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## Evaluating the Effectiveness of a Heart Improvement Toolkit Program: A Pilot Project

Cheryl L. Mitchell

*Eastern Kentucky University*

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Evaluating the Effectiveness of a Heart Improvement Toolkit Program: A Pilot Project

Submitted in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice  
at Eastern Kentucky University

By

Cheryl L. Mitchell

Richmond, Kentucky

2015

### Abstract

Heart failure (HF) is a chronic, debilitating disease resulting in over one million hospitalizations with an estimated 30.7 million dollars in total health care cost per year (Go et al., 2014).

Evidence shows that HF education programs that promote adherence to pharmacological and non-pharmacological provider recommendations are effective in reducing 30-day HF recidivism rates, increasing self-care behavior, and decreasing adverse clinical events. The purpose of this evidence-based project was to implement the Heart Improvement Toolkit (HIT) Program which is a one-on-one, comprehensive HF-specific education program, for patients with a HF diagnosis who have been admitted to non-cardiac specialty units. Program evaluation included 30-day recidivism rates, adverse clinical events, and self-care behavior (SCB).

*Keywords:* heart failure, self-care, patient education, knowledge, nursing, readmission

Evaluating the Effectiveness of a Heart Improvement Toolkit Program:

A Pilot Project

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## Evaluating the Effectiveness of a Heart Improvement Toolkit Program: A Pilot Project

### **Background and Significance**

Diseases of the heart have long been the leading cause of death in the United States contributing to over 597,000 deaths in 2010 (Centers for Disease Control and Prevention, 2013). The underlying etiology of heart disease is varied; however, the end-point for many individuals is heart failure (HF) (American Heart Association, 2014). Approximately 5.1 million persons in the United States are living with HF, with an expected 46% increase in prevalence by 2030 (Go et al., 2014).

While some improvements with medical management have been made over time, survival rates for individuals with HF are still very poor. Approximately 50% of individuals diagnosed with heart failure die within five years (Go et al., 2014). According to the Centers for Disease Control and Prevention (2013), HF-related mortality rates in Kentucky (216.2 per 100,000) far exceed national rates (166.3 per 100,000).

HF-related admissions may be preventable (Bocchi et al., 2008; Boyde, Turner, Thompson, & Stewart, 2011; Dahl & Penque, 2001; Gerdes & Lorenz, 2013; Grancelli et al., 2003; Jack et al., 2009; Jovicic, Holroyd, & Straus, 2006; Krumholz et al., 2002; Lambrinou, Kalogirou, Lamnisis, & Sourtzi, 2012; Naylor et al., 1994; Philbin, 1999; Rich et al., 1995); yet, in 2000 and 2010, there were one million HF-related admissions in the United States (Centers for Disease Control and Prevention, 2012). In 2012, HF-related health care cost utilization was approximately \$30.7 billion with a projected increase in annual health care cost of \$69.7 billion by 2030. At least 68% of total cost for HF management is attributed to direct medical costs (Go et al., 2014), including HF-related readmissions. HF-specific education and support programs may impact HF recidivism rates, thereby, reducing health care cost and resource utilization



(Bocchi et al., 2008; Boyde, Turner, Thompson, & Stewart, 2011; Dahl & Penque, 2001; Gerdes & Lorenz, 2013; Grancelli et al., 2003; Jack et al., 2009; Jovicic, Holroyd, & Straus, 2006; Koelling, Johnson, Cody, & Anderson, 2005; Krumholz et al., Lambrinou, Kalogirou, Lamnisos,; Naylor, et al., 1994; 2012; Philbin, 1999; Rich et al., 1995).

Central and Southeastern Kentucky area development districts (i.e., Big Sandy, Cumberland Valley, Gateway, Kentucky River, and Lake Cumberland) were among Kentucky's highest areas for HF-related hospitalization rates (Centers for Disease Control and Prevention [CDC], n.d.). Patients from these area development districts were included in the HIT program. The CDC has mapped the hospitalization rates using five categories. The numerical ranges in each category are from 9.8 to 59.4. National, state, and Kentucky area development district HF hospitalization rates by county are presented in Table 1. A tertiary care center serving these development districts documented 255 heart failure admissions in 2012. Of those 255 HF admissions, at least 63 patients (24.7%) were readmitted within thirty days of discharge (aggregate data only). Thus, the rate in this part of Kentucky exceeds the 15.6% national average for HF-related readmissions from 2010-2012 (Medicare.gov., n.d.).

Table 1

*Heart Failure Hospitalization Rate per 1,000 Medicare Beneficiaries, 65+, All Races, All Gender, 2010-2012 for US, Kentucky, and KY Area Development Districts, by county*

Geographical Area	HF Hospitalization Rate
<b>National</b>	15.6
<b>Kentucky</b>	21.6
<b>KY Area Development Districts</b>	
<b>Bluegrass</b>	
Fayette*	14.3
<b>Big Sandy</b>	
Johnson	27.2
Pike	29.4
Magoffin	29.9
Floyd	31.5
Martin	38.0
<b>Cumberland Valley</b>	
Whitley	25.8
Laurel	32.1
Harlan	45.4
Clay	52.7
Bell	59.4
<b>Gateway</b>	
Bath	20.8
Rowan	25.0
<b>Kentucky River</b>	
Owsley	23.0
Leslie	24.8
Perry	25.5
Wolfe	26.3
Knott	30.0
Breathitt	33.5
Letcher	52.3
<b>Lake Cumberland</b>	
Clinton	29.6
Adair	41.9

\*UK HealthCare is located in Fayette County. HF hospitalization rates in other Bluegrass counties range from 9.8 to 20.8.

With the skyrocketing costs of HF disease management and the looming threats to Medicaid and Medicare funding, the Centers for Medicare and Medicaid Services (CMS) implemented limited reimbursements for HF-related readmissions within thirty days from discharge (CMS, 2013). In addition to the economic and resource burden for health care organizations, HF-related readmissions may influence quality of life (QOL) (Bocchi et al., 2008; Boyde, Turner, Thompson, & Stewart, 2011; Brandon, Schuessler, Ellison, & Lazenby, 2009; DeWalt et al., 2006; Ditewig, Blok, Havers, & vanVeenendaal, 2010; Rich et al., 1995).

### **Problem Statement**

In some institutions, discharge education for HF patients is inconsistent and may be ineffective in providing patients with knowledge promoting adherence to pharmacological and non-pharmacological provider recommendations (Jack et al., 2009; Kommuri, Johnson, & Koelling, 2012; Paul, 2008). As a result, patients may experience recurrent hospitalizations and adverse clinical events which are not only costly, but may also diminish QOL. The purpose of this evidence-based project was to implement the HIT Program, a one-on-one, comprehensive HF-specific education program, for patients with a HF diagnosis who have been admitted to non-cardiac specialty units. Evaluation of the program included 30-day recidivism rates, adverse clinical events, and SCB. Adverse clinical events were operationally defined as HF-related Emergency Department (ED) visits, unscheduled acute outpatient cardiology clinic or urgent treatment center visits, length of stay for HF-related readmissions, myocardial infarction, and death.

## Theoretical Framework

### Self-Care: Concept Analysis and Definition

Self-care is an important outcome measure for patients with chronic diseases as it is critical for effective management of progressive disease (Sidani, 2011). Self-care for patients with HF may include symptom monitoring, weight management, dietary adherence, fluid management, and medication management (Riegel et al., 2009). Contributing factors to the importance of self-care include the prevalence of chronic health problems among the elderly, a shift in ideology from “cure” to “care”, economics, and patient knowledge and emphasis on improving their own health (Sidani, 2011). Patients with chronic illnesses are responsible for lifelong recognition of disease-specific symptoms to effectively manage their illness (Sidani, 2011). HF-specific patient education programs that promote self-care positively influence patient outcomes (Artinian, Magnan, Sloan, & Lange, 2002, Brandon et al., 2009, Caldwell, Peters, & Dracup, 2005, DeWalt et al., 2006; Jaarsma, Abu-Saad, Dracup, & Halfens, 2000; Jack et al., 2009; Riegel et al., 2009, Smeulders, et al., 2010).

The concept of self-care has been documented in the nursing literature for many decades. Orem (2001) identified two aspects of self-care: self-care agency and self-care. Self-care *agency* was defined as the capacity or ability of the patient to know and meet specific demands for basic physiological functioning and development. Self-care agency has several domains: cognitive, physical, emotional, and behavioral (Orem, 2001). Self-care, then, was a purposeful action word describing the actual practice or performance of behaviors necessary to maintain life, health, and well-being. Self-care is supported with domains including universal, development, and health-deviation. Riegel et al. (2004) distinguished between self-care and self-care management. Riegel (2004) defined self-care as a natural process in decision making, including selecting and

performing behaviors necessary to maintain health. Self-care management involves the decision-making process but is reactionary to symptoms related to disease processes. Sidani (2011) penned the essential attributes of self-care conceptually as the ability to perform health-related activities supported by a foundational process that includes recognition of symptoms, the capacity to accurately assess differences in medical conditions with appropriate intervention and evaluation of the acute health situation.

For the purposes of this capstone project, the term self-care behavior was used and operationally defined as the purposeful engagement of activities or behaviors necessary to manage HF-specific health conditions. Performance of health-related activities and/or behaviors may be influenced by cognitive, psychosocial, physical, demographic, and sociocultural factors.

### **Orem's Self-Care Deficit Nursing Theory**

Orem's (2001) self-care deficit nursing theory (SCDNT) provides a framework for promoting individual management of care and nurses helping patients manage their care. By applying concepts of Orem's SCDNT, nurses can identify the necessary action steps required to promote self-care in patients with HF. Identification of self-care deficits may decrease hospital recidivism rates and promote self-care among patients with HF (Artinian et al., 2002).

Orem's (2001) SCDNT has multiple entities. This project was framed on multiple constituent theories: (a) theory of self-care, (b) theory of self-care deficit, and (c) theory of nursing systems. All three constituent theories are relevant to disease-specific HF education and may influence outcomes in patients with HF.

Theory of self-care describes how and what individuals must do in an effort to maintain life and health (Orem, 2001). In order to meet self-care demands, specific self-care requisites must be in play and are recognized as maintenance of the following: air, food, water,

elimination, activity, rest, balance of social interaction and solitude, safety, and normalcy (Orem, 2001). In patients with HF, it is unfathomable to assume that effective disease management is achievable without self-care.

The theory of self-care deficit becomes relevant when individuals are no longer able to care for themselves and require assistance from nursing. When a deficit occurs and limitations exist, a relationship with nursing can be established (Orem, 2001). Nursing assessment and interventions are beneficial in helping to meet the patient's needs.

According to Orem (2001), the theory of nursing systems involves the role of nursing in meeting and/or assisting the patient to meet their self-care needs. Nursing facilitates this relationship by designing, producing, and facilitating actions that engage the patient or carer to perform self-care measures. There are three nursing systems within this phenomenon: (a) wholly compensatory nursing system; (b) partly compensatory nursing system; and (c) supportive-educative (developmental) nursing system (Orem, 2001). The supportive-educative developmental nursing system includes a combination of techniques including teaching, guidance, and support. In the supportive-educative nursing system, the patient has the ability to perform self-care measures but cannot be successful without the assistance of nursing (Orem, 2001). HF-specific disease management education programs may play a significant role in facilitating knowledge and self-care in patients with HF.

### **Literature Review and Synthesis**

Literature, with a focus on the effect of HF-specific patient education programs on 30-day HF recidivism rates, adverse clinical events, and self-care behaviors, served as a foundational basis for this review. Databases included in the search were The Cochrane Libraries, Medical Literature Analysis and Retrieval System Online (MEDLINE), and

Cumulative Index to Nursing and Allied Health (CINAHL). Key terms included heart failure, knowledge, patient education, nursing, self-care, and readmission. Studies were selected based on inclusion of an educational intervention related to HF disease management or promotion of self-care in HF patients. Studies were excluded if outcomes related to 30-day HF recidivism rates, adverse clinical events, or self-care behaviors were not reported. For a more global perspective, studies from outside the United States were included. No limitations were placed on locality or age. Both large and small sample sizes were included to determine trends related to significance reflective of sample size.

Collectively, the majority of studies reviewed were randomized control trials (RCT) with HF-specific education programs designed to improve outcomes in patients with HF (Bocchi et al., 2008; Brandon, 2009; Caldwell et al., 2005; Davis et al., 2012; Dewalt et al., 2006; Dracup et al., 2014; Jaarsma et al., 2008; Jack et al., 2009; Koelling et al., 2005; Kommuri, et al., 2012; Krumholz et al., 2002; Naylor et al., 1994; Powell et al., 2010; Rich et al., 1995; Rich et al., 1993; Smeulders et al., 2010). Four systematic reviews/meta analyses were included (Boyde et al., 2011; Ditewig et al., 2010; Jovicic et al., 2006; Lambrinou et al., 2012). No qualitative studies were included as evidence for a HF education intervention.

### **Integrative Summary of HF Education Literature**

#### **Patient characteristics and setting.**

Most studies had sample sizes greater than 100 (Bocchi et al., 2008; Dahl & Penque, 2001; Davis et al., 2012; DeWalt, et al., 2006; Dracup et al., 2014; Gerdes & Lorenz, 2013; Jaarsma et al., 2000; Jaarsma et al., 2008; Jack et al., 2009; Koelling et al., 2005; Kommuri et al., 2012; Naylor et al., 1994; Powell et al., 2010; Rich et al., 1995; Smeulders et al., 2010; Veroff et al., 2012; Grancelli et al., 2005); relatively few studies had less than 100 participants (Brandon et

al., 2009; Caldwell et al., 2005; Krumholz et al., 2002; Rich et al., 1993). Settings included acute care hospitals (Dahl & Penque, 2001; Davis et al., 2012; Jack et al., 2009; Koelling et al., 2005; Kommuri et al., 2012; Naylor, et al., 1994; Rich et al., 1995; Rich et al., 1993) and outpatient cardiology clinics (Bocchi et al., 2008; Caldwell et al., 2005; DeWalt et al., 2006, Dracup et al., 2014; Gerdes & Lorenz, 2013; Krumholz et al., 2002; Powell et al., 2010; Smeulders et al., 2010). At least three studies included rural patient populations (Brandon et al., 2009; Caldwell et al., 2005; Dracup et al., 2014). Veroff et al. (2012) studied individuals who were covered by the Medicare Advantage Program. Throughout the literature, studies included more males than females. This is consistent with health data indicating an increase in HF hospitalizations for males, and a decrease in HF hospitalizations for females (CDC, 2012). Consistent with the natural occurrence of HF, studies in this review did not include anyone under the age of 18.

### **Description of interventions.**

Interventions for HF education have taken many forms. Nurses provided HF-specific education in the majority of the studies (Brandon et al., 2009; Caldwell et al., 2005; Dahl & Penque, 2001; Davis et al., 2012; Dracup et al., 2014; Grancelli et al., 2005; Jaarsma et al., 2000; Jaarsma et al., 2008; Jack et al., 2009; Kommuri et al., 2012; Krumholz et al., 2002; Powell et al., 2010; Smeulders et al., 2010). Several investigators used interprofessional teams, including, but not limited, to pharmacists, dieticians, psychologists, health educators, cardiologist, and social workers (Bocchi et al., 2008; Dahl & Penque, 2001; DeWalt et al., 2006; Gerdes & Lorenz, 2013; Naylor et al., 1994; Rich et al., 1995). The location of the educational interventions varied. Some were located in acute care hospital settings (Dahl & Penque, 2001; Davis et al., 2012; Jack et al., 2009; Koelling et al., 2005; Kommuri et al., 2012); and others in



outpatient cardiology clinics (Bocchi et al., 2008; Caldwell et al., 2005; DeWalt et al., 2006, Dracup et al., 2014; Gerdes & Lorenz, 2013; Krumholz et al., 2002; Powell et al., 2010; Smeulders et al., 2010). A few investigators included home visits (Jaarsma et al., 2000; Jaarsma et al., 2008; Krumholz et al., 2002; Rich et al., 1995). The duration of initial education sessions varied greatly. Some were less than 60 minutes (Brandon et al., 2009; Dahl & Penque, 2001; Dracup et al., 2014, Jack et al., 2009); most were one to two hours (Bocchi et al., 2008; DeWalt et al., 2006; Koelling et al., 2005; Kommuri et al., 2012; Krumholtz et al., 2002); and a few were longer than two hours (Gerdes & Lorenz, 2013; Powell et al., 2010; Smeulders et al., 2010). Several investigators did not report the duration of the initial education session (Caldwell et al., 2005; Davis et al., 2012; Jaarsma et al., 2000; Lee et al., 2011; Naylor et al., 1994; Rich et al., 1995; Rich et al., 1993; Veroff et al., 2012). The number of HF education sessions varied across the studies from a single session (Davis et al., 2012; DeWalt et al., 2006; Dracup et al., 2014; Gerdes & Lorenz, 2013; Jack et al., 2009; Koelling et al., 2005; Kommuri et al., 2012) to multiple sessions (Bocchi et al., 2008; Brandon et al., 2009; Caldwell et al., 2005; Naylor et al., 1994; Powell et al., 2010, Rich et al., 1995; Rich et al., 1993; Smeulders et al., 2010). Many included follow-up phone-calls to reinforce adherence to a prescribed regimen, assess for symptom exacerbation, answer patient questions, and/or determine if additional education was needed (Bocchi et al., 2008; Brandon et al., 2009; Caldwell et al., 2005; Dahl & Penque, 2001; Davis et al., 2012; DeWalt et al., 2006; Dracup et al., 2014; Grancelli et al., 2005; Jaarsma et al., 2000; Jaarsma et al., 2008; Jack et al., 2009; Kommuri et al., 2012; Krumholtz et al., 2002; Naylor et al., 1994; Rich et al., 1995; Rich et al., 1993).

**Educational content.**

Most investigators included HF-specific content congruent with the 2013 American College of Cardiology Foundation (ACCF) and American Heart Association (AHA) Guidelines for the Management of Heart Failure (Yancy et al., 2013). The majority of investigators included symptom monitoring with a designated plan for symptom exacerbation, weight monitoring, dietary sodium restriction, medications, physical activity, or self-care behaviors (Bocchi et al., 2008; Brandon et al., 2009; Caldwell et al., 2005; Dahl & Penque, 2001; Davis et al., 2012; DeWalt et al., 2006; Dracup et al., 2014; Gerdes & Lorenz, 2013; Grancelli et al., 2005; Jaarsma et al., 2000; Jaarsma et al., 2008; Jack et al., 2009; Koelling, et al., 2005; Kommuri et al., 2012; Krumholtz et al., 2002; Lee et al., 2011; Naylor et al., 1994; Powell et al., 2010; Rich et al., 1995; Rich et al., 1993; Smeulders et al., 2010; Veroff et al., 2012). According Yancy et al. (2013), non-adherence to dietary sodium restriction and medications are common issues that precede HF-related admissions.

Many investigators have studied cognitive/behavioral interventions within this population. Davis et al. (2012) evaluated environmental manipulation and training for HF-patients with mild cognitive functioning. HF education has been delivered in multiple formats: verbal and written (Caldwell et al., 2005; Dahl & Penque, 2001; DeWalt et al., 2006; Dracup et al., 2014; Gerdes & Lorenz, 2013; Jaarsma et al., 2000; Jaarsma et al., 2008; Jack et al., 2009; Kommuri et al., 2012; Krumholz et al., 2002; Naylor et al., 1994; Powell et al., 2010; Rich et al., 1995; Rich et al., 1993; Smeulders et al., 2010); verbal, written, and audiotape (Davis et al., 2012); written with audiovisual decision aids (Veroff et al., 2012); and written with telephone contact (Grancelli et al., 2005). Written materials included booklets, brochures, and diaries to record and monitor symptoms, daily weighing, dietary sodium intake, and follow-up appointments.

### **Commonly Reported Outcomes**

A variety of outcomes have been reported. Impact of illness outcomes includes 30-day readmission rates, all-cause readmission rates, adverse clinical events, and length of stay (LOS) for readmission (Bocchi et al., Brandon et al., 2009; Dahl & Penque, 2001; Gerdes & Lorenz, 2013; Grancelli et al., 2005; Jack et al., 2009; Krumholz et al., 2002; Lambrinou et al., 2012; Naylor et al., 1994; Rich et al., 1995; Rich et al., 1993). Self-reported patient outcomes included self-care behavior, knowledge, and QOL (Brandon et al., 2009, Caldwell, et al., 2005, Davis et al., 2012; DeWalt et al., 2006; Jaarsma, et al., 2000; Jack et al., 2009; Reigel et al., 2009, Rich et al., 1995; Smeulders, et al., 2010).

### **Evidence Supporting HF Education**

#### **30-day readmissions, all-cause readmissions, and adverse clinical events.**

In one of the earliest investigations, Rich et al. (1993) evaluated the impact of a non-pharmacological, interprofessional educational intervention on 90-day HF-related readmissions, LOS, and cost for 98 acute care patients with HF. In this prospective, randomized pilot study, the intervention group received HF-specific patient education, strategies to promote medication adherence, early discharge planning, and post-discharge follow-up (home visits and phone calls); the control group received usual care. Usual care included conventional treatments as ordered by physician and routine services provided by other hospital services. The intervention group did not have significantly fewer readmissions or total number of hospitalized days compared to the control group. However, the percentage of readmissions and total number of hospitalized days were reduced for the intervention group compared to the control group. Rich et al. (1995) continued their work evaluating the effect of an interprofessional HF-education program on readmissions, cost, and QOL in 282 hospitalized with HF. Following randomization into groups,

the intervention group had significantly lower HF-related readmissions ( $p = 0.04$ ) and more improvement in QOL scores ( $p = 0.001$ ) than the control group. In their earlier work, the investigators attributed a small sample size ( $N = 98$ ) as a potential limitation to differences in outcomes.

In an RCT, Naylor et al. (1994) investigated the effect of comprehensive discharge planning on hospital readmission, and cost for 123 patients with medical diagnoses (including HF) and surgical diagnoses. A nurse-led, interprofessional team provided disease-specific education for patients and caregivers during hospitalization with two follow-up phone calls post discharge. The medical intervention group had significantly lower readmission rates ( $p = 0.04$ ) and health care costs ( $p = 0.001$ ) at six weeks; however, significance for readmission and cost did not extend to 12 weeks.

Dahl & Penque (2001) used a pretest/post-test design to evaluate the effects of an advanced practice nurse (APN)-directed HF program on readmission, LOS, and mortality in a sample of 1,193 hospitalized patients with HF. The education sessions were taught by the APN with referral to a social worker or dietician if needed. Other program aspects included a HF pathway and order set. Compared to pre-program patients for a similar time period, the program group had significantly lower rates of readmission at 90-days ( $p = 0.046$ ). However, readmission rates at 15- and 30-day intervals were not significantly different. LOS ( $p < 0.001$ ) and mortality rates ( $p < 0.05$ ) were significantly lower for the program group than the pre-program group.

Krumholz et al. (2002) investigated the effects of an education and support intervention on readmissions, mortality, and cost for 88 recently discharge HF patients. Following randomization into groups, the intervention group received a one-hour, face-to-face education session within two weeks of discharge with follow-up phone calls. The investigators did not

report specific details regarding the control group. The intervention group had significantly lower risks of readmission or death ( $p = 0.01$ ), and significant reductions in hospital associated costs ( $p = 0.04$ ) compared to the control group.

In an RCT, Grancelli et al. (2003) evaluated the effects of a telephone intervention on HF-related admissions, mortality, and QOL for 1,518 outpatients with HF. The intervention group received verbal and written HF-specific education. Patients received serial phone calls based on evidence-based criteria for HF-related readmissions. The intervention group had a significantly greater relative risk reduction (RRR) for HF-related admissions ( $p = 0.005$ ); and significantly greater QOL scores ( $p = 0.001$ ) than the control group. The groups did not differ significantly in mortality rates.

Koelling et al. (2005) conducted an RCT with 223 HF hospitalized patients with HF to test the effectiveness of a HF-specific education program on HF-related hospitalizations, mortality, and SCB. The intervention group received individualized, nurse-led, education sessions prior to discharge; the control group received usual care with routine discharge information. The intervention group had significantly fewer hospitalization days ( $p = 0.009$ ) and health care cost ( $p = 0.001$ ) compared to the control group. In a subsequent study, Kommuri et al. (2012) evaluated the relationship between knowledge and clinical outcomes. As part of the previous RCT, the intervention group had significantly higher knowledge scores ( $p = 0.007$ ) than the control group. Lower knowledge scores were significantly associated with readmission or death ( $p = 0.002$ ).

In an RCT, Bocchi et al. (2008) evaluated the effectiveness of a disease management program on hospitalizations, long-term survival, and QOL in 350 ambulatory care patients with HF. A multidisciplinary team provided one-hour educational sessions to patients and their

caregivers. The intervention group had significantly better outcomes than the control group, including adherence to the program ( $p < 0.001$ ), RR (relative risk) to first hospitalization or mortality ( $p = 0.008$ ), and QOL ( $p < 0.003$ ).

Brandon et al. (2009) investigated the effect of an APN-led telephone intervention on readmission rates, SCB, and QOL for 20 outpatients with HF. Using a pre-test/post-test experimental design, the intervention group received a series of phone calls by an APN for 12 weeks while the control group received usual care from their cardiologist. Compared to the usual care group, the intervention group had a significant reduction in hospital readmissions ( $p = 0.013$ ), improvement in self-care behaviors ( $p < 0.001$ ), and QOL scores ( $p = 0.026$ ).

Jack et al. (2009) conducted an RCT to evaluate the effect of an inpatient hospital discharge program for 749 HF patients on hospital utilization. Nurse discharge advocates provided HF-specific education to the intervention group while the control group received usual care. Post-discharge phone calls were made by pharmacists to review medications and plans of care. The intervention group had significantly lower rates of hospital utilization 30 days post-discharge ( $p = 0.009$ ) than the control group.

In a systematic review of the literature, Lambrinou et al. (2011) reported on the effectiveness of nurse-led discharge programs on reducing HF and all-cause readmissions. Nineteen RCTs were reviewed. Most studies included an inpatient and outpatient component including follow-up phone calls. Based on these trials, the authors reported a significant RR for HF readmissions ( $p < 0.05$ ); and all-cause readmission ( $p < 0.05$ ) in support of nurse-led discharge programs.

Gerdes & Lorenz (2013) used a pre-intervention/post-intervention design to evaluate the effect of an outpatient interprofessional education program on 30-, 60-, and 180-day

readmissions for 170 outpatients with HF. A retrospective approach was utilized to collect pre-intervention data for the usual care group. Both the intervention and usual care groups received usual bedside education, including written and verbal information on HF disease management. The intervention group received an additional 3-hour educational session from multiple disciplines. The intervention group had significantly lower 30-day readmission rates ( $p = 0.021$ ) compared to the usual care group; comparisons at 60- and 180-days were not significant.

### **Self-Care.**

Self-care can be challenging for patients with HF; yet, it is an essential component associated with life-long management and influences patient outcomes (Artinian et al., 2002; Carlson, Riegel, & Moser, 2000; Lee et al., 2011; Jaarsma et al., 2000). Several studies provided evidence on the effect of HF-specific patient education on self-care behaviors (Brandon et al., 2009, Caldwell, et al., 2005, Davis et al., 2012; DeWalt et al., 2006; Jaarsma, et al., 2000; Jack et al., 2009; Reigel et al., 2009, Smeulders, et al., 2010); other studies did not report significant outcomes on the effect of self-care on HF-related readmissions (Davis et al., 2012; Dracup et al., 2014; Powell et al., 2010).

Jaarsma et al. (2000) described the effect of an education program on HF self-care behaviors for 128 hospitalized patients with HF. In this RCT, the intervention group received HF-specific education and support during hospitalization with telephone support, and at least one home visit post-discharge. The control group received standard care without additional education and support. The intervention group had significantly higher SCB scores at one-month ( $p < 0.001$ , ES = 0.69) and three-months ( $p = 0.005$ , ES = 0.51); significance was not reported at nine-months compared to the control group, although a small effect size is noted ( $p = 0.11$ , ES = 0.30).

In an RCT, Caldwell et al. (2005) investigated the effects of an outpatient symptom-focused educational and counseling program on knowledge, SCBs, and disease severity for 36 rural patients with HF. The intervention group received one-on-one education and training on HF-specific education and barriers to self-care and a follow-up phone call. The control group received usual care plus written materials. The intervention group had significantly higher SCB scores for daily weights ( $p = 0.01$ ) and significantly higher knowledge scores ( $p = 0.03$ ) measured at three months when compared with the control group.

DeWalt et al. (2006) demonstrated the effectiveness of a HF self-management program on hospitalizations and mortality in an RCT with 123 outpatients with HF. The intervention group received education on HF-specific SCBs: daily weighing, self-dose adjustment of diuretics, and symptom monitoring and response. The intervention group had significantly lower rates of rehospitalization or death ( $p = 0.013$ ) compared to the control group. There were no significant differences between lower and higher literacy patients.

Smeulders et al. (2010) investigated the effect of a nurse-led disease management program on SCB, cardiac-specific QOL, and cognitive symptom management (CSM) in 317 outpatients with HF. Following randomization into groups, the intervention group received usual care plus a six-week self-management program led by a cardiac nurse specialist and peer patient representative. The control group received usual care with outpatient clinic visits. The intervention group had significantly higher SCB scores ( $p = 0.008$ ,  $ES = 0.18$ ) and CSM scores ( $p < 0.001$ ,  $ES = 0.34$ ); however, significance was not achieved at six- and 12-months.

Using data from their previous observational studies, Lee et al. (2011) conducted a secondary analysis to examine the association between self-care management and event risk for 195 patients with HF. Patients were categorized into groups based on mean self-care



management scores: above-average, below-average, and symptom-free. Patients who engaged in above-average self-care management and those who were free of symptoms had significantly greater RRR of adverse events ( $p < 0.05$ ) compared to those who performed below-average self-care behaviors.

Davis et al. (2012) hypothesized that mild cognitive impairment (MCI) would be prevalent in the HF patient population and hinder their ability to perform self-care behaviors. Thus, in their RCT with 125 hospitalized HF patients, the intervention group received disease-specific education with environmental manipulation and training utilizing aids to facilitate memory (medication organizer, personal schedule, and symptom tracker). The control group received usual discharge information with written materials. Self-care was measured with the Self-Care of Heart Failure Index (SCHFI) which includes three subscales: self-care maintenance, self-care management, and self-care confidence. There was no statistically significant difference in readmission rates, but a small ES was noted in mean SCHFI scores for self-care maintenance ( $p = 0.711$ ,  $ES = .22$ ) and self-care management ( $p = 0.430$ ,  $ES = 0.21$ ).

### **Evidence Supporting the HIT Program**

The toolkit for the HIT program contains several literacy-sensitive educational components and health literacy teaching principles (see Appendix A for HIT components). The following sections discuss evidence supporting medication adherence, dietary sodium adherence, daily weight measurements, symptom monitoring, and physical activity. This section also includes discussion of health literacy and health literacy teaching principles. In patients with HF, adherence to pharmacological and non-pharmacological provider recommendations influences outcomes.

#### **Medication adherence.**

HF patients require a variety of medications to manage their chronic illness (Yancey et al., 2013). There is strong evidence that failure to adhere to medication regimens may precede HF-related hospitalizations or adverse clinical events (Esposito, Bagchi, Verdier, Bencio, & Myoung, 2009; Hope, Wu, Corley, Lennie, & Moser, 2012; Vinson, Rich, Sperry, Shah, & McNamara, 1990; Wu, Moser, Chung, & Lennie, 2008; Wu, Moser, Lennie, & Burkhart, 2008; van der Wal, & Jaarsma, 2008). In a descriptive correlational study, Hope et al. (2004) described the association of medication adherence, knowledge, and skills and ED visits in 314 patients with HF enrolled in a separate RCT. Participants who did not adhere to prescribed medications had a significantly greater risk of an ED visit ( $p = 0.001$ ). Esposito et al. (2009) reported on the association between medication adherence and health care resource utilization and cost for 37,408 Medicaid patients with HF. Individuals who were adherent had significantly less hospital and ED utilization ( $p = 0.01$ ); and less health care costs ( $p < 0.01$ ) compared to individuals who were nonadherent.

Wu et al. (2012) conducted an RCT to investigate the effect of a medication-taking behavior feedback theory-based intervention on adverse clinical events, QOL, and medication adherence in 82 outpatients with HF. The intervention groups received multiple education sessions on attitudes, beliefs, and medication adherence skills. The Lite group received education and counseling only while the PLUS group received feedback and support from investigators on medication-taking behaviors. Participants in the Plus and Lite intervention groups had significantly longer event-free survival ( $p < 0.05$ ) compared with the control group. The authors concluded that medication adherence is an essential element to prevention of HF-related readmissions and adverse clinical events.

### **Dietary adherence.**

Numerous investigators have demonstrated the effect of dietary sodium on patient outcomes (Kollipara et al., 2008; Son, Lee, & Song, 2011; van der Wal, van Veldhuisen, Veeger, Rutten, & Jaarsma, 2010). In patients with HF, a disproportionate amount of dietary sodium is directly linked to fluid volume excess. HF patients are vulnerable to excessive fluid volume which may lead to symptom exacerbation and frequent hospitalizations. Dietary sodium restriction is common in the non-pharmacological management of HF (Yancy et al., 2013).

Kollipara et al. (2008) evaluated the relationship between dietary sodium knowledge and HF-related readmission in a correlational study with 97 hospitalized patients with HF. Patients with lower dietary sodium knowledge scores had a significantly higher risk of 90-day readmission ( $p = 0.02$ ) compared to patients with higher knowledge scores. In a cohort study, van der Wal et al. (2010) investigated the relationship between adherence to dietary sodium, fluid restriction, daily weight measurement, and exercise and HF-related hospitalization and mortality in 830 recently discharged patients with HF. Patients who were non-adherent to dietary sodium, fluid restriction, daily weight measurements, and exercise had significantly greater HF-related hospitalizations and mean HF-related LOS ( $p < 0.01$ ). Non-adherence to daily weights following discharge was significantly associated with mortality ( $p = 0.02$ ).

In a cohort study of 232 outpatients with HF, Son et al. (2011) evaluated the association of adherence to dietary sodium restriction with symptom exacerbation and cardiac event-free survival. Patients who were non-adherent to dietary sodium restriction had significantly more HF-related symptoms ( $p < 0.007$ ) and significantly shorter times to cardiac event-free survival than patients who were adherent to dietary sodium restrictions ( $p = 0.008$ ).

According to Yancey et al. (2013), provider recommendations for fluid restriction are largely driven by individual clinical experiences and the classification of HF. Patients with

refractory HF may benefit from fluid restriction (1.5 – 2 liters per day) due to hyponatremia. Research evidence varies on clinical recommendations for fluid restriction. In an RCT, Travers et al. (2007) evaluated the effect of fluid restriction on time to clinical stability in 67 patients with class IV HF. The fluid restriction group did not have significantly shorter time to clinical stability ( $p = 0.17$ ) compared to the free fluid group. Similarly, Badin et al. (2013) conducted an RCT to compare the effect of aggressive fluid and dietary sodium restrictions on weight loss and clinical stability. The intervention group did not have significantly lower weight ( $p = 0.82$ ), clinical congestion ( $p = 0.47$ ), or readmission rates ( $p = 0.41$ ) compared to the control group.

Philipson, Ekmon, Forslund, Swedberg, and Schaufelberger (2013) investigated the effect of sodium and fluid restriction in 97 patients with chronic HF. In this RCT, the intervention group received tailored education and counseling on dietary sodium and fluid restriction while the control group received standard HF education with cautionary instructions for dietary sodium and fluid intake. Specific parameters for dietary sodium (2 – 3 grams per day) and maximum fluid intake (1.5 liters per day) were recommended. The intervention group had significantly greater improvement in New York Heart Association Functional Classification (NYHA) and leg edema ( $p < 0.001$ ).

### **Symptom monitoring.**

Research evidence shows that early recognition of symptom exacerbation significantly reduces hospitalization and adverse clinical events (Lee, Lennie, Warden, Jacobs-Lawson, & Moser, 2013). Patients with HF experience a myriad of symptoms including, but not limited to, dyspnea, fatigue, anorexia, nausea, peripheral edema, weight gain, confusion, pulmonary

congestion, coughing, and tachycardia. Dyspnea was described as one of the most commonly reported symptoms; yet, it was associated with delayed communication with health care providers. *Acute* onset of dyspnea prompts earlier communication with health care providers (Lam & Smeltzer, 2013).

In a pilot study, Lee et al. (2013) used an experimental design to investigate the effect of a comprehensive symptom management program on event-free survival, health-related QOL, and fluid-status monitoring behaviors in 34 HF patients with recent cardiac-related hospitalizations. The intervention group received home-based written and verbal education and training utilizing a symptom diary, but the control group received standardized discharge education including written information on dietary sodium restriction, medications, and HF. The intervention group had significantly longer event-free survival ( $p = 0.03$ ) than the control group. Health-related QOL scores were not significantly different between groups.

Jurgens, Lee, Reitano, and Riegel (2013) conducted an RCT to evaluate the effectiveness of symptom monitoring and response training on event-free survival in 99 outpatients with HF. In this pilot study, the intervention group received symptom-focused written and verbal education sessions, personal scale for daily weight measurements, and at least one home visit. The control group received written educational materials and personal scales. The intervention group had significantly higher self-care maintenance, management, and confidence scores ( $p < 0.01$ ) when compared to the control group. Event-free survival was not significantly different between groups.

#### **Daily weight measurements.**

Daily weight measurements are an objective indicator of fluid volume excess and are essential self-care behaviors for HF patients. Less than 45% of patients report adherence to daily

weight measurements (McEntee, Cuomo, & Dennison, 2009). A sudden increase in body weight may require treatment adjustments or signify worsening HF requiring hospitalization. Chaudhry, Wang, Concato, Gill, and Krumholz (2007) described the association of weight patterns and the risk of HF-related hospitalization. Hospitalized HF patients (case) experienced incremental changes in weight approximately 30 days prior to hospitalization when compared to patients without HF-related hospitalization (control). Weight changes for comparison between case and control groups was significant ( $p = 0.001$ ).

Jones et al. (2012) found that adherence to daily weights was associated with lower odds of hospitalizations or ED visits (odds ratio 0.42, 95% confidence interval 0.23 – 0.76) for 297 outpatients with HF. In 2014, Jones and others extended their previous work investigating self-reported and diary recorded weight measures and the association with HF-related hospitalization. The investigators reported that patients who performed optimal daily weighing with a diary-based measure had a significantly lower incidence rate of hospitalization (IRR 0.32, 95% confidence interval 0.15 – 0.70). Self-reporting recall of daily weight measurements was not significantly associated with fewer hospitalizations compared to daily weighing with a diary-based measure.

### **Physical activity.**

Physical activity can be challenging for HF patients due to commonly reported symptoms of dyspnea, fatigue, and edema; however, evidence shows regular physical activity (exercise training) is beneficial for patients with stable HF (Davies et al., 2010; Yancey et al., 2013). In an RCT, Belardinelli, Georgiou, Cianci, and Purcaro (1999) investigated the effects of long-term

moderate exercise training on functional capacity, QOL, hospital readmission, and mortality for 99 patients with stable HF. The intervention group participated in exercise training; the control group did not receive exercise training. The intervention group had significant improvements in QOL scores ( $p < 0.001$ ), lower rates of HF-related readmissions ( $p = 0.02$ ), and mortality ( $p = 0.001$ ).

Corvera-Tindel, Doering, Woo, Khan, & Dracup (2004) conducted an RCT to investigate the effects of a home walking exercise program on functional status and HF-related symptoms in 79 HF patients. The control group maintained their normal activity; but the intervention group had prescriptive walking exercise plans. The intervention group had significantly improved on six-minute walk assessments ( $p = 0.001$ ), and significantly less reports of dyspnea or fatigue symptoms ( $p = 0.03$ ). Gary (2006) reported similar results on the effect of a walking program on self-efficacy for exercise endurance, functional performance, depression, and QOL for 32 older women with diastolic HF. After completing a 12-week walking program, the intervention group had significant improvements from baseline in walking distance ( $p = 0.002$ ), QOL ( $p = 0.002$ ), and depression ( $p = 0.012$ ).

Pozhel, Duncan, Hertzog, and Norman (2010) utilized an experimental design to evaluate the effects of a HF exercise and training camp (HEART CAMP) on self-efficacy, QOL, physical functioning, and HF-related symptoms in 42 outpatients with HF. The intervention group participated in 12-week education and exercise training sessions while the control group received education only. The intervention group had significantly improved self-efficacy exercise scores ( $p = 0.01$ , ES = 0.31) and significantly fewer HF-related symptoms ( $p < 0.03$ , ES = 0.04).

### **Health literacy.**

Health literacy was defined as the ability to read, comprehend, and perform health-related behaviors (U.S. Department of Health and Human Services, n.d.). Research evidence shows that patients with adequate health literacy have improved self-care abilities and health-related knowledge (Baker, Parker, Williams, & Clark, 1998; Chen et al., 2011; Dennison et al., 2011); while patients with low or marginal health literacy have unfavorable outcomes (Baker et al., 2002; Peterson et al., 2011).

In a prospective cohort study, Baker et al. (2002) investigated the effect of inadequate health literacy on the risk of hospitalization in 3,260 Medicare patients. Patients with inadequate health literacy had a significantly higher risk of hospitalization (RR = 1.43; 95% CI 1.24, 1.6) than patients with adequate health literacy. Peterson et al. (2011) utilized a retrospective cohort design to investigate the effects of health literacy on patient outcomes in 1,494 patients with HF. Patients with inadequate health literacy was significantly associated with mortality ( $p = 0.001$ ) compared to patients with adequate health literacy.

#### **Health literacy teaching principles.**

Health literacy teaching principles include use of plain language, and “teach-back” methods. Utilizing teach-back and plain language methods allows for understanding and verbalization of what is learned (The Joint Commission, 2007). Schillinger et al. (2003) found that use of interactive communication techniques and adequate health literacy was significantly associated with improved patient outcomes. In a prospective cohort study, White, Gerbez, Carroll, Brinker, & Howie-Esquivel (2013) investigated the effect of a teach-back educational intervention on knowledge and hospital admissions in 276 patients with HF. After utilizing teach-back methods, patients answered evaluation questions correctly 84.4% of the time during hospitalization, and 77.1% of the time correctly post-discharge. HF-related readmissions were



not significantly associated with utilization of teach-back methods; however, the authors reported low HF-related admission rates prior to the investigation.

Evidence reviewed in this paper support HF-specific patient education programs that promote adherence to pharmacological and non-pharmacological provider recommendations. Individuals with HF require disease-specific knowledge and the ability to perform self-care skills to prevent readmissions and adverse clinical events. Both inpatient (Dahl & Penque, 2001; Davis et al., 2012; Jack et al., 2009; Koelling et al., 2005; Kommuri et al., 2012) and outpatient (Bocchi et al., 2008; Brandon et al., 2009; Caldwell et al., 2005; DeWalt et al., 2006, Gerdes & Lorenz, 2013; Grancelli et al., 2003; Krumholz et al., 2002; Smeulders et al., 2010) HF-education programs have demonstrated improvement in patient outcomes and may reduce health care cost and resource utilization.

## **Methods**

### **Process Improvement Framework**

This project utilized Langley, Nolan, Nolan, Norman, and Provost's (2009) model for process improvement. The model represents a systematic process that incorporates a specific aim, measures, and appropriate change processes that correspond with action steps: Plan-Do-Study-Act (PDSA). The first step of the PDSA cycle is "plan" which includes identification of project objectives, making predictions about proposed change, and identifying intricacies of the plan to test change. "Do" is the next action step which includes implementing the plan, data collection, and beginning data analysis. In the "study" phase, data analysis is completed with interpretation of results and summarization of what is learned. "Act" is the final step of the PDSA process improvement framework. Decisions to fully implement the pilot project and planning for additional cycles occur in this phase (Langley, et al., 2009).

## **Project Description**

This evidence-based project evaluated the effectiveness of a nurse-led, one-on-one, comprehensive HF-specific education program for patients with HF admitted on units which do not specialize in cardiac care. The project was implemented at an 825-bed tertiary care center in Central Kentucky. This hospital provides services for Kentucky's highest areas for HF-related hospitalizations. The project was designed to promote self-care behaviors in patients with HF. The HIT program provided HF-specific education in addition to usual discharge care. Outcome measures were 30-day recidivism, adverse clinical events, and SCB. Adverse clinical events were operationally defined as HF-related Emergency Department (ED) visits, unscheduled cardiology clinic or urgent treatment center visits, length of stay for HF-related readmissions, myocardial infarction, and death.

The HITs (Appendix A) were designed and funded by the UK HealthCare Don and Cathy Jacobs Education Center and UK Gill Heart Institute. An iPad featuring HealthClips were also used as an alternative method of instruction (Milner-Fenwick, 2015).

## **Project Design**

A pre-test, post-test design was used to test the effectiveness of the HIT program. After Institutional Review Board (IRB) approval from the University of Kentucky (Appendix B), and Eastern Kentucky University respectively (Appendix C), participants enrolled in the HIT program received at least one nurse-led, comprehensive, one-on-one education session, and two post-discharge phone calls. After obtaining informed consent, demographic data was collected and baseline SCHFI were completed (Appendix D).

Next, a cardiac expert nurse conducted one-on-one, comprehensive education sessions using the HIT and iPad with HF-related video clips. Educational content was individualized for

each patient based on SCHFI responses or patient identification of HF-specific self-care behaviors. Content included the following: pathophysiology of HF, medication adherence, dietary sodium adherence, symptom monitoring, daily weight measurements, physical activity, and the importance of follow-up appointments. Educational sessions ranged from 20 to 50 minutes in length and were conducted in the patient's hospital room. Teach-back methods were used for evaluation of learning.

Participants were contacted by phone at least 15- and 30-days post-discharge to complete SCHFI and to obtain report of HF-related readmissions and adverse clinical events. When indicated, additional HF-specific education was provided. In addition to patient/caregiver reports, a data extract request was submitted to UK Center for Clinical and Translational Science (CCTS) for evaluation of HF-related readmissions, HF-related ED visits, unscheduled outpatient cardiology visits, myocardial infarction, and death.

### **Population/Setting**

The HIT Program was implemented at a large, academic medical center in central Kentucky. Male and female adult patients (age 18 years and older) were invited to participate in the HIT program if they met the following criteria: (a) admitted to with a primary or secondary diagnosis of HF, (b) managed by Cardiology, Cardiothoracic, or Internal Medicine services, (c) admitted to one of the designated units (7 East, 6 South, Ground Clinical Decision Unit, and Second Floor Clinical Decision Unit), (d) capable of providing their own consent for care, (e) discharged to a home residence, and (f) available by phone contact for data collection at 15- and 30-days post-discharge. HF diagnoses were defined by the *Heart Failure International Classification of Disease (ICD) Codes - 9* found in Appendix E (CMS, n.d.). Patients were not

excluded based on gender, race, annual income, education, or marital status. Participation in the HIT Program was voluntary with no monetary rewards or prizes.

Patients were identified via the hospital's computer system, Sunrise Clinical Manager (SCM), and by verbal communication with Cardiology's APRN or staff nurses. Of the 35 patients identified, 20 met inclusion criteria. Patients who met inclusion criteria received an informational brochure from their staff nurse before being approached for participation (Appendix F). Seven patients declined, 13 patients consented to participate, and three patients were withdrawn (two expired and one was discharged to a rehabilitation facility). Both patients who provided informed consent and patients who did not provide informed consent received usual discharge care from their assigned nurse.

## **Instruments**

### **30-day Recidivism and Adverse Clinical Events**

Recidivism was measured as HF-related admissions (Appendix E) to any health care institution within 30-days post-discharge. Adverse clinical events were operationally defined as HF-related ED room visits, unscheduled outpatient cardiology visits, LOS for HF-related readmission, myocardial infarction, and death. Data for adverse clinical events were measured post-discharge day 1 - 15, and day 16 - 30 via patient/caregiver self-report and by data extract from UK CCTS.

### **Self-Care of Heart Failure Index**

The SCHFI was used to measure self-care behavior at baseline, 15- and 30-day post-discharge. Participant identification numbers were assigned to each SCHFI to correspond with

pre- and post-intervention responses. The 22-item SCHFI measures self-care behaviors and consists of three sub-scales: self-care maintenance, self-care management, and self-care confidence (Riegel et al., 2004; Riegel, Lee, Dickson, & Carlson, 2009). Self-care maintenance measures behaviors that maintain clinical stability and is scored on a scale from never or rarely (1) to always (4). Self-care management measures response to HF-related symptoms and is scored on a scale from I did not recognize it (0) to recognition of symptoms very quickly (4). Self-care confidence measures the ability to confidently implement, respond, and evaluate HF-related symptoms and treatments; scoring ranges from not confident (0) to extremely confident (4). Each sub-scale is scored individually and standardized to a 0 to 100 range; a higher score indicates a higher level of self-care. A cut-point of at least 70 for each subscale denotes adequate self-care behavior. In a sample of 760 HF patients, Cronbach's alphas for each subscale ranged from 0.56 to 0.82: self-care maintenance (0.56); self-care management (0.70); and self-confidence (0.82) (Riegel, 2004). The less favorable alpha coefficient for self-care maintenance may be related to assessment of behaviors that may be influenced by factors other than HF. In a sample of 97 patients with HF, Cronbach's alphas for each subscale ranged from 0.56 to 0.85: self-care maintenance (0.56); self-care management (0.70); and self-confidence (0.85) (Salyer, Schubert, & Chiaranai, 2012). Cronbach's alphas for this project were self-care maintenance (0.99); self-care management (0.86); and self-care confidence (0.85).

### **Results**

Data were analyzed using Statistical Package for the Social Sciences (SPSS), Version 22.0. Descriptive statistics were used to summarize sociodemographic data, clinical characteristics, and self-care management scores. A repeated-measures analysis of variance (ANOVA) was performed to evaluate the effect of the HIT Program on mean SCHFI self-care

maintenance and self-care confidence scores over time (baseline, 15- and 30-days post-discharge).

### **Descriptive Statistics**

The mean age of the participants ( $N = 13$ ) was 58.7 ( $SD = 12.8$ , range 35 – 82). The majority of the participants were female ( $n = 7$ ; 46.2%), and Caucasian ( $n = 11$ ; 84.6%). Less than half of the participants were married ( $n = 5$ ; 38.5%), 30.8% had not completed high school ( $n = 4$ ), 48.2% held a high school diploma ( $n = 6$ ) and 21% had at least some college. Over half of the participants were either unemployed with disability benefits ( $n = 5$ ; 38.5%) or retired ( $n = 3$ ; 23.1%). Only 15.4% of the participants ( $n = 2$ ) were employed, but only part-time.

The majority of the participants were at New York Heart Association Functional Class III ( $n = 7$ ; 53.8%), and 15.4% of the participants were at Class IV ( $n = 2$ ) (Table 1). Left ventricular ejection fraction (LVEF) ranged from 12 to 55 ( $M = 29.62 \pm 11.38$ ).

Table 1

*Sociodemographic and Clinical Characteristics (N = 13)*

Variable	Frequency	Percent
Gender		
Male	6	46.2
Female	7	53.8
Ethnicity		
Caucasian	11	84.6
African American	2	15.4
Marital Status		
Single	3	23.1
Steady relationship	2	15.4
Married	5	38.5
Divorced/Separated	2	15.4
Widowed	1	7.7
Education		
No high school diploma	4	30.8
Diploma or GED	6	48.2
Associate Degree	2	15.4
Baccalaureate Degree	1	7.7
Employment		
Part-time	2	15.4
Unemployed due to illness, no disability	3	23.1
Unemployed on disability	5	38.5
Retired	3	23.1
NYHA		
I	1	7.7
II	3	23.1
III	7	53.8
IV	2	15.4
Total	13	100

*Note.* GED = General Education Development Test; NYHA = New York Heart Association Functional Classification

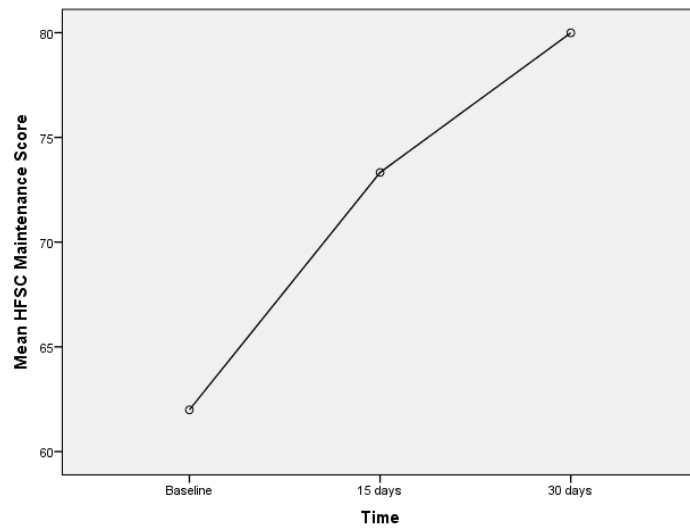
### **30-day Recidivism and Adverse Clinical Events**

Two participants experienced HF-related readmissions at other health care institutions within 15-days post-discharge, both of which resulted in death ( $N = 13$ ; 15.4%). One participant was readmitted with a HF-related diagnosis between 16- and 30-days post-discharge (7.7%). Three participants were readmitted within 15-days post-discharge with other diagnoses ( $N = 13$ ; 23.1%). One participant had an emergency room visit for shortness of breath and ascites, and another participant had a HF-related, urgent outpatient visit within 15-days post-discharge. None of the participants experienced myocardial infarction.

### **Self-care Behavior**

**Self-care maintenance.** Participants' HFSC Maintenance scores improved from baseline ( $61.99 \pm 6.70$ ) at both 15 days ( $73.33 \pm 16.40$ ) and 30 days ( $79.99 \pm 9.01$ ) following discharge (Figure 1). A repeated measures ANOVA with Sphericity Assumed determined that mean SCHFI Maintenance scores differed significantly across time ( $F(2, 18) = 11.74, p = 0.001$ ). There was a large effect size (Partial Eta Squared = .56). A Bonferonni post-hoc analysis showed a significant improvement in mean SCHFI Maintenance scores from baseline to 15 days ( $p = .032$ ) and baseline to 30-days ( $p < .0001$ ). There was no significant change between 15 and 30 days (Table 2).





*Figure 1.* Comparison of mean SCHFI Maintenance Scores at baseline, 15 days, and 30 days following discharge.

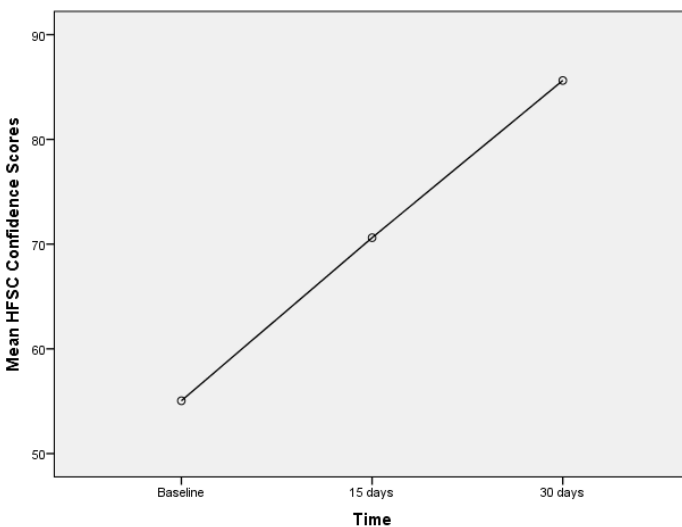
Table 2

*Repeated Measures ANOVA for SCHFI Maintenance (N = 10)*

	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
Time	1655.97	2	827.98	11.74	.001
Error	1269.38	18	70.52		

**Self-care management.** Three participants were scored on self-care management because they reported experiencing trouble breathing or ankle swelling in previous 15 days. The mean SCHFI Management scores for two participants increased from baseline ( $12.50 \pm 3.54$ ) to 15 days ( $17.50 \pm 17.68$ ), indicating that these participants were giving attention to their symptoms. The third participant experienced HF symptoms between 15 and 30 days post-discharge. This participant's self-management score of 90 at baseline increased to 95 at 30 days post-discharge.

**Self-care confidence.** A repeated measures ANOVA with Sphericity Assumed determined that mean scores for SCHFI Confidence were significantly different ( $F(2, 18) = 17.74, p < 0.0001$ ). There was a large effect size (Partial Eta Squared = .66). A Bonferonni post-hoc analysis showed a significant improvement in mean SCHFI Confidence scores across all time points following discharge: baseline to 15 days ( $p = .004$ ), baseline to 30 days ( $p < .0001$ ) and 15 to 30 days ( $p = .02$ ) (Table 3).



*Figure 2.* Comparison of mean SCHFI Confidence Scores at baseline, 15 days, and 30 days following discharge.

Table 3

*Repeated Measures ANOVA for SCHFI Confidence (N = 10)*

	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
Time	4676.19	2	2338.09	17.74	.0001
Error	2372.10	18	131.78		

### Discussion

HF is a clinical syndrome that requires specific self-care behaviors to prevent rehospitalization and improve quality of life. Numerous researchers documented the impact of HF-specific education on patient outcomes (Bocchi et al., Brandon et al., 2009; Dahl & Penque, 2001; Gerdes & Lorenz, 2013; Grancelli et al., 2005; Jack et al., 2009; Krumholz et al., 2002; Lambrinou et al., 2012; Naylor et al., 1994; Rich et al., 1995; Rich et al., 1993). In this evidence-based project, one-on-one, comprehensive education sessions utilizing the HIT were conducted to promote adherence to pharmacological and non-pharmacological provider recommendations. Only one of ten participants completing the full 30-day HIT program was readmitted with a HF-related diagnosis between 16- and 30-days post-discharge and one participant had a HF-related outpatient visit within 15 days post-discharge. These findings are consistent with a previous study in which patients with increased HF-specific knowledge had significantly fewer hospitalization rates (Koelling et al., 2005).

The HIT Program significantly improved mean self-care maintenance scores. Based on recommendations by Riegel et al. (2004), a score of at least 70 is needed to denote adequate self-care behavior, mean scores at baseline represented inadequate self-care, but improved to

demonstrate adequate self-care at both 15 and 30 days. Self-care maintenance involves routine behaviors including, but not limited to, daily weighing, checking ankles for swelling, dietary sodium restriction, and medication adherence. The majority of participants verbalized challenges with restriction of dietary sodium, thus, verbal and written education on limiting dietary sodium were included as part of the education session. Since excess dietary sodium can be a precipitating factor for fluid volume excess resulting in exacerbation of symptoms, and rehospitalization (Kollipara et al., 2008; Son, Lee, & Song, 2011; van der Wal, van Veldhuisen, Veeger, Rutten, & Jaarsma, 2010), examples of hidden sodium guidelines on how to reduce sodium were provided. Improvement in HIT Program participants' self-care maintenance scores at 15 and 30 days following discharge is consistent with previous findings on the effect of HF-specific patient education on self-care behaviors (Brandon et al., 2009, Caldwell, et al., 2005, Davis et al., 2012; DeWalt et al., 2006; Jaarsma, et al., 2000; Jack et al., 2009; Reigel et al., 2009, Smeulders, et al., 2010).

Recognition of symptom worsening is essential for self-care management, yet is often underreported by patients with HF. This project provided HF-specific education on symptom exacerbation including a plan of action for symptom worsening. A healthy habits calendar was provided to each participant to track symptoms and record daily weighing. Only two participants experienced shortness of breath and ankle swelling within 15 days post discharge. One participant improved from a baseline self-care management score of 10 to score of 30 at 15 days post-discharge. However, the other participant dropped from a score of 15 at baseline to a score of 5 at 15 days post-discharge. For both participants, all self-care management scores were far below the score of 70 which is necessary to denote adequate self-care. This finding is concerning as it reflects the inability of those two participants to make appropriate decisions for

management of HF-related symptoms. Lee et al. (2013) found that early recognition of symptom exacerbation significantly reduces rehospitalization and adverse clinical events. Another participant experienced HF symptoms between 15 and 30 days post-discharge. This participant's self-management score of 90 at baseline indicated adequate self-care. At 30 days post-discharge, the participant's score had risen to 95, indicative of additional self-care behaviors to manage the HF symptoms.

According to Riegel et al. (2009), confidence is influential in self-care and may impact patient outcomes. Following participation in the HIT program, mean self-care confidence scores rose dramatically, indicating improving self-confidence in managing pharmacological and non-pharmacological provider recommendations, recognizing changes in health status, and taking appropriate actions to relieve symptoms. Mean scores rose from a level denoting inadequate self-care confidence ( $55.04 \pm 21.52$ ) to a level minimally adequate self-care confidence at 15 days ( $70.61 \pm 26.86$ ) to substantial self-care confidence at 30 days ( $85.62 \pm 15.99$ ). Self-care confidence, then, may influence adherence to pharmacological and non-pharmacological provider recommendations in HF patients. Previous investigators have documented the impact of adherence to pharmacological (Esposito et al., 2009; Hope et al., 2012; Vinson et al., 1990; Wu et al., 2008; Wu et al., 2008; van der Wal, & Jaarsma, 2008) and non-pharmacological provider recommendations (Belardinelli et al., 1999; Chaudhry et al., 2007; Corvera-Tindel et al., 2004; Davies et al., 2010; Jones et al., 2012; Jones et al., 2014; Jurgens et al., 2013; Kollipara et al., 2008; Lee et al., 2013; Pozhel et al., 2010; Son et al., 2011; van der Wal et al., 2010).

## **Facilitators, Barriers, and Limitations of HIT Program**

### **Facilitators.**

The HITs were provided and funded by the UK HealthCare Don and Cathy Jacobs Education Center. Additionally, the UK Don and Cathy Jacobs Education Center provided office space for the project leader and a secure location for confidential program documents. The division of cardiovascular services and internal medicine were supportive of the HIT Program welcoming educational opportunities for HF patients on non-specific cardiac specialty units.

### **Barriers.**

Although HITs were initially readily available, there were two occasions when materials for the HIT were not available. Issues with materials for the HIT were resolved quickly. The HIT Program was implemented at a large, academic medical center. There were multiple opportunities for patients to participate in various studies. Participants were recruited from four non-cardiac specialty units. The UK HealthCare Research Council unanimously approved the project with few recommendations; however, recommendations by the council for expansion to additional patient care areas were not incorporated into final project procedures. Concerns regarding potential disruption in nursing workflow and patient care delivery were identified.

Despite the importance of the educational intervention, some patients were physiologically unstable and unable to participate in the HIT program or required shorter sessions due to HF-related symptoms. Information regarding the participant's health status was communicated to the patient's health care provider and adjustments were made to scheduling the educational intervention. At least four patients declined participation in the HIT Program due to current enrollment in a similar program or had previously participated in a "heart failure class".

**Limitations of the HIT Program.**

Limitations of this project were small sample size, constraints of working with acutely ill patients in a real-world hospital setting, and self-reported outcome data. The project leader was the sole individual responsible for program recruitment and implementation of the HIT Program on the non-cardiac specialty units. Expanding the HIT Program to other non-cardiac specialty units may help nursing staff provide this important teaching to a larger number of patients, therefore improving the ability to evaluate program outcomes. The majority of studies reviewed had sample sizes greater than 100 (Bocchi et al., 2008; Dahl & Penque, 2001; Davis et al., 2012; DeWalt, et al., 2006; Dracup et al., 2014; Gerdes & Lorenz, 2013; Jaarsma et al., 2000; Jaarsma et al., 2008; Jack et al., 2009; Koelling et al., 2005; Kommuri et al., 2012; Naylor et al., 1994; Powell et al., 2010; Rich et al., 1995; Smeulders et al., 2010; Veroff et al., 2012; Grancelli et al., 2005)

Participant/family report of outcome data may be inaccurate. On at least one occasion, self-reported participant data for unscheduled outpatient cardiology visits differed from the UK CCTS data extract. Inaccurate self-reported data always has the potential to skew outcome data analysis.

**Recommendations and Implications**

This project emulates similar studies that documented the effect of HF-specific patient education on self-care behaviors (Brandon et al., 2009, Caldwell, et al., 2005, Davis et al., 2012; DeWalt et al., 2006; Jaarsma, et al., 2000; Jack et al., 2009; Reigel et al., 2009, Smeulders, et al., 2010). The HIT Program provided patients with valuable HF-specific knowledge to enhance self-care behaviors. As a result, self-care maintenance scores improved. Two participants experienced HF-related symptoms within 15-days post-discharge and only one participant

experienced symptoms between 16- and 30-days post-discharge. Mean self-care confidence scores increased dramatically across the 30-day observation period. HF-related knowledge and self-confidence can contribute to positive patient outcomes and negate health care cost utilization.

Some health care institutions incorporate discharge education as routine nursing responsibilities and have HF-related discharge education procedures that are inconsistent. It is recommended that a dedicated nurse with cardiac expertise provide one-on-one, comprehensive HF-specific education utilizing health literacy teaching principles for *all* HF patients. Future programs may benefit from baseline HF-specific knowledge assessments prior to conducting the educational sessions. Specific knowledge assessments may help nurse educators determine gaps in knowledge. In this program, educational content was determined by categorical responses to items on SCHFI.

### **Conclusions**

HF is a life-long, debilitating disease that requires HF-specific self-care behaviors. The patient's inability to comprehend and/or report worsening symptoms may result in hospital recidivism and adverse clinical events. Educational programs that promote HF-specific self-care behaviors may influence adherence to pharmacological and non-pharmacological provider recommendations. There is strong research evidence showing adherence to pharmacological (Esposito et al., 2009; Hope et al., 2012; Vinson et al., 1990; Wu et al., 2008; Wu et al., 2008; van der Wal, & Jaarsma, 2008) and non-pharmacological provider recommendations (Belardinelli et al., 1999; Chaudhry et al., 2007; Corvera-Tindel et al., 2004; Davies et al., 2010; Jones et al., 2012; Jones et al. 2014 Jurgens et al.,2013; Kollipara et al., 2008; Lee et al., 2013; Pozhel et al., 2010; Son et al., 2011; van der Wal et al., 2010) influences patient outcomes.



Nursing plays a major role in the educational process and promotion of self-care for patients with HF (Orem, 2001). Results from the HIT Program are promising in promoting HF-specific self-care behaviors and may positively influence patient outcomes.

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## Appendix A

## Heart Improvement Toolkit Components

1. Digital videodisk (DVD) on HF basics for better care (includes chapters on medications, diet, tobacco, alcohol, activity, symptom management, daily weighing, and appointment follow-up).
2. Healthy habits calendar for daily weight and symptom monitoring.
3. Seven day pill box medication adherence aid with designated sections for morning, noon, evening, and bedtime medications.
4. Living Well Heart Failure brochure with literacy-sensitive information on medication administration, dietary restrictions, activity, and symptom management; and a medication schedule.
5. Return to clinic reminder handout.
6. UK HealthCare Don and Cathy Jacobs Education Center stationary and pen.

## Appendix B

## University of Kentucky Institutional Review Board Approval



Office of Research Integrity  
 IRB, IACUC, RDRC  
 315 Kinkead Hall  
 Lexington, KY 40506-0057  
 859 257-9428  
 fax 859 257-8995  
[www.research.uky.edu/ori/](http://www.research.uky.edu/ori/)

Initial Review

Approval Ends  
 September 14, 2015

IRB Number  
 14-0624-P3H

TO: Cheