

# Implementation of a Disease Management Program in Adult Patients With Heart Failure

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## ABSTRACT

**Background:** Approximately 5.7 million people in the United States are diagnosed and living with heart failure (HF), with projected prevalence rates to increase 46% by 2030. Heart failure leads hospital admissions in the United States for individuals 65 years or older, with many acute exacerbation admissions resulting from a lack of medication management, poor patient treatment plan adherence, and lack of appropriate follow-up within the health care system. In 2017, the 30-day HF readmission rate at the facility of implementation was 27%, 3% higher than the national average and, more specifically, 18.5% for the cardiac care unit (CCU).

**Objective:** The aim of this study was to develop an HF disease management program to reduce 30-day readmission rates for HF patients through the implementation of a structured program including self-care education utilizing the teach-back method, multimodal medication reconciliation, multidisciplinary consultation, telephone follow-up within 48–72 hr of discharge, and follow-up visit within 7–10 days of discharge.

**Primary Practice Setting:** The implementation of the disease management program took place at a major military treatment facility in the continental United States. The facility is a teaching facility housing a 272-bed multispecialty hospital and an ambulatory complex. The implementation took place on the CCU, the primary unit for cardiac admissions, with approximately 30 admissions a month for a primary diagnosis of HF.

**Methodology and Sample:** In August 2018, a multidisciplinary disease management program was implemented to include patient education utilizing the teach-back method, multimodal medication reconciliation, multidisciplinary consultation, telephone follow-up within 48–72 hr of discharge, and follow-up visit within 7–10 days of discharge. Data were collected and analyzed for 90 days and compared with retrospective data from 2017.

**Findings:** Participants in the disease management program had a statistically significant improvement ( $p < .001$ ) in the hospital readmission rate. The overall 30-day readmission rate decreased from 27% to 10.2% during the implementation period, a decrease of 38%. Ninety-three percent of the patients completed the self-care education, and telephone follow-up was successfully achieved with 96% of these patients. Only 4 patients in the HF disease management program experienced readmission within 30 days. Patients and caregivers reported increased satisfaction with their care due to the disease management program and increased follow-up with care.

**Implications for Case Management Practice:** The findings of this innovation suggest that a multidisciplinary disease management program can reduce avoidable 30-day readmissions. The program improved patient follow-up and decreased follow-up appointment no-shows. Multiple participants expressed increased patient satisfaction. The program supports the need for coordinated, interdisciplinary disease management to improve the quality of life of those affected by HF and improve the use of resources to reduce the overall health care burden. Case management is critical to the organized care of HF patients due to the complex, individualized care to achieve optimum patient outcomes.

**Key words:** cardiology, disease management program, heart failure, readmission

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**H**eat failure (HF) is the most common cause of hospital admission in the United States for individuals 65 years or older, with national readmission rates remaining high at 23% (Centers for Medicare & Medicaid Services, 2013). The cost to treat HF patients is predicted to rise markedly from \$30.7 billion per year to \$70 billion per year by the year 2030 (Go et al., 2014). The mortality of these patients is related to not only progression of the disease but also their reduced quality of life (Hoekstra et al., 2013). From January 1, 2017, to December 31, 2017, the 30-day readmission rate for HF at the facility of implementation was 27%, 4% higher than the national readmission rate (Centers for Medicare & Medicaid Services, 2013). More specifically, the 30-day readmission rate for the cardiac care unit (CCU), the primary unit for such admissions, was 19.9% in 2016 and 18.5% in 2017, with HF diagnosis being the most common cause of readmission. To provide the highest quality of clinical services, admissions and readmissions must be proactively managed.

## **EVIDENCE-BASED LITERATURE REVIEW AND SYNTHESIS**

According to the American Heart Association (AHA), approximately 5.7 million people in the United States have HF and projections suggest that the prevalence of HF will increase by 46% in 2030 (Go et al., 2014; Mozzafarian et al., 2016). The AHA estimates that approximately half of individuals who develop HF die within 5 years of diagnosis. Heart failure acute exacerbation admissions and readmissions are often due to preventable causes including a lack of medication management, poor patient adherence with the treatment plan, and lack of appropriate follow-up within the health care system (Clark et al., 2015; Vedel & Khanassov, 2015). In addition to the significant physical and financial challenges posed to the health care system, HF patients experience a dramatic symptom burden that may decrease quality of life due to the disease process (McMurray et al., 2012).

Preventing and decreasing readmissions for patients with HF are significant challenges for hospitals and outpatient practitioners. Although many

hospitals have treatment plans and pathways in place for the care of HF patients, health care practitioners often fail to provide adequate patient education regarding self-care of the patient and/or the caregiver to manage this complex disease process (Albert, 2016; Clark et al., 2015). An abundance of scientific evidence exists supporting HF disease management programs focused on improving self-care and decreasing hospital readmissions (Albert, 2016; Feltner et al., 2014; Howie-Esquivel et al., 2015). Current guidelines recommend that health care practitioners provide comprehensive HF education focused not only on knowledge but also on self-care behaviors and management skills (Yancy et al., 2013, 2017). Strategies, such as inpatient education, postdischarge telephone calls, home visits, or intensive technology-based monitoring, are being utilized in both inpatient and outpatient settings to improve care, reduce the health care burden, and improve clinical outcomes and patient satisfaction (Dunlay, Pereira, & Kushwaha, 2014; Feltner et al., 2014). Because of the wide variability of program interventions, however, it is difficult to discern the key elements associated with the greatest improvement in outcomes (Albert, 2016; Feltner et al., 2014; Hansen, Young, Hinami, Leung, & Williams, 2011).

Successful HF disease management requires the patient and/or the caregiver to be an active participant in their plan of care (Albert, 2016; González et al., 2014; Ruppert et al., 2016). Educating patients and caregivers to promote self-care maintenance and management and encouraging self-advocacy are highly recommended in the coordinated management of HF (Burke, Guo, Prochazka, & Misky, 2014; Kripalani, Theobald, Anctil, & Vasilevskis, 2014; Yancy et al., 2013). The delivery of the self-care education should focus on building self-confidence and promoting active involvement of the HF patient to make changes in lifestyle and maintain a healthy attitude (González et al., 2014). Caregivers should be involved in the education process as much as possible as these individuals are key to the well-being of the patient, and their inclusion in care planning has been demonstrated to successfully reduce the risk of readmissions in this highly vulnerable HF population (Deek et al., 2017).

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The AHA's *Get With the Guidelines—Heart Failure* transitions-of-care strategies for HF patients utilize a number of characteristics identified in current literature as successful strategies to reduce readmission rates (Albert et al., 2015). The model recommends patient education utilizing the teach-back model, telephone follow-up, follow-up provider visit within 7–10 days of discharge, medication reconciliation, caregiver presence and involvement, and hand-off posthospitalization to primary providers. The American College of Cardiology Foundation (ACCF) and the AHA's evidence-based joint HF guideline encourages individualized patient education focused on self-care behaviors such as monitoring symptoms and weight fluctuations, medication adherence, physical activity, and seeking social support and avoiding behaviors that may increase the risk of HF such as smoking, excessive alcohol consumption, and high sodium intake (Yancy et al., 2013, 2017). In addition, the literature suggests that patients benefit from education delivered over multiple follow-ups (Burke et al., 2014). Multiple studies have shown positive outcomes utilizing the teach-back method of education, which entails teaching the patient key concepts and then asking the patient to restate the information that was presented (Ha Dinh, Bonner, Clark, Ramsbotham, & Hines, 2016; Howie-Esquivel et al., 2015; Shan, Finder, Dichoso, & Lewis, 2014). This method (teach-back) not only allows the educator to assess the individual's understanding of the education but also identifies any need for additional clarification and encourages the individual to ask questions. The teach-back method is also important in identifying varying levels of health literacy and complex chronic health conditions due to the multiple treatment modalities and need for continual self-monitoring (Ha Dinh et al., 2016).

Educational components that advance self-care maintenance and management include general information about HF disease, medication adherence, follow-up appointments, monitoring signs and symptoms, diet modifications, activity and exercise, and limiting alcohol and tobacco use (Albert, 2016; González et al., 2014; Kommuri, Johnson, & Koelling, 2012; Ruppert et al., 2016; Yancy et al., 2013). Critical elements of medication adherence

include medication reconciliation, monitoring usage, and encouraging the patients to notify the practitioner immediately of any adverse side effects. Patients should be encouraged to be proactive when monitoring for signs and symptoms of HF exacerbation such as weight gain and edema and communicate these changes to their practitioner immediately so that their care plan can be adjusted. Exercise has been shown to improve HF functional class, lower symptom burden, and reduce medication (Albert, 2016; Hoeksma et al., 2013).

Successful HF disease management necessitates better integration and transition of care between inpatient and outpatient care to reduce readmissions (Bradley et al., 2013; Feltner et al., 2014; Vedel & Khanassov, 2015). Studies demonstrate the importance of coordinating follow-up prior to discharge and scheduling the first follow-up appointment within 7 days to optimize care (Albert, 2016; Bradley et al., 2013; Vedel & Khanassov, 2015). To improve continuity of care, a copy of the complete and accurate discharge summary should be given to the patient and sent to the patient's primary care provider to ensure accurate communication and coordination of care between all health care practitioners (Bradley et al., 2013; Burke et al., 2014; Vedel & Khanassov, 2015; Yancy et al., 2013). The purpose of this quality improvement project was to reduce 30-day readmission rates for HF patients through the implementation of a structured program including self-care education utilizing the teach-back method, multimodal medication reconciliation, multidisciplinary consultation, telephone follow-up within 48–72 hr of discharge, and follow-up visit within 7–10 days of discharge.

## ORGANIZATIONAL SETTING

The implementation of the HF disease management program took place at a major military treatment facility in the western continental United States. The facility is a teaching facility housing a 272-bed multi-specialty hospital and an ambulatory complex. Nearly 100,000 beneficiaries, including active duty, veterans, retirees, and their dependents, are enrolled for care at the facility. The facility is staffed by more than 6,500 military, civilian, contractor, and volunteer personnel.

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*The practitioner also completed medication reconciliation upon admission. In addition to the initial medication reconciliation, the process was completed multiple times during the disease management program including during education, prior to discharge, during the follow-up phone call, and during the follow-up appointment.*

The CCU is the primary unit for cardiac admissions, with approximately 30 admissions a month for a primary diagnosis of HF. Average census of the unit is 13 patients, with an average length of stay of 3 days; however, HF patients average between 3 and 5 days. After discharge, HF patients receive follow-up on the facility campus at the Cardiology Clinic, which is staffed by the same practitioners who circulate through the CCU for inpatient care.

## **PRACTICE CHANGE**

This quality improvement innovation utilized a pre/posttest design. Baseline 30-day readmission data had been collected by the leadership of the CCU through the facility data management team for the period of time ranging from December 2016 to November 2018. The convenience sample for the innovation included patients admitted to the CCU between December 2018 and February 2019. All patients who spoke and understood English were included in the disease management program. Exclusion criteria included patients with limited functional or cognitive abilities and no available or consistent primary caregiver to engage in the disease management program or patients who were discharged to a skilled nursing facility.

The main purpose of this quality improvement innovation was to utilize evidence-based practice to improve the quality of care for HF patients. The innovation focused on the implementation of a nurse-led HF maintenance and management program in an effort to improve HF outcomes including reducing 30-day readmission rates. Specific aims included:

1. Within 3 months of implementation, the 30-day readmission rate for HF patients will be below 22%.
2. Within the 3-month implementation period, the inpatient unit will successfully complete education with 90% of HF patients.
3. Within 3 months of implementation, the patient care coordinator (PCC) will have successful contact via a postdischarge follow-up telephone call to 75% of patients included in the disease management program.

The HF disease management program utilized a combined inpatient and outpatient effort between

the CCU and the Cardiology Clinic. Upon admission of a patient with HF, the patient's practitioner entered a consult for the dietician, social worker, clinical pharmacist, and physical therapist to engage with the patient at the first opportunity to begin respective specialty patient education and care. The practitioner also completed medication reconciliation upon admission. In addition to the initial medication reconciliation, the process was completed multiple times during the disease management program including during education, prior to discharge, during the follow-up phone call, and during the follow-up appointment. The PCC on the CCU was responsible for tracking HF admissions on the provided tracking Excel spreadsheet (see Figure 1). Daily the PCC reviewed the diagnosis of all patients admitted to the CCU and identified patients admitted with HF. The PCC utilized the CardioSmart Patient Guide: Living Well With Heart Failure patient education resource developed by the American College of Cardiology to begin education utilizing the teach-back method with the patient and/or the primary caregiver (American College of Cardiology, 2018; Bilbao, Escobar, Garcia-Perez, Navarro, & Quiros, 2016). The education included basic HF knowledge such as the causes of HF and signs and symptoms of worsening HF, self-care maintenance or behaviors to maintain clinical stability such as daily adherence to prescribed medication, low sodium diet, and symptom monitoring, and self-care management such as recognition of weight gain requiring an extra diuretic. In addition, the American College of Cardiology's My Heart Health Plan was utilized by the PCC to develop a personal plan and tracking method for the patient and/or caregiver's daily use. After each teaching session, a set of four questions were utilized to assess the patient and/or caregiver's understanding of the information provided and to provide the opportunity for further questions (see Table 1). In the absence of the PCC, the clinical nurse specialist reviewed the diagnosis of all admitted patients and ensured that the appropriate education was completed. Patients and caregivers were encouraged to be proactive when monitoring for signs and symptoms of HF exacerbation such as weight gain and edema and communicate these changes to their practitioner immediately so that their care plan could be adjusted.

### Heart Failure Admission Tracker

Patient Number	Phone Number	Support Person	Admission Date	New Onset	Mentation (A&Ox?)	30 Day Readmit (Y/N)	Discharge Date	Discharge Dispo	Follow-up appointment scheduled prior discharge	Follow-up phone call date	Attended appointment (Y/N)	Follow-up phone call if missed appointment	3 month follow-up	Comments

**FIGURE 1**  
Data tracking flow sheet.

When the patient was discharged, the registered nurse ensured that a follow-up appointment had been scheduled for the patient within 7–10 days, as this has been shown to reduce the rate of readmission by allowing early intervention of potential HF complications. All patients and/or caregivers were given the PCC’s contact information should they have any questions or concerns. The PCC notated the date of discharge on the Excel spreadsheet and 48–72 hr after discharge conducted follow-up contact with the patient and/or the caregiver via a phone call utilizing the phone number provided by the patient or caregiver during the admission. The PCC utilized a discharge phone call script (see Figure 2) to assess the patient’s current health status including symptom burden, verify medication adherence, clarify the patient’s clinic appointment date and transportation, review what to do if the patient’s condition worsens, ask the same preset four questions that the patient and/or the caregiver were asked during the inpatient education sessions, and ask whether the patient has any additional questions or concerns. If the patient had any

additional questions or needs, the PCC contacted the on-call cardiology fellow for assistance.

Prior to the follow-up appointment, the HF clinic nurse retrieved the patient’s discharge information from the electronic medical record. At the follow-up appointment, the same preset four questions were asked of the patient and/or the caregiver to assess understanding of the education that was provided and identify any areas that may need further discussion. If the patient failed to attend his or her follow-up appointment, the PCC contacted the patient via telephone for a verbal follow-up and to reschedule the appointment.

### DATA EVALUATION METHODS

The success of the HF disease management program was evaluated through three outcome measures that are directly related to the aforementioned aims (see Table 2). Baseline 30-day readmission data had been collected by the leadership of the CCU through the facility data management for the period ranging from December 2016 to November 2018. Following

#### TABLE 1 Teach-Back Questions

1. Please name three symptoms or warning signs that should prompt you to call your doctor?
2. What is the name of your water pill?
3. How much weight gain would you want to report to your doctor?
4. What high-salt foods do you need to avoid/be aware of?

*Introduction:* Hello my name is (first name). I am the Patient Care Coordinator that you met while you were admitted to the Cardiac Care Unit. Is Mr./Mrs. \_\_\_\_\_ (patient's first and last name) available?

*When the patient comes to the phone tell him/her:* I am calling in follow-up for your discharge from our hospital. I have a few questions to ask you and wanted to see if you have any questions before we begin?

*Follow-Up Questions:*

1. How are you feeling?
2. How often are you weighing yourself?
3. What time of day are you weighing yourself?
4. How are you tracking your weight?
5. How much weight have you gained or lost?
6. How often are you checking your blood pressure?
7. How are you tracking your blood pressure?
8. Have you noticed any changes in your blood pressure?
9. Have you noticed any signs or symptoms of worsening heart failure?
10. Have you noticed any swelling to your legs, feet, or abdomen?
11. Have you experienced any shortness of breath?
12. Do you have any questions regarding your medications? (Compare to discharge instructions)
13. How are you taking your water pill?
14. What substance are you avoiding in your diet?
15. When is your follow-up appointment?
16. How will you be travelling to your follow-up appointment?

Now, I am going to ask you the same four questions from our discussions during your admission:

1. Please name three symptoms or warning signs that should prompt you to call your doctor?
2. What is the name of your water pill?
3. How much weight gain would you want to report to your doctor?
4. What high-salt foods do you need to avoid/be aware of?

*Conclusion:* Are there any questions that I can answer for you at this time or anything that I can help you with? Thank you for your time. It was a privilege to serve you. We are constantly seeking ways to improve so if you have any feedback, please let us know. You have my name and phone number so if you have any issues or questions, feel free to call me.

**FIGURE 2**

Discharge phone call script.

implementation of the HF disease management program, the 30-day readmission rate was evaluated for patients admitted during the 3-month implementation period ranging from December 2018 to February 2019. Data for the readmission rate were retrieved by the facility's data management coordinator through electronic audit and compared with the data from the prior year. Electronic medical record review was conducted to verify that the records were appropriate for inclusion in the data set. Fisher's exact test was utilized to compare pre- and postintervention readmission rates.

Fidelity of the innovation was evaluated through the implementation of the education and successful contact during the follow-up phone call. Electronic medical record review was utilized to extract the number of patients with documented education by the PCC or clinical nurse specialist. This number was compared with the total number of patients admitted with a diagnosis of HF. Descriptive statistics ( $n$ , %) were calculated and presented in the following text. The PCC utilized an Excel spreadsheet to log data for each patient including successful completion of the follow-up phone call. The number

**TABLE 2****Assessment and Measures Plan**

Fidelity/Outcome Measure	Operational Definition	Data Source	Data Collection Plan	Data Analysis Plan
Readmission rate (Effective and Efficient)	Change in 30-day readmission rate of the population	Electronic medical record review	Facility data management coordinator will compile data via electronic audit	Fisher's exact test
Heart failure education completed (Fidelity)	Presence and completion of Heart Failure Pathway in the patient's electronic medical record indicating that materials were given (number materials given/total number of patients with heart failure admitted)	Electronic medical record review/tracker spreadsheet review	DNP student will review electronic medical record of patients with admitting diagnosis of heart failure to ensure documentation of completed care pathway	Descriptive statistics
Follow-up phone call completed (Fidelity)	Patient contact with the patient care coordinator during follow-up phone call documented (number of patients successfully contacted/total number of patients with heart failure admitted)	Recorded by the patient care coordinator	The patient care coordinator will log data into an Excel spreadsheet; DNP student will review the spreadsheet	Descriptive statistics

of patients successfully contacted was compared with the total number of patients admitted with a diagnosis of HF.

G\*Power software was utilized to conduct a priori sample size requirements based on medium effect size (0.50), power at 0.80, and  $\alpha$  set to .05 for a paired-samples *t* test. The estimated required sample size to achieve statistical significance was 34 patients, with complete data at pre- and postintervention. IBM SPSS v. 25 was utilized to conduct statistical analyses with  $\alpha$  set to .05.

## FINDINGS

One hundred seven patients were admitted to the CCU with a primary or secondary diagnosis of HF between December 2018 and February 2019. Ninety patients were identified for participation in the HF disease management program. Six patients met exclusion criteria and were not included in the disease management program; thus, 84 patients participated in the HF disease management program. Participants' ages ranged from 42 to 92 years, with a mean age of 61.8 years. Participants were primarily male (65%).

Findings related to the three primary aims included:

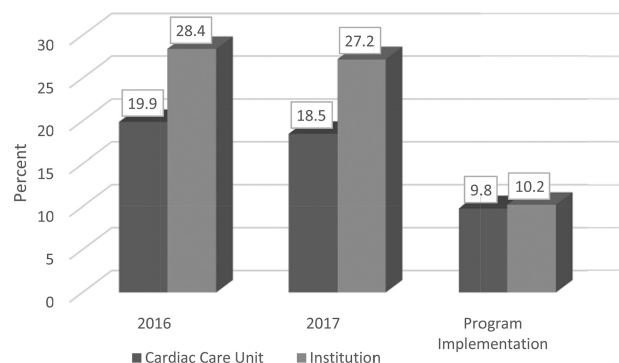
1. Of the 84 patients included in the HF disease management program, only four patients experienced readmission within 30 days, resulting in a 4.7% 30-day all-cause readmission rate for the disease management program innovation group. The overall 30-day readmission rate decreased to 10.2% during the implementation period, a

decrease of 38% (see Figure 3). Participants experienced a statistically significant ( $p < .001$ ) decrease in the 30-day hospital readmission rate.

2. Seventy-eight patients (93%) completed the self-care education, with six patients refusing to engage in the education interaction.
3. Telephone follow-up was successfully achieved with 75 of the 78 patients (96%) who received self-care education.

## DISCUSSION

The results from this quality improvement innovation provide evidence to substantiate that a comprehensive multidisciplinary disease management program can decrease 30-day readmission rates of the participants, thereby, in turn, decreasing the overall all-cause readmission rate. These results were consistent with



**FIGURE 3**  
Thirty-day readmission rates.

*The disease management program bridged the gap during the critical period of transition of care from inpatient to outpatient utilizing a coordinated approach that included multidisciplinary consult and coordinated care, self-care education initiated during the inpatient stay and emphasized at multiple follow-ups, medication reconciliation during multiple points in time, a follow-up telephone phone between 48 and 72 hr postdischarge, and a follow-up visit in the Cardiology Clinic within 7–10 days.*

findings from similar disease management programs providing self-care education, utilizing postdischarge structured telephone support, and close follow-up care (Albert, 2016; Feltner et al., 2014; Jack et al., 2009; Koehler et al., 2009). Although little evidence exists to determine the benefit of individual interventions, high-level evidence has identified a number of characteristics that are shared by bundled HF disease management programs that attribute to improved patient outcomes.

The disease management program bridged the gap during the critical period of transition of care from inpatient to outpatient utilizing a coordinated approach that included multidisciplinary consult and coordinated care, self-care education initiated during the inpatient stay and emphasized at multiple follow-ups, medication reconciliation during multiple points in time, a follow-up telephone phone between 48 and 72 hr postdischarge, and a follow-up visit in the Cardiology Clinic within 7–10 days. The pathway care for the HF patient population at the implementation institution had varied greatly during the last 10 years, ranging from no organized program to inpatient discharge education to an established HF outpatient clinic with a weekly support/education group. Prior to implementation of the disease management program, patient education was limited to discharge education provided by the discharging staff nurse, the social worker, and the clinical pharmacist if medication changes were being made. Most of the education occurred immediately before the patient was discharged, which did not allow adequate time for absorption of the information or the opportunity to ask questions and consisted primarily of a piece of paper and/or verbal education. Education during the disease management program began within 12 hr of admission utilizing the teach-back method and continued throughout the transition of care. The teach-back method allowed for assessment of the patient and/or caregiver's understanding of key concepts including the diagnosis of HF, signs and symptoms, and treatment. The addition of the self-care maintenance and management education proved valuable in improving patient and caregiver knowledge,

effectively reducing readmission rates from 27% in 2017 to 10.2% after the 3-month implementation period. The outcomes from the implementation of the HF disease management program were consistent with similar multiple intervention studies including those conducted by Jack et al. (2009) and Koehler et al. (2009), which saw a reduction in 30-day readmission rate of 6% and 28%, respectively. Nurse-driven self-care education sessions are effective in improving patient knowledge and HF patient outcomes including reduced risk of readmissions (Clark et al., 2015; González et al., 2014; Kommuri et al., 2012; Shan et al., 2014).

Although education is a key component of HF disease management programs, education alone has been shown to not be as effective as bundled interventions in lowering readmission rates and improving patient outcomes (Yancy et al., 2017). In a study conducted by Bradley et al. (2013), strategies found to be associated with lower readmission rates included coordination between inpatient and outpatient practitioners, arranging a follow-up appointment prior to discharge, and having a process in place to send discharge paperwork directly to the patient's primary practitioner. The transition of patients from hospital to home is a critical period in the scope of a patient's illness and requires unique and specific skills to achieve optimal management and outcome (Kripalani et al., 2014). The disease management program bridged the vulnerable gap through scheduling a follow-up appointment prior to discharge, a follow-up telephone phone call, and a process to ensure the

*Although education is a key component of HF disease management programs, education alone has been shown to not be as effective as bundled interventions in lowering readmission rates and improving patient outcomes.*



inpatient record was reviewed by the clinic staff prior to the scheduled follow-up appointment.

In their systematic review, Hansen et al. (2011) found that follow-up phone calls were included in all randomized trials that demonstrated a significantly effective bundle of interventions. Patients and caregivers in this program reported that having a single point of contact with a trusted member of their care team provided reassurance and increased overall communication and care. Multiple patients reported prior experiences with difficulty obtaining refills of their diuretic medication at the pharmacy after requiring extra doses based on weight gain. These patients reported difficulty communicating with the providers as an outpatient and failure to follow-up due to frustration with the process. The patients expressed a feeling of defeat with the prior process and reported that they often would not make another attempt to refill their medication, resulting in continued weight gain, an increase in symptoms, and ultimately an admission to the hospital for treatment. One patient commented (personal communication, February 21, 2019):

Knowing that I could call the second I noticed weight gain or swelling in my feet and actually talk to a person who could provide me answers meant I didn't constantly worry that I was going to have to spend a night in the hospital away from my family. My overall mood and outlook on health began to change with each day that I remained out of the hospital.

Having a responsible and knowledgeable clinician to respond to questions can boost patients' self-confidence in their ability to manage their disease (Burke et al., 2014; Feltner et al., 2014). During the follow-up telephone call, the PCC was able to identify and address a number of potential issues, including inability to refill prescription, lack of knowledge regarding the time and/or date of the follow-up appointment, lack of a scheduled follow-up appointment, and lack of transportation to the follow-up appointment.

Four of the 84 patients included in the disease management program were readmitted. Two of these individuals were unable to be successfully contacted during the attempts at telephone follow-up. Two of the individuals gained greater than 10 pounds in 5 days and were symptomatic and thus were directed to return for follow-up at which time they were readmitted for appropriate treatment.

Future goals for the HF disease management program include a dedicated licensed independent practitioner to evaluate the patient during the inpatient stay in order to individualize the approach and follow-up with the patient in the outpatient setting to ensure continuity of care, an improved scheduling

process to provide transparency and maximum flexibility, more availability for appointments so that all initial follow-up appointments are conducted in the HF clinic, a care pathway or order set to ensure goal-directed medical therapy, and ability to provide patients resources such as blood pressure monitor and electronic scale upon discharge. Further studies are needed to evaluate the effectiveness of individual interventions and/or a specific bundle of interventions on decreasing hospital readmission and improving patient outcomes.

## **STRENGTHS AND LIMITATIONS OF THE DESIGN**

Several strengths existed within this quality improvement innovation. Although not a large, randomized study, the findings of this innovation did achieve statistical significance. Consistency was maintained during the disease management program through the PCC acting as a single point of contact and completed 95% of the inpatient education as well as the use of a structured telephone script to ensure all key elements were addressed.

Several limitations of this innovation and evaluation must be acknowledged. First, the lack of a comparison group prevented a direct comparison of individuals who did not participate in the disease management program. Although the patient population of this innovation was similar to other studies, the program was implemented at a single site, thus possibly limiting the generalizability of findings as the program may not provide the same outcomes at other locations.

Different approaches may be necessary to manage different phases of illness; thus, an individualized plan of care is necessary to optimally manage this population of patients with complex care needs. Because of limited staffing, the innovation failed to capture 17 patients admitted with HF due to admissions of less than 24 hr, admissions over a weekend, or admissions during a holiday time period. The presented data did not account for patients potentially being admitted or readmitted to another institution; however, most patients are transferred to the institution if the admission is greater than 24 hr, so most patients should have been captured.

## **CONCLUSION**

Heart failure is a progressive, chronic disease that requires lifestyle changes, frequent monitoring, and collaboration between patients, caregivers, and practitioners to manage successfully (Feltner et al., 2014). Evidence has been insufficient to determine a single intervention that is most effective in reducing readmissions for HF patients; however, multiple interventions have been identified and bundled

into disease management programs to produce positive patient outcomes. Implementing more than one strategy as a bundled intervention has been associated with greater reductions in readmission rates (Bradley et al., 2013; Shan et al., 2014). The ACCF and the AHA recommend the use of a multidisciplinary HF disease management program to facilitate goal-directed therapy, address barriers to change, and reduce the risk of readmission (Yancy et al., 2013).

Improving health outcomes of patients is a primary responsibility of the interdisciplinary health care team. The HF disease management program was associated with fewer hospital readmissions within 30 days than in prior years. The key components within this program can provide a framework for HF disease management programs at other institutions. Patients and caregivers expressed increased satisfaction with their care after inclusion in the disease management program, and no-shows to follow-up appointments decreased. The results of this innovation provide evidence to substantiate a comprehensive disease management approach to reduce the rate of 30-day readmissions. The program supports the need for coordinated, interdisciplinary disease management to improve the quality of life of those affected by HF and improve the use of resources to reduce the overall health care burden. Case management is critical to the organized care of HF patients due to the complex, individualized care to achieve optimum patient outcomes. Future studies are needed to analyze the efficacy of individual interventions to increase effectiveness of programs and evaluate additional factors not examined in this innovation that may predict readmissions in the HF population.

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## REFERENCES

- Albert, N. M. (2016). A systematic review of transitional-care strategies to reduce rehospitalization in patients with heart failure. *Heart & Lung, 45*(2), 100–113. doi:10.1016/j.hrtlng.2015.12.001
- Albert, N. M., Barnason, S., Deswal, A., Hernandez, A., Kociol, R., Lee, E., ... White-Williams, C. (2015). Transitions of care in heart failure: A scientific statement from the American Heart Association. *Circulation, 8*(2), 384–409. doi:10.1161/HHF.0000000000000006
- American College of Cardiology. (2018). *CardioSmart: Heart failure*. Retrieved from <https://www.cardiosmart.org/Heart-Conditions/Heart-Failure>
- Bilbao, A., Escobar, A., Garcia-Perez, L., Navarro, G., & Quiros, R. (2016). The Minnesota Living with Heart Failure Questionnaire: Comparison of different factor structures. *Health and Quality of Life Outcomes, 14*, 23. doi:10.1186/s12955-016-0425-7
- Bradley, E. H., Curry, L., Horwitz, L. I., Sipsma, H., Wang, Y., Walsh, M. N., ... Krumholz, H. M. (2013). Hospital strategies associated with 30-day readmission rates for patients with heart failure. *Circulation: Cardiovascular Quality Outcomes, 6*(4), 444–450. doi:10.1161/CIRCOUTCOMES.111.000101
- Burke, R. E., Guo, R., Prochazka, A. V., & Misky, G. J. (2014). Identifying keys to success in reducing readmissions using the ideal transitions in care framework. *BMC Health Services Research, 14*(423), 1–10. doi:10.1186/1472-6963-14-423
- Centers for Medicare & Medicaid Services. (2013). *Hospital Compare quality of care profile page*. Retrieved from <https://www.cms.gov/medicare/quality-initiatives-patient-assessment-instruments/hospitalqualityinits/hospitalcompare.html>
- Clark, A. P., McDougall, G., Riegel, B., Joiner-Rogers, G., Innerarity, S., Meraviglia, M., ... Davila, A. (2015). Health status and self-care outcomes after an education-support intervention for people with chronic heart failure. *The Journal of Cardiovascular Nursing, 30*(4S), S3–S13. doi:10.1097/JCN.0000000000000169
- Deek, H., Chang, S., Newton, P. J., Nouredine, S., Inglis, S. C., Arab, G. A., ... Davidson, P. M. (2017). An evaluation of involving family caregivers in the self-care of heart failure patients on hospital readmission: Randomised controlled trial (the FAMILY study). *International Journal of Nursing Studies, 75*, 101–111. doi:10.1016/j.ijnurstu.2017.07.015
- Dunlay, S. M., Pereira, N. L., & Kushwaha, S. S. (2014). Contemporary strategies in the diagnosis and management of heart failure. *Mayo Clinic Proceedings, 89*(5), 662–676. doi:10.1016/j.mayocp.2014.01.004
- Feltner, C., Jones, C. D., Cene, C. W., Zheng, Z., Sueta, C. A., Coker-Schwimmer, E. J., ... Jonas, D. E. (2014). Transitional care interventions to prevent readmissions for persons with heart failure. *Annals of Internal Medicine, 160*(11), 774–784. doi:10.7326/M14-0083
- Go, A. S., Moazaffarian, D., Roger, V. L., Benjamin, E. J., Berry, J. D., Blaha, M. J., ... Stroke, S. S. (2014). Heart disease and stroke statistics—2014 update: A report from the American Heart Association. *Circulation, 129*(3), e28–e292. doi:10.1161/01.circ.0000441139.02102.80
- González, B., Lupón, J., del Mar Domingo, M., Cano, L., Cabanes, R., de Antonio, M., ... Bayes-Genis, A. (2014). Educational level and self-care behaviour in patients with heart failure before and after nurse educational intervention. *European Journal of Cardiovascular Nursing, 13*(5), 459–465. doi:10.1177/1474515113510810
- Ha Dinh, T. T., Bonner, A., Clark, R., Ramsbotham, J., & Hines, S. (2016). The effectiveness of the teach-back

- method on adherence and self-management in health education for people with chronic disease: A systematic review. *JBI Database of Systematic Reviews and Implementation Report*, 14(1), 210–247. doi:10.11124/jbisrir-2016-2296
- Hansen, L. O., Young, R. S., Hinami, K., Leung, A., & Williams, M. V. (2011). Interventions to reduce 30-day rehospitalization: A systematic review. *Annals of Internal Medicine*, 155(8), 520–528. doi:10.7326/0003-4819-155-8-201110180-00008
- Hoekstra, T., Jaarsma, T., van Veldhuisen, D. J., Hillege, H. L., Sanderman, R., & Lesman-Leegte, I. (2013). Quality of life and survival in patients with heart failure. *European Journal of Heart Failure*, 15(1), 94–102. doi:10.1093/eurjhf/hfs148
- Howie-Esquivel, J., Carroll, M., Brinker, E., Kao, H., Pantilat, S., Rago, K., & De Marco, T. (2015). A strategy to reduce heart failure readmissions and inpatient costs. *Clinical Research in Cardiology*, 6(1), 201–208. doi:10.14740/cr384w
- Jack, B. W., Chetty, V. K., Anthony, D., Greenwald, J. L., Sanchez, G. M., Johnson, A. E., ... Culpepper, L. (2009). A reengineered hospital discharge program to decrease rehospitalization: A randomized trial. *Annals of Internal Medicine*, 150, 178–187. doi:107326/0003-4819-150-3-200902030-00007
- Koehler, B. E., Richter, K. M., Youngblood, L., Cohen, B. A., Prengler, I. D., Cheng, D., & Masica, A. L. (2009). Reduction of 30-day postdischarge hospital readmission or emergency department (ED) visit rates in high-risk elderly medical patients through delivery of a targeted care bundle. *Journal of Hospital Medicine*, 4(4), 211–218. doi:10.1002/jhm.427
- Kommuri, N. V., Johnson, M. L., & Koelling, T. M. (2012). Relationship between improvements in heart failure patient disease specific knowledge and clinical events as part of a randomized controlled trial. *Patient Education and Counseling*, 86(2), 233–238. doi:10.1016/j.pec.2011.05.019
- Kripalani, S., Theobald, C. N., Anctil, B., & Vasilevskis, E. E. (2014). Reducing hospital readmission rates: Current strategies and future directions. *Annual Review of Medicine*, 64, 471–485. doi:10.1146/annurev-med-022613-090415
- McMurray, J. J., Adamopoulos, S., Anker, S. D., Auricchio, A., Bohm, M., Dickstein, K., ... Zeiher, A. (2012). ESC guidelines for the diagnosis and treatment of acute and chronic heart failure 2012: The Task Force for the Diagnosis and Treatment of Acute and Chronic Heart Failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. *European Journal of Heart Failure*, 14(8), 803–869. doi:10.1093/eurjhf/hfs105
- Mozzafarian, D., Benjamin, E. J., Go, A. S., Arnett, D. K., Blaha, M. J., Cushman, M., ... Turner, M. B. (2016). Heart disease and stroke statistics—2016 update: A report from the American Heart Association. *Circulation*, 133, e38–e360. doi:10.1161/cir.0000000000000350
- Ruppar, T. M., Cooper, P. S., Mehr, D. R., Delgado, J. M., & Dunbar-Jacob, J. M. (2016). Medication adherence interventions improve heart failure mortality and readmission rates: Systematic review and meta-analysis of controlled trials. *Journal of the American Heart Association*, 5(6). doi:10.1161/JAHA.115.002606
- Shan, D., Finder, J., Dichoso, D., & Lewis, P. S. (2014). Interventions to prevent heart failure readmissions: The rationale for nurse-led heart failure programs. *Journal of Nursing Education and Practice*, 4(11), 23–32. doi:10.5430/jnep.v4n11p23
- Vedel, I., & Khanassov, V. (2015). Transitional care for patients with congestive heart failure: A systematic review and meta-analysis. *Annals of Family Medicine*, 13(6), 562–571. doi:10.1370/afm.1844
- Yancy, C. W., Jessup, M., Bozkurt, B., Butler, J., Casey, D. E., Drazner, M. H., ... Wilkoff, B. L. (2013). 2013 AACC/AHA guideline for the management of heart failure: A report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *Journal of the American College of Cardiology*, 62(16), e147–e239. doi:10.1016/j.jacc.2013.05.019
- Yancy, C. W., Jessup, M., Bozkurt, B., Butler, J., Casey, D. E., Colvin, M. M., ... Westlake, C. (2017). 2017 ACC/AHA/HFSA focused update of the 2013 ACCF/AHA guideline for the management of heart failure: A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Failure Society of America. *Circulation*, 136(6), e137–e161. doi:10.1161/CIR.0000000000000509

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