 10, 2019. There were 125 HF patients admitted to the selected units over the 30-day project implementation. There were 52 (42%) HF patients aged 75 or older. Heart failure affects all ages, but the aged population is more vulnerable. Therefore, this aged portion shown in this project was consistent with the typical HF patient population. The patients' characteristics in terms of gender and race were also representative of the average local patient population (data not shown). Table 1 summarizes the data from eight teaching classes, including the total number of HF patients on selected units, and the number of participants, the aged portion, Mini-Cog assessment, and the conditions/reason for those who did not attend the course. Figure 2

illustrates the details of the HF patients in percentage. The information was used to test if the interprofessional

HF education achieved the project objectives and the aim statement.

Table 1

Data from Eight Training Sessions

60-minute HF Education Data								
Date	Total HF	Class attendee	Bedbound /critical ill	Refused/no motivation	Confused HF	75 yo and older	Mini cog*	Off unit	Isolation
11/12/2019	11	5	3	2	1	4	1(-)	0	0
11/14/2019	21	4	6	5	6	6	1(+)	0	0
11/19/2019	17	2	6	5	1	6	1(-)	3	0
11/21/2019	8	3	0	1	1	3	0	2	1
11/26/2019	16	7	4	1	2	6	1(+),1(-)	1	1
12/3/2019	18	6	7	1	1	9	0	2	1
12/5/2019	17	6	5	2	2	11	1(-)	2	0
12/10/2019	17	6	2	5	2	7	1(+),1(-)	2	0
8 sessions	125	39	33	22	16	52		12	3
Percentage		31.2%	26.4%	17.6%	12.8%	41.6%		9.6%	2.4%
* Screened 8 and 3(+)/8 positive for cognitive impaired								
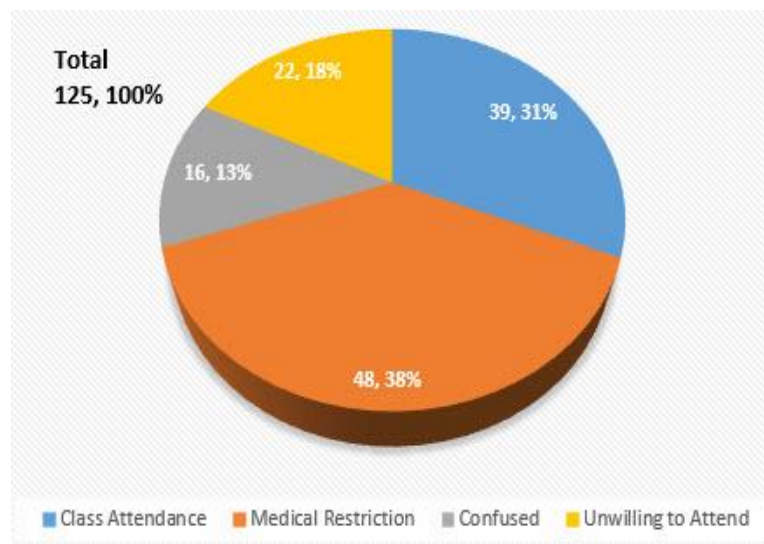
Figure 2. The 125 HF patients and their components.

Evaluation Criteria

The change regarding the three measures discussed during the session about "Measurement Methods" is

the key indicator to assess the success of this QI project. Other indicators, such as the satisfaction of inpatient

experience showing in the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey, evaluated the outcome of this NP-driven interprofessional HF education program.

Results

Primary data included the number of attendees for the 60-minute education for the whole four weeks of implementation. Out of 125 total HF patients who identified on the units during the four weeks, 39 patients participated in the 60-minute interprofessional HF education. Participants from the first two weeks of HF education class were called back to evaluate the incidence of 30-day readmission and the compliance of 7-day post-discharge follow-up. Even though multiple attempts were tried, there were eight participants reach out and provided feedback about the post-discharge experience, including if they completed the post-discharge follow-up and readmitted to an inpatient setting. The number of declined HF education classes, patients aged 75 or older, HF patients with cognitive impairment, critically ill, bedbound, taken out for other activities, and patients on infection disease isolation status provided secondary collected data for analysis.

The descriptive statistics were selected for the Data summarization. The Chi-squared statistical analyses were determined as an appropriate tool to evaluate the differences between the data from the intervention of the comprehensive HF education project and the baseline data. The components of 30-day readmissions, 7-day post-discharge follow-up, and the number of HF education receivers among the HF education participants were used for the project evaluation. There was a comparison of project outcomes and acceptable change. There were 125 HF patients identified in the targeted units over 4weeks of implementation. Among 125 HF patients, 64 were unable to attend the education sessions due to 33 patients were bedbound or critically ill, 15 patients were off-unit or isolated, 15 patients were cognitive deficit, and one patient does not speak English. Among the 61 patients who were capable of participating in the education, i.e., not restricted by a medical condition or language barrier, 39 (63.9%) attended the program, and 22 (36.1%) patients refused to participate in this HF education project.

Following the completion of their education, participants from the first two weeks received telephone calls. However, it was only possible to reach out to eight patients. Speaking by way of the telephone, these patients provided feedback about how they had applied the knowledge and skills for self-care at home. Through

the telephone contacts, the DNP student was also aware that among the eight patients, seven patients (87.5%) had

a 7-day post-discharge follow-up. Unfortunately, one of these follow-up patients died. Only one of the eight

patients was readmitted to a hospital within the 30-day post-discharge period. That readmission was due to

shortness of breath. Therefore, the QI revealed positive outcomes in the percentage of 60-minute HF education,

7-day post-discharge follow-up adherence, and a reduction in 30-day HF patient readmission. Figure 3 illustrates

a comparison of the implementation outcomes for patient attendance with the pre-implementations data.
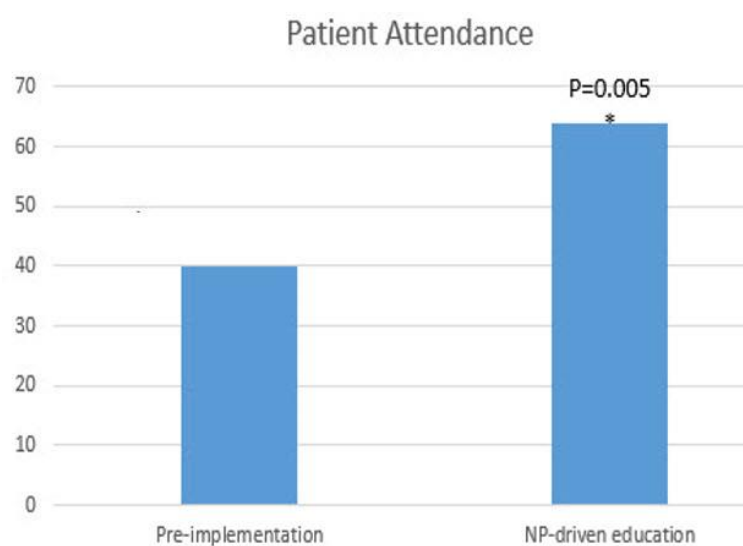
Figure 3. Participation in the NP-driven program.

The pre-implementation data shows that, at most, 40% of all HF patients received and

documented the 60-minute HF education. However, the outcome revealed that the effectiveness

of NP-driven HF education improved HF patient education participation among the HF patients

admitted to the cardiology units over 30 days of implementation.

Also, before implementing the QI project, 65% of the HF patients completed the 7-day post-discharge

follow-up appointment. The project outcome revealed the effectiveness of NP-driven HF education regarding

this measure among the HF participants, seven out of eight patients (87.5%) reported the completion of post-

discharge follow-up. Figure 4 illustrates the improvement.
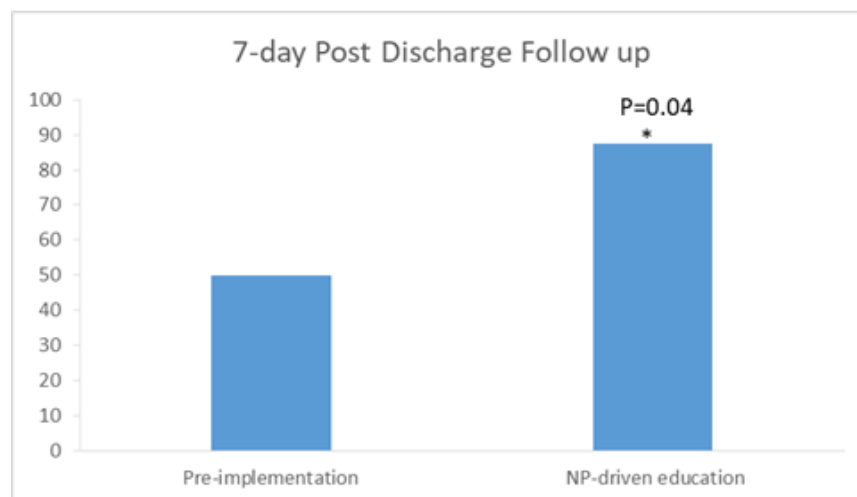
Figure 4. NP-driven education significantly improved a 7-day post-discharge follow-up rate

A review of the baseline data showed that the 30-day readmission rate was 20% for both cardiology units. The telephone follow-up reported that one of the eight patients (12.5%) was readmitted to a hospital within 30 days of discharge. This result was compared with the baseline, i.e., 20% of the 30-day HF readmission rate. The project outcome regarding the measure appears to be better than the pre-implementation data even though not as significant with $p = 0.606$, as shown in Figure 5.
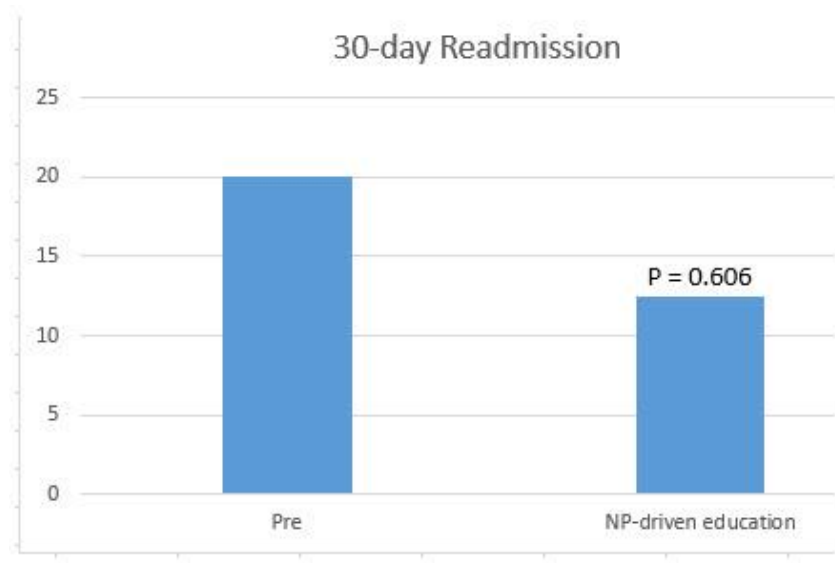
Figure 5. The NP-driven HF education project reduced the patients' 30-day readmission rates.

The expected outcomes of this QI project were at least 75% of the heart failure patients would receive 60-minute HF education, at least 70% of HF patients would comply with 7-day post-discharge follow-up appointments, and there would be at least a 5% reduction in HF 30-day readmissions.

The NP-driven HF education project decreased the 30-day readmission rates in 60-minute HF education participants. Before the implementation of the NP-driven program, the 30-day readmission rate was 20% on both cardiology units. Among the eight patients who were called to follow-up on the post-discharge situation, only one patient (12.5%) was readmitted to a hospital within 30 days of discharge due to having shortness of breath. This result appears to be better than the pre-implementation rate, even though not as significant ($p = 0.606$). A maximum of 65% of the HF patients completed the 7-day post-discharge follow-up appointments before implementing the QI project. The project outcome revealed the effectiveness of NP-driven HF education, which brought the score up to 87.5% ($p = 0.04$). In the project units, the rate of 60-minute HF education receivers was only 40% before the implementation of the NP-driven program. By a chi-square statistical analysis, the post-implementation rate was 63.9% ($p = 0.005$). The program improved the HF education measure but did not meet the expectation (75%). Even though the qualitative data, such as patient satisfaction, was not one of the three measures in the Metrics Grid, the HCAPHS score was improved significantly during the project implementation time. Over the unit leadership rounding, HF education participants reported that the project provided them with helpful and practical information.

Barriers/Limitation

The DNP student identified some barriers after the project was implemented, such as schedule conflicts, anxiety, pain, CI, poor motivation, bed-bound, and lack of family involvement. Of the 125 HF patients, 22 HF patients refused to participate in the 60-minute HF education. These 22 HF patients did not have impaired mobility or lacked cognitive function. Instead, they refused to attend the 60-minute HF education because of no motivation to learn. Some of the barriers, such as the schedule conflict, were identified and minimized before the project implementation. The DNP student provided a motivational interview individually before the HF education class to promote the learning. Still, the portion of non-participation

negatively influenced the project's outcome. The patient's literacy, disease acuity, age, mobility, and language possibly influenced the QI project outcomes. Some of the barriers were addressed before the project implementation. For example, the Mini-Cog assessment was performed for cognitive function assessment to ensure the effectiveness of learning for aged 75 and older.

Moreover, HF patients have a high anxiety level, which impairs their cognitive abilities to hold information and makes the thought process less effective. Emotional support is universally inadequate for chronically ill HF patients. In this QI project, the majority of identified HF patients did not have any family involvement with their care. Lack of motivation in HF patients is evidence of pain, fatigue, shortness of breath, fear, and anxiety. The final data indicated that only 31% of the identified HF patients attended the group HF education. There were 26% of the HF patients who were bedbound or critically ill. Almost 17% of HF patients showed no motivation to learn. Nearly 47% were aged 75 or older, and 12% of HF patients had cognitive impairment.

A literature review showed that patients' health literacy level is a significant risk factor for hospital readmissions, and health literacy is associated with better HF-related quality of life (Cajita et al., 2016). Thus, the content discussed in the 60-minute HF education class met the individuals' needs by following the AHA guidelines and organization HF education booklist. The design of the educational materials provided Flesch-Kincaid readability of 70–60, thereby making the English content understandable to readers with eighth or ninth-grade comprehension levels. Appendix G contains a copy of the HF education in plain English. This education handout highlighted the hospital HF education booklist (see Appendix A). Although the program has shown good signs as a quality improvement program, to be more convincing, there should be testing for a longer time and with more patients.

Discussion

The internal audit showed a 20% HF 30-day readmission in this organization. The HF 30-day readmission rate reported in the literature varies and ranges from 20–25% for inpatient settings. The data from the post-implementation of interprofessional HF education was 12.5% for HF education participants. Moreover, 23–40 % of the HF patients in this hospital received the 60-minute HF education before being

discharged home. This QI project improved this measure by over 63%. Furthermore, over 87% of the HF

participants returned for the 7-day post-discharge follow-up appointment, which was an improvement over the

65% pre-implementation data.

Of the 125 HF patients admitted in the study units, only 39 participated in this study. Nearly 40%

did not participate in this education program due to their medical conditions, such as impaired mobility.

The education sessions can be more flexible in ways that will accommodate more patients' situations.

This QI implementation did not provide language support to patients, causing one Filipino speaker to be

unable to take advantage of the education. An additional 17.6% of the patients refused to participate in the

education program. It could have resulted from the nature of chronic HF patients, who often experience

depression. For those patients, there is a need for more effective communication. Future HF studies can

focus on depression screening to assess for learning readiness.

From 125 HF patients on the units over the project implementation time, more than 40% of the

HF patients were age 75 years or older. The patient's gender was not considered for data analysis. The

Mini-Cog assessment tool helps determine the cognition capability of older patients (Agarwal et al., 2016;

Patel et al., 2015). Cognitive engagement is essential for the education program to be effective. In this

pilot period, however, for this project, the Mini-Cog screened only eight elderly patients. Three of them

(37.5%) showed cognitive impairment and were excluded from the project. It is worth further

investigation to make clear whether and by how much the Mini-Cog score impacted the outcomes of

education in terms of the 7-day post-discharge follow-up and 30-day readmission in this pilot project. The

possibility that a systematic assessment using Mini-Cog would enhance the education program remains

for future exploration. Moreover, the NP-driven interprofessional HF education program did not achieve

all of the expected goals, even though the program brought positive outcomes to the organization.

Conclusion

HF is the most prevalent cardiac issue, and it is a burden to individuals, families, and society.

Inpatient HF education programs have become the focus of most acute care hospital's quality initiatives.

There is a variety of HF education methods. Still, the literature review demonstrated that there is a lack of

quality studies to validate a gold standard approach for HF inpatient education. American Heart Association guidelines recommend that HF patients and their caregivers should receive individualized instruction and counseling to emphasize self-care by a team approach. Guidelines also recommend that HF education should respond to current HF knowledge, patient needs, and patient perception of change.

Notwithstanding the application of varied HF education strategies, the literature suggests that there are limitations currently to using an interprofessional method to measure the quality of HF education. Therefore, the promotion of HF patient self-management outcomes requires that HF patient education as an integral component. When designing education programs, consideration of multiple factors is necessary, including patient literacy level, cognitive situation, and other patient characteristics. The duration of the pilot QI project was one month. Still, it showed improvements in the number of HF patient education, 7-day post-discharge follow-up, inpatient experience, and HF 30-day readmission reduction. This quality project required minimal cost and resources throughout the organization. This HF education initiative demonstrated its efficacy and potentials for further HF education projects.

Recommendations and Implications for Practice

Implications for Practice

HF readmission is a national healthcare issue for society, hospitals, patients, and families. Living with HF conditions is challenging, requiring behavioral, lifestyle changes, medication adherence, and self-care ability. Adaption of recommended lifestyle needs to be reinforced and assessed regularly to ensure the patient is following the treatment plan. This QI project followed the American Heart Association's GWTG-HF, Orem's self-care theory, and guided by the PDSA model to provide comprehensive HF education on HF patients on selected units. From the completion of this project, both project participants and project team members have benefited greatly in the knowledge of HF patient management. However, a large percentage of HF patients refused to participate in the HF education class. The reasons to refuse to participate in the HF class were varied. Sleepiness from pain medication, shortness of breath, fatigue, immobility, and depression would be the characteristics of HF disease and the reasons for the absence of learning. The nature of HF disease would potentially have implications for future HF education project design. For the best education outcomes, the DNP student recommended that HF education should consider learning readiness, depression and cognitive function assessment, and HF education enforcement.

DNP Implication

The Doctor of Nursing Practice (DNP) Essentials provided directions for the development of this QI project. The DNP practicum was the unique opportunity to enhance integrating the nursing concepts into realistic patient care. This project aimed at the needs of HF patients and showed beneficial effects on targeted measures. The completion of this scholarly project demonstrates the advanced levels of the leadership role in designing evidence-based interventions and evaluating practice outcomes of the author of this professional paper. This QI project addressed the critical points of DNP Essentials I, II, III, VII, and VIII, which are described and summarized by the American Association of Nursing (AACN, 206). This multidisciplinary HF educational method allowed the DNP student to assess the current strategies of HF patient management and identified the gap for the implementation of the NP- driven interprofessional

quality improvement project on the HF patient population. The DNP student followed the HF

management guidelines, used the PDSA model and Orem's self-care theory, effectively communicated at

the hospital level and within the professional team, and established a therapeutic relationship with

participants during the project implementation. Finally, the DNP was able to analyze the project findings,

identified the barriers, and sustain the positive outcomes of the QI project.

Project Sustainability

The QI project improved the number of HF patient education, 7-day post-discharge follow-up

adherence, and reduction of 30-day readmission among the project participants. The organization adopted

it as part of the HF patient management strategy. The cardiology NP continues to provide the 60-minutes

of HF education every Thursday at 1:00 p.m. and 2:30 p.m. in units A7 and A8.

Application to Other Cardiology Unit

This QI project took place in two of three cardiology units, A7, and A8. Unit F11, which was not

engaged in the HF project, manages HF patients with LVADs. To teach HF patients with an LVAD

implementation, the HF education information used for the pilot units required some modification.

The DNP student discussed the intent of project dissemination with the educator and director on

F11. There is an agreement to implement this project after revising the teaching materials and after

control of the Coronavirus (COVID) infection.

Methods of Dissemination

Dissemination of the outcomes of this QI project can be both internal and external. The DNP

student shared the experience and the project outcomes with the project team and unit staff in March.

Sharing the positive results of the project will potentially motivate more nurses/NPs to get involved in

future nursing initiatives and scientific innovation.

A presentation of this project will occur at Texas Woman's University's Student Creative Arts

and Research Symposium. However, due to the COVID-19 prevalence, the date and time of this

presentation are pending. Additionally, the NP has submitted the abstract of this project to the journal of

the Heart Failure Society of America.

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Appendix A:

Organization Heart Failure Patient Education Booklist

HEART FAILURE
PATIENT EDUCATION

HOUSTON
Methodist
DEBAKEY HEART &
VASCULAR CENTER

Appendix B:

Self-Check Plan for HF Management Colored Zone

Appendix C:

Houston Methodist IRB Review

HOUSTON
Methodist
LEADING MEDICINE

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October 22, 2019

TO: Lixian Luo, MBA, MS, AGACNP-BC, APRN

SUBJECT: HMRI Determination of Not Human Subject Research: A Nurse Practitioner Driven 60-Minute Interprofessional Heart Failure Education Improves Patient Care Outcomes

Based on the information and protocol provided, the HMRI IRB has determined that the project referenced above does not meet the definition of Human Subject Research per 45 CFR 46 and does not require prior IRB review and approval at Houston Methodist.

Please understand that should your protocol change in any way, your new protocol will need to be resubmitted for review and a new IRB determination made before any data collection can begin.

If you have any questions, do not hesitate to contact me. Best of luck on a successful quality improvement project!

Sincerely,

Shannan Hamlin, PhD, RN, ACNP-BC, AGACNP-BC, CCRN, NE-BC
HMRI IRB Designated Member

Appendix D:

Study Unit Approval Letter

Methodist
DeBakey Heart Center
Affiliated with Baylor College of Medicine

6565 Fannin
Houston, Texas 77030
713-DEBAKEY
www.debakeyheartcenter.com

October 24, 2019

To Whom It May Concern,

I have reviewed Ms. Lixian Luo, MBA, MS, AGACNP-BC APRN project titled: " Nurse Practitioner-Driven 60-Minute Inter-Professional Heart Failure Education: Improves patient Care Outcomes" The expected outcomes are scientifically sound and will yield valuable information. Without reservation, I support Ms. Luo's project and its implementation on my departments: ALKEK 7 & ALKEK 8 Cardiology Medical at Houston Methodist Hospital.

Please let me know if you have any questions.

Sincerely,

Cecilia Alalay, RN, MSN, CVRN, CNML

Director Alkek 7 & 8 Medical Cardiology

Houston Methodist DeBakey Heart & Vascular Center

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houstonmethodist/heart

DeBakey Educat

Appendix E:

Texas Woman's University IRB Approval Letter

IRB #: IRB-FY2020-95

Title: A NURSE PRACTITIONER-DRIVEN 60-MINUTE INTER-PROFESSIONAL HEART FAILURE EDUCATION IMPROVES PATIENT CARE OUTCOMES

Creation Date: 11-1-2019

End Date:

Status: Approved

Principal Investigator: Lixian Luo

Review Board: TWU IRB - Houston

Sponsor:

Study History

Submission Type	Initial	Review Type	Exempt	Decision	No Human Subjects Research

Key Study Contacts

Member	Donna Quin	Role	Co-Principal Investigator	Contact	dquin@twu.edu
Member	Lixian Luo	Role	Principal Investigator	Contact	lluo@twu.edu
Member	Lixian Luo	Role	Primary Contact	Contact	lluo@twu.edu

Appendix F:

60-minute HF Education Flyer

Appendix G:

60-Minute Interprofessional HF Education

Basic knowledge of HF and self-care (Page 64-78, Heart Failure Patient Education, Houston Methodist Debakey Heart Vascular Center)

Heart failure is a chronic, progressive condition in which the heart muscle is unable to pump enough blood to meet the body's needs for blood and oxygen. The heart cannot keep up with its workload.

Diagnostic tests/lab: Echo, heart catheterization, blood test

Cause of HF: Hypertension, CAD, DM, kidney disease, COPD, and other genetic issues

Symptoms and signs: use your self-check plan handout

- Shortness of breath (also called dyspnea)
- Persistent coughing or wheezing
- Buildup of excess fluid in body tissues (edema)
- Tiredness, fatigue
- Lack of appetite, nausea
- Confusion, impaired thinking
- Increased heart rate
- Depression

Living with HF

- Daily weight
- Activity
- Take medication as prescribed
- Heart-healthy diet, fluid restriction
- Medical follow-up

Summary

- Keep a daily log of your weight, blood pressure, and heart rate using the tracking sheets
- Use the dietary recommendations for following a low salt diet
- Know your fluid restriction
- Know when to call the doctor by using your handout color zone as a guide
- Know whom to call
- Follow-up with your doctor's appointments as scheduled
- Take your medications as directed
- If you smoke, use available community resources to help you stop and avoid second-hand smoke

Medication: Discuss the action and side effects of HF medication.

The goal is establish relationships and process with clinical pharmacy that would allow for continued monitoring of patients to ensure they are following the medication directives in order to bridge the gaps in medication adherence as the patient transitions from the hospital to home and ensure ongoing monitoring of medications effectiveness and the need for changes.

(Page 20-23, Heart Failure Patient Education, Houston Methodist Debakey Heart Vascular Center)

- ACE Inhibitors: example: Lisinopril, Enalapril, Ramipril
- Aldosterone Antagonists: Spironolactone

Appendix G (cont'd)

- Angiotensin Receptor Blockers: Losartan, Valsartan
- New HF medication: Angiotensin Receptor-Neprilysin Inhibitors (ARNIs): Sacubitril/ valsartan & IfChannel Inhibitor: Ivabradine
- Beta-Blockers: Carvedilol, Bisopolol, Metoprolol succinate extended release (Metoprolol CR/XL), Carvedilol CR
- Antiarrhythmic: Amiodarone, Dronedarone
- Digoxin
- Diuretics: Furosemide, Bumetanide
- Vasodilator: Hydralazine and isosorbide dinitrate
- Blood-thinners: Eliquis, Warfarin, Xarelto, Pradaxa
- Medication to avoid:
- HF need to be particularly careful when taking nonsteroidal anti-inflammatory medication (NSAIDs)
- Talk to your cardiologist before taking any Herbal medication and home remedies

Diet

(Page 26-38, Heart Failure Patient Education, Houston Methodist Debakey Heart Vascular Center)

Daily sodium recommendation for HF patients

- Mild HF: Limit sodium intake to 3000 MG or less per (1/1/2 teaspoon per day)
- Moderate to severe HF patients: Limit sodium intake to 2000 mg or less per day (1 teaspoon per day)

Daily lifestyle recommendations regarding sodium intake

- Follow your diet prescription
- Read food labels
- Prepare foods with less sodium
- Choose low-sodium foods when dining out

Fluid restriction

- Commonly HF patients will have 2 liters of fluid in 24 hours to help lessen congestion and the need for additional diuretics.
- Plan out ahead to time the amount of fluid that you need to take with your medication as well the fluids that you will drink with your meals.
- Do not forget to include the fluids in the foods you eat, particularly soups and broths.

Exercise and activity (Pages 42-49, Heart Failure Patient Education, Houston Methodist Debakey Heart Vascular Center)

- Exercise can improve HF symptoms and feeling better. It helps reduce high blood pressure, stress, and anxiety. Start slowly and gradually build intensity and duration. The goal for most of HF patients is to be active for at least 30 minutes per day most days of the week. You can accumulate 30-minutes throughout the day including aerobic activity, strength training, or muscle building.
- Borg scale: range from 6-20. Level 6 indicates no exertion at all. 20 is maximal exertion. The goal is to strive for levels 11-12. Try not to overexert yourself and listen to your body.

When should you not be more active?

- Avoid with shortness of breath at rest or more heart failure symptoms than usual
- Avoid with a fever, infection, or illness
- Avoid with chest pain
- Watch signs of overexertion during activity
- Be aware of shortness of breath that does not get better when you decrease or stop activity
- Be aware of chest pain or tightness or irregular heart rate

Appendix H:

HF Post-Discharge Follow-up Phone Call Script

Introduction:
CALLER: Hello Mr./Ms. _____. I am Lixian Luo, a nurse practitioner from Houston Methodist Hospital. I am one of the HF educators for the 60-minute HF education you attended before you were discharged home. You may remember being told you would receive a call checking in on things. I am hoping to talk to you about your medical issues, see how you are doing, and see if there is there is anything I can do—to help you? Do you mind if I ask you a few questions so I can see if there is there is anything I can do—to help you?
Is this a good time to talk? It will probably take about 10-15 minutes.

> **If yes,** continue.
> **If no,** CALLER: Is there a better time that I can call you back? If patient refuses, document it.

Health Status
CALLER: Before you left the hospital, you, your family, or your caregiver attended the 60-minute HF education. Are the knowledge, skills, and information which you received helpful for you to take care of your heart failure condition at home?

> **Yes:** Continue
> **No:** Explain

CALLER: Before you left the hospital, did you have an appointment set up for a 7-day post-discharge follow-up appointment with our Heart Failure Clinic?

> **Yes:** Did you complete your appointment as indicated? When?
> **No:** Explain: forget? No transportation? Other reasons?

CALLER: you were discharged from Houston Methodist Hospital on (date ____). Were you readmitted to a hospital during this time frame?

> **If yes:** What were the causes of your readmission?
> **If no,** continue . . .

CALLER: Have you been using the HF Color Zones, which you were given in the HF education class, to monitor your sign s or symptoms of HF at home? Is it helpful for you to take care of your HF condition at home?

> **If no:** explain
> **Yes:** continue…

Clarification of Appointments
What is the next appointment you have scheduled? Whom is your appointment with?
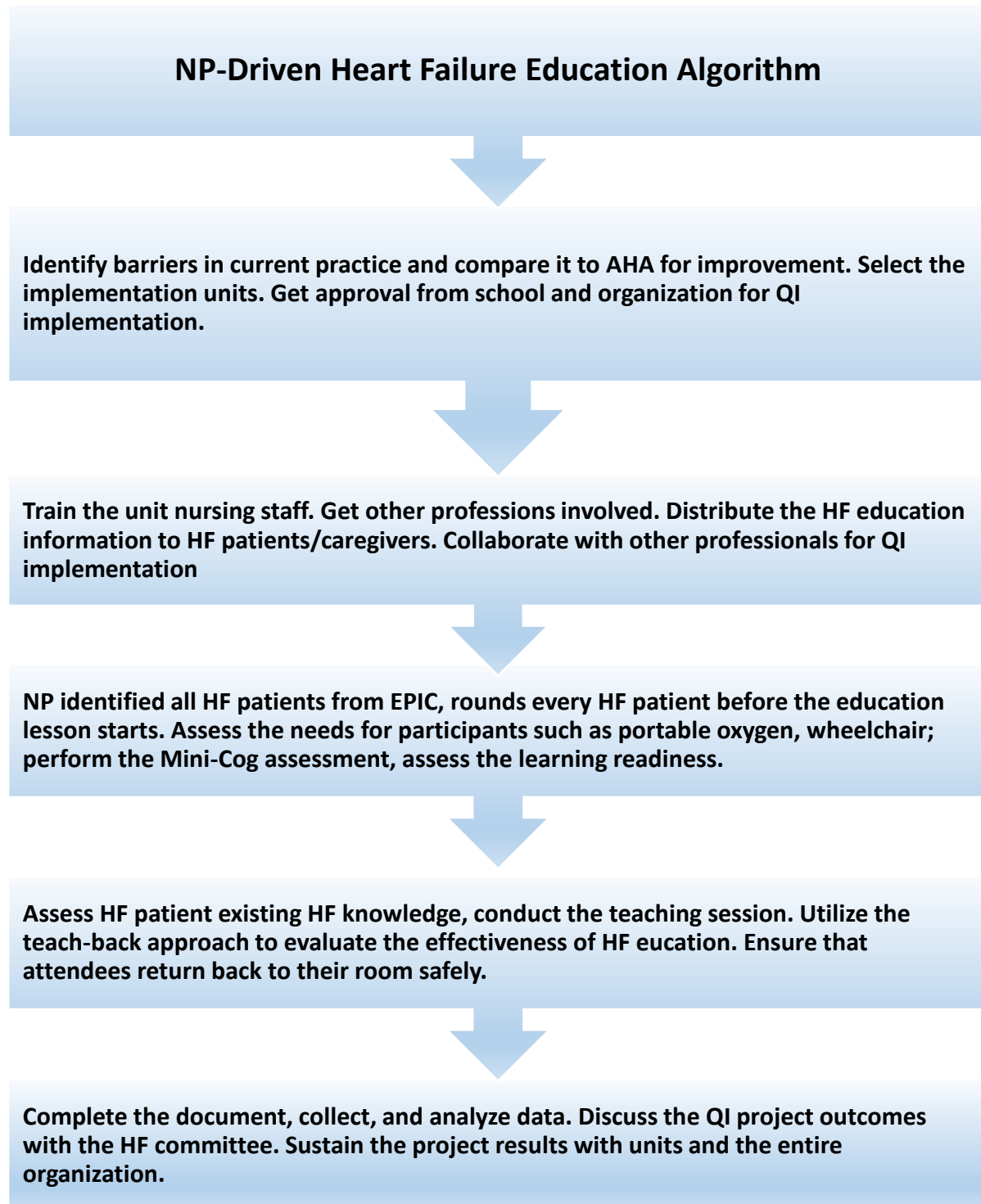
Completion of call

CALLER: That's all I needed to ask you about. We've covered a lot of information. What questions can I answer for you?

> **If none, CALLER:** Thank you and have a good day. If you have to follow-up with patient on anything, remind him or her that you will be calling back.
> **If the patient has questions,** answer them.

Appendix I:

QI Project Algorithm

NP-Driven Heart Failure Education Algorithm

Identify barriers in current practice and compare it to AHA for improvement. Select the implementation units. Get approval from school and organization for QI implementation.

Train the unit nursing staff. Get other professions involved. Distribute the HF education information to HF patients/caregivers. Collaborate with other professionals for QI implementation

NP identified all HF patients from EPIC, rounds every HF patient before the education lesson starts. Assess the needs for participants such as portable oxygen, wheelchair; perform the Mini-Cog assessment, assess the learning readiness.

Assess HF patient existing HF knowledge, conduct the teaching session. Utilize the teach-back approach to evaluate the effectiveness of HF eucation. Ensure that attendees return back to their room safely.

Complete the document, collect, and analyze data. Discuss the QI project outcomes with the HF committee. Sustain the project results with units and the entire organization.

Appendix J:

Telephone Call-Back Documentation

60- Minute HF Education Telephone Follow Up List Notes					
Pt #	Class	Discharge	7 day F/U	30-day Readmission	Comments
1	11/12/2019	11/19/2019	Y	N	Felt like the class was an entry level class. Patient stated that he had a lot of knowledge to share with the other patients in the class.
2	11/12/2019	11/30/2019	N	Y	Readmitted with UTI 12/5-12/11/19
3	11/12/2019	11/19/2019	N	N	Did not answer on first attempt, called again and spoke to wife. The class was very helpful and use the zone sheet as a reference. Did go to the 7 day post visit but when they arrived to the office there was an issue with the insurance. The patient was able to get an appointment with the heart failure clinic on the following week after initial visit.
4	11/12/2019	11/13/2019			Phone number not working
5	11/12/2019	11/21/2019	Y	N	
6	11/14/2019	11/16/2019			Attempted to call twice and no answer on both attempts.
7	11/14/2019	11/15/2019			Phone number not working
8	11/14/2019	11/15/2019			Phone number not working
9	11/14/2019	11/15/2019	Y	N	Class was very helpful and uses Zone sheet regularly.
10	11/19/2019	11/26/2019			Patient Expired/ Deceased
11	11/19/2019	11/21/2019	Y	N	
12	11/21/2019	11/25/2019			Attempted to call twice and no answer on both attempts.
13	11/21/2019	12/12/2019	Y	N	Daughter does not remember attending the class or receiving any information regarding heart failure education.
14	11/21/2019	12/5/2019	N	Y	Feels like class was not very helpful because patient was readmitted back to the hospital for SOB (Shortness of Breath). Stated patient should have received a tap before leaving the hospital.

Appendix K:

SWOT Analysis

Strength	Weakness
• Leadership/management • Academic advisor/clinical mentorship • Cardiology specialists • Interprofessional involvement/Collaboration • Technology: EPIC • American Heart Association Guidelines • Heart Failure Committee • NP- driven HF Clinic provides follow up schedule	• HF patients characteristics with Cognitive impaired, fatigue, immobility, hypoxemia • Language/Low health literacy (patient) • No motivation (patient) • Cultural influence • Behavior changes
Opportunity	**Threat**
• Improve HF patient care outcomes • Improve HCAHPS scores • Reduce HF hospitalization • Reduce preventable cost • Improve HF patient quality of life	• HIPPA violation • Resistance for change (both patient and staff) • Lack of readiness to change • Lack of stakeholder engagement

Appendix L:

Project Timeline

	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20
Need assessment & Initial QI plan	→	Completed						
Theory/Model & Literature review	→	→	Completed					
Pilot unit selection& approval	→	→	Completed					
IRB exemption	→	→	Completed					
Team formation % training	→	Completed						
Implementation& Data analysis				→	→	→	Completed	
Communicate results to organization							→	Completed
QI outcome dissemination							→	→

Appendix M:

Project Estimates

Name of Item	Per Patient	Total Patient	Total Cost	Sum	Ongoing
Printed Handouts	$ 2.00	125	$ 250.00	$ 250.00	Depends # of participants
Laminated Colored Zone	$ 1.00	125	$ 125.00	$ 125.00	Depends # of participants
Customized Pen	$ 1.00	125	$ 125.00	$ 125.00	Depends # of participants
Folder	$ 0.50	125	$ 62.50	$ 62.50	Depends # of participants
Total				$ 562.5	

Appendix N:

Metrics Grid

What was evaluated	What was done to evaluate the component	Metrics used to analyze data	Data needed for evaluation
Outcome 1: Decrease 30-days readmission rate by 5%	Compare baseline data	30-day HF readmission rate	Number of HF patients admitted within 30-day discharge
Outcome 2: At least 75% of HF inpatients will receive comprehensive HF education before discharge	Compare baseline data	Compliance with AHA guideline for referral of 60-minute HF patient education	Percent of inpatients with HF receives comprehensive HF education before discharge
Outcome 3: At least 70% of HF patients will comply with the early post-discharge follow-up recommendation	Compare baseline data	Compliance with AHA guideline for early post-discharge follow- up	rates in returning for post - discharge follow-up within 7 days or less

Appendix O:

Mini-Cog Instructions

Mini-Cog™ — Instructions for Administration & Scoring

ID: _____ Date: _____

Step 1: Three Word Registration

Look directly at person and say, "Please listen carefully. I am going to say three words that I want you to repeat back to me now and try to remember. The words are [select a list of words from the versions below]. Please say them for me now." If the person is unable to repeat the words after three attempts, move on to Step 2 (clock drawing).

The following and other word lists have been used in one or more clinical studies.[1-3] For repeated administrations, use of an alternative word list is recommended.

Version 1	Version 2	Version 3	Version 4	Version 5	Version 6
Banana	Leader	Village	River	Captain	Daughter
Sunrise	Season	Kitchen	Nation	Garden	Heaven
Chair	Table	Baby	Finger	Picture	Mountain

Step 2: Clock Drawing

Say: "Next, I want you to draw a clock for me. First, put in all of the numbers where they go." When that is completed, say: "Now, set the hands to 10 past 11."

Use preprinted circle (see next page) for this exercise. Repeat instructions as needed as this is not a memory test. Move to Step 3 if the clock is not complete within three minutes.

Step 3: Three Word Recall

Ask the person to recall the three words you stated in Step 1. Say: "What were the three words I asked you to remember?" Record the word list version number and the person's answers below.

Word List Version: _____   Person's Answers: _____   _____   _____

Scoring

Word Recall: _____ (0-3 points)	1 point for each word spontaneously recalled without cueing.
Clock Draw: _____ (0 or 2 points)	Normal clock = 2 points. A normal clock has all numbers placed in the correct sequence and approximately correct position (e.g., 12, 3, 6 and 9 are in anchor positions) with no missing or duplicate numbers. Hands are pointing to the 11 and 2 (11:10). Hand length is not scored. Inability or refusal to draw a clock (abnormal) = 0 points.
Total Score: _____ (0-5 points)	Total score = Word Recall score + Clock Draw score. A cut point of <3 on the Mini-Cog™ has been validated for dementia screening, but many individuals with clinically meaningful cognitive impairment will score higher. When greater sensitivity is desired, a cut point of <4 is recommended as it may indicate a need for further evaluation of cognitive status.

Appendix O (cont'd)

Clock Drawing

ID: _____   Date: _____
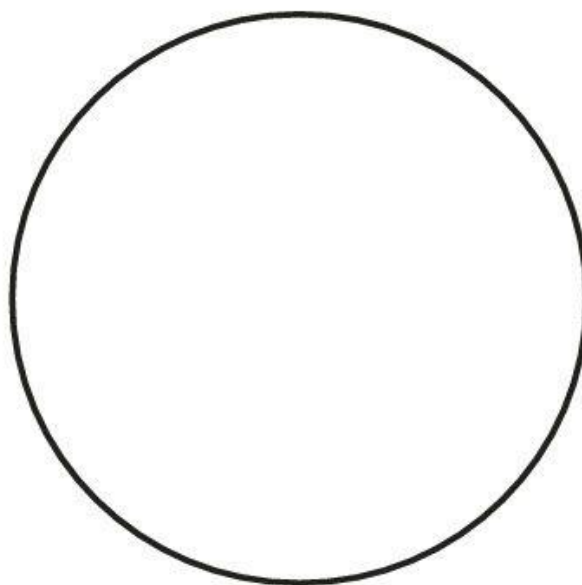
References

1.   Borson S, Scanlan JM, Chen PJ et al. The Mini-Cog as a screen for dementia: Validation in a population-based sample. J Am Geriatr Soc 2003;51:1451–1454.

2.   Borson S, Scanlan JM, Watanabe J et al. Improving identification of cognitive impairment in primary care. Int J Geriatr Psychiatry 2006;21: 349–355.

3.   Lessig M, Scanlan J et al. Time that tells: Critical clock-drawing errors for dementia screening. Int Psychogeriatr. 2008 June; 20(3): 459–470.

4.   Tsoi K, Chan J et al. Cognitive tests to detect dementia: A systematic review and meta-analysis. JAMA Intern Med. 2015; E1-E9.

5.   McCarten J, Anderson P et al. Screening for cognitive impairment in an elderly veteran population: Acceptability and results using different versions of the Mini-Cog. J Am Geriatr Soc 2011; 59: 309-213.

6.   McCarten J, Anderson P et al. Finding dementia in primary care: The results of a clinical demonstration project. J Am Geriatr Soc 2012; 60: 210-217.

7.   Scanlan J & Borson S. The Mini-Cog: Receiver operating characteristics with the expert and naive raters. Int J Geriatr Psychiatry 2001; 16: 216-222.

(Used with permission from the author, Soo Borson)

Appendix P: Level of Literature Review					
Synthesis Section	Specific Themes	Variations: Concepts	Variations: Methods and Design	Citations: Author and Year	Level of Evidence
1	Testing video education to improve outcomes in heart failure	Usual HF education; video education; patients' satisfaction; self-care maintenance scores; 30-day readmissions	Completed the Atlanta Heart Failure Knowledge Test and the Self-care of Heart Failure Index before and after receiving video education, to measure HF knowledge, self-efficacy, and self-care respectively	Reid, K., Reid, K., Esquivel, J., Thomas, S., Rovnyak, V., Hinton, I., & Campbell, C. (2019). Using video education to improve outcomes in heart failure. Heart & Lung, 48(5), 386-394.	III
2	A nurse-led education program to improve knowledge, self-care, and reduce readmission for individuals with heart failure	Nurse-led heart failure patient education; self-care; 30-day readmission rate	This is a survey. Research used Dutch Heart Failure Knowledge Scale and Self-care Heart Failure Index Pre/posttest to evaluate heart failure patient population	Awoke, M., Baptiste, D., Davidson, P., Roberts, A., & Dennison-Himmelfarb, C. (2019). A quasi-experimental study examining a nurse-led education program to improve knowledge, self-care, and reduce readmission for individuals with heart failure. Contemporary Nurse, 55(1), 15-26.	III
3	Nurse-led education on hospitalization, readmission, quality of life and cost in adults with heart failure	Nurse-led patient education hospital admissions Hospital readmission Quality of life	A systematic review	Rice, H., Say, R., & Betihavas, V. (2018). The effect of nurse-led education on hospitalization, readmission, quality of life and cost in adults with heart failure. A systematic review. Patient Education and Counseling, 101(3), 363-374.	I
4	Self-care educational intervention to reduce hospitalizations in heart failure	Educational interventions self-care behaviors Readmission	Patients were randomly allocated 1:1 to usual education or a multimedia educational intervention.	Boyde, M., Peters, R., New, N., Hwang, R., Ha, T., & Korczyk, D. (2017). Self-care educational intervention to reduce hospitalizations in heart failure: A randomized controlled trial. European Journal of Cardiovascular Nursing, 17(2), 178-185.	II
5	Patient Navigator Program to reduce 30-day heart failure readmission rate	Patient Navigator Program readmission rate	Using a Navigator Team composed of a nurse and clinical pharmacist delivered evidenced-based interventions to improve identification of HF inpatients and reduce the 30-day all-cause readmission rate	Palo, D. K., Patel, K., Assafin, M., & Piña, I. (2017). Implementation of a patient navigator program to reduce 30-day heart failure readmission rate. Progress in Cardiovascular Diseases, 60(2), 259-266.	III

Appendix P: Level of Literature Review					
Synthesis Section	Specific Themes	Variations: Concepts	Variations: Methods and Design	Citations: Author and Year	Level of Evidence
6	Association between health literacy and 30-day healthcare use after hospital discharge	Health literacy hospital readmissions	heart failure was assessed for health literacy using the BHLS; Unplanned healthcare use after discharge was assessed using univariate and logistic regression models	Cox, S., Liebl, M., McComb, M., Chau, J., Wilson, A., Achi, M., Garey, K., & Wallace, D. (2017). Association between health literacy and 30-day healthcare use after hospital discharge in the heart failure population. Research in Social and Administrative Pharmacy, 13(4), 754-758.	III
7	Nonadherence, and a knowledge gap is the reasons for HF patient's admission	Nonadherence and lack of knowledge Readmission	Perform brief questionnaire regarding circumstances leading to admission, using multivariate regression analysis	Gilotra, N., Shpigel, A., Okwuosa, I., Tamrat, R., Flowers, D. & Russell, S. (2017). Patients commonly believe their heart failure hospitalizations are preventable and identify worsening heart failure, nonadherence, and a knowledge gap as reasons for admission. Journal of Cardiac Failure, 23(3), 252-256.	III
8	Feasibility study of a nurse-led heart failure education program	Nurse-led heart failure (HF) Education program scores for self-care maintenance, self-management	Implemented a nurse-led education program with 30-day post-discharge home-based telephone follow-up. The SCHFI was used to measure self-care behaviors.	Baptiste, D., Davidson, P., Groff Paris, L., Becker, K., Magloire, T., & Taylor, L. (2016). Feasibility study of a nurse-led heart failure education program. Contemporary Nurse, 52(4), 499-510.	III
9	Interprofessional heart failure education program on hospital readmissions	Adult patients with heart congestive failure	Education-based strategy designed to decrease hospital readmissions A retrospective case-control study	Clarkson, J., Schaffer, S. and Clarkson, J. (2017). The Effect of an Interprofessional Heart Failure Education Program on Hospital Readmissions Journal for Healthcare Quality, 39(2), pp.78-84.	III
10	Association between self-care and hospital readmissions of patients with heart failure	Self-care Education Hospital readmissions	Longitudinal study Use score of self-care (European Heart Failure Self-care Behavior Scale and Self-care Scale) for Patients with Heart Failure	Linn, A.C., Azollin, K., & Souza, E.N. (2016). Association between self-care and hospital readmissions of patients with heart failure. Rev Bras Enferm, 69(3), 500-6.	III

Appendix P: Level of Literature Review					
Synthesis Section	Specific Themes	Variations: Concepts	Variations: Methods and Design	Citations: Author and Year	Level of Evidence
11	Health literacy mediates the relationship between age and health outcomes in patients with heart failure	Health literacy Health outcomes HF readmissions	A longitudinal study Using Kaplan-Meier survival curves with log-rank tests; Separate Cox regressions	Wu, J., Moser, D., DeWalt, D., Rayens, M., & Dracup, K. (2016). Health literacy mediates the relationship between age and health outcomes in patients with heart failure. Circulation: Heart Failure, 9(1), e002250.	II
12	Educational program on quality of life and self-care in patients with heart failure	Illness Perception; quality of life; self-care	Randomized controlled trial Combination of illness perception correction-based education program vs. usual care. SPSS version 13 was used for the analysis.	Akbari, S. A., Cheraghi, M., Kazemnejad, A., Nomali, M., & Zakerimoghadam, M. (2019). Effect of illness perception correction-based educational program on quality of life and self-care in patients with heart failure: A randomized controlled trial. Journal of Caring Sciences, 8(2), 89-93.	II
13	A nurse-led structured education program improves self-management skills and reduces hospital readmissions in patients with chronic heart failure	Nurse-led structured education program Self-management Hospital readmissions	A randomized and controlled trial. A structured education program was delivered to the intervention group during hospitalization and after discharge. Control group patients were managed as per clinical guidelines without structured education.	Cui, X., Zhou, X., Ma, L., Sun, T., Bishop, L., Gardiner, F., & Wang, L. (2019). A nurse-led structured education program improves self-management skills and reduces hospital readmissions in patients with chronic heart failure: a randomized and controlled trial in China. Rural and Remote Health, 19(2), 270	II
14	Motivational interviewing as a strategy to impact outcomes in heart failure patients	Motivational Interviewing hospital readmission long-term outcomes	A modified Cochrane systematic review literature search in the MED- LINE, CINAHL, Cochrane Collabor-ative Systematic Reviews, PsycINFO, Health Source: Nursing/Academic Edition, and Google Scholar databases.	Poudel, N., Kavookjian, J., & Scalese, M. (2019). Motivational interviewing as a strategy to impact outcomes in heart failure patients: A systematic review. The Patient - Patient-Centered Outcomes Research. https://doi.org/10.1007/s40271-019-00387-6.	I
15	Effectiveness of discharge education with the teach-back	discharge education with the teach-back 30-day readmission	Systematic Review MEDLINE, CINAHL, Embase, The Cochrane Library, and Web of Science were used the Risk of Bias Assessment tool for Nonrandomized Studies.	Oh, E., Lee, H., Yang, Y. & Kim, Y. (2019). Effectiveness of Discharge Education with the Teach-Back Method on 30-Day	II

			Appendix P: Level of Literature Review		
Synthesis Section	**Specific Themes**	**Variations: Concepts**	**Variations: Methods and Design**	**Citations: Author and Year**	**Level of Evidence**
	method on 30-day readmission		Data were analyzed using Cochrane Review Manager (Revman) software 5.2.	Readmission. Journal of Patient Safety. https://doi: 10.1097/PTS.0000000000000596	
16	Heart failure education in the emergency department markedly reduces readmissions	Heart failure Education Readmissions	Open label, interventional study, using a parallel observational control group	Asthana, V., Sundararajan, M., Ackah, R., Karun, V., Misra, A., Pritchett, A., Bugga, P., Siler-Fisher, A. & Peacock, W. (2018). Heart failure education in the emergency department markedly reduces readmissions in un- and under-insured patients. The American Journal of Emergency Medicine, 36(12), 2166-2171.	II
17	Strategies to improve self-management in heart failure patients.	Self-management, education Patient quality of life Patient readmission	systematic reviews, meta-analyses (PRISMA) The articles identified through an extensive search using PubMed and UpToDate from 1999 to 2016	Toback, M. & Clark, N. (2017). Strategies to improve self-management in heart failure patients. Contemporary Nurse, 53(1), 105-120.	I
18	Health Literacy and Heart Failure	Health literacy HF self-care Common HF outcomes	A systematic Review Databases were conducted, Pub-Med, CINAHL Plus, Embase, PsycINFO, and Scopus, using relevant keywords and clear inclusion and exclusion criteria	Cajita, M., Cajita, T., & Han, H. (2016). Health literacy and heart failure. The Journal of Cardiovascular Nursing, 31(2), 121-130.	I
19	Mini-cog performance as a novel marker of post-discharge risk among HF patients	Mini-Cog cognitive impairment (CI) readmission mortality risk	A prospective observational cohort study Random survival forest (RSF) analysis 19 was performed	Patel, A., Parikh, R., Howell, E., Hsich, E., Landers, S., & Gorodeski, E. (2015). Mini-Cog Performance. Circulation: Heart Failure, 8(1), 8-16.	IV
20	Global public health burden of heart failure	Global epidemiology of HF prevalence, incidence, mortality morbidity	System review	Savarese, G., & Lund, L. (2017). Global public health burden of heart failure. Cardiac Failure Review, 03(01), 7.	V

Appendix P: Level of Literature Review				
Synthesis Section	**Specific Themes**	**Variations: Concepts**	**Variations: Methods and Design**	**Citations: Author and Year**	**Level of Evidence**
21	The association between cognitive function and self-care in HF patients	Cognitive dimension Self-care Psychomotor speed	Cross-sectional study European Heart Failure Self-Care Behavior Scale, neuropsychological battery, and the Patient Health Question-naire were examined with multiple regression analyses.	Hjelm, C., Broström, A., Riegel, B., Årestedt, K., & Strömberg, A. (2015). The association between cognitive function and self-care in patients with chronic heart failure. Heart & Lung, 44(2), 113-119.	IV
22	Knowledge deficits in hospitalized chronic heart failure patients	Heart failure knowledge deficits Self-care.	Nurse Practitioners (NP) provided screening and intervention Retrospective analysis of the re-identified quality data	Pudlo, M., Homer, S., Daniel, C., Bionat, S., Creamer, A., Ketkar, S. & Bhimaraj, A. (2015). High Prevalence of Heart Failure (HF) Knowledge Deficits in Hospitalized Chronic Heart Failure Patients-a Single-Center Retrospective Analysis of Quality Data Showing a Need for Better CMS Core Measures. Journal of Cardiac Failure, 21(8), S58-S59.	IV
23	Cognitive impairment and its effect on heart failure readmissions of elderly adults	Mini-Cog scores caregiver education readmission rate	Prospective cohort quality improvement program	Agarwal, K., Kazim, R., Xu, J., Borson, S. & Taffet, G. (2016). Unrecognized cognitive impairment and its effect on heart failure Readmissions of elderly adults. Journal of the American Geriatrics Society, 64(11), 2296-2301.	IV
24	Transitions of care in heart failure	Transition programs Optimal clinical outcomes	An overview of the complexity of HF management	Albert, M. N., Barnason, S., Deswal, A., Hernandez, A., Kociol, R., Lee, E., Paul, S., Ryan, C.J., & Williams, C.N. (2015). Transitions of care in heart failure: A scientific statement from the American Heart Association. Circulation: Heart Failure. 8:384–409.	V
25	Patient characteristics predicting readmission	Patient characteristics; readmission; rehospitalization	A systemic review Database searches yielded 950 potential articles, of which 34 studies met inclusion	O'Connor, M., Murtaugh, C. M., Shah, S., Barrón-Vaya, Y., Bowles, K. H., Peng, T. R., & Feldman, P. H. (2015). Patient characteristics predicting readmission among individuals hospitalized for heart failure. Medical Care Research and Review, 73(1), 3–40.	I

Appendix P: Level of Literature Review					
Synthesis Section	Specific Themes	Variations: Concepts	Variations: Methods and Design	Citations: Author and Year	Level of Evidence
26	Transitional care interventions to prevent readmissions	Transitional care interventions Readmission Mortality rates	Systematic review and meta-analysis Forty-seven trials were included	Feltner, C., Jones, C. D., Cené, C.W., Zheng, Z. J., Sueta, C. A., Coker-Schwimmer, E. J., Arvanitis, M., Lohr, K. N., Middleton, J. C., & Jonas, D. E. (2014). Transitional care interventions to prevent readmissions for persons with heart failure: a systematic review and meta-analysis. Annals of Internal Medicine. 3,160(11):774-84. doi: 10.7326/M14-0083	I

Level of Evidence

Level I   Experimental study, randomized controlled trial (RCT) Systematic review of RCTs, with or without meta-analysis

Level II   Quasi-experimental Study. Systematic review of a combination of RCTs and quasi-experimental, or quasi-experimental studies only, with or without meta-analysis.

Level III   Non-experimental study**.** Systematic review of a combination of RCTs, quasi-experimental and non-experimental, or non-experimental studies only, with or without meta-analysis. Qualitative study or systematic review, with or without meta-analysis

Level IV   Opinion of respected authorities and/or nationally recognized expert committees/consensus, panels based on scientific evidence Includes: Clinical practice guidelines. Consensus panels

Level V   Based on experiential and non-research evidence. Includes: Literature reviews**,** quality improvement, program or financial evaluation**, c**ase reports**,** opinion of nationally recognized expert(s) based on experiential evidence (Dearholt, 2012)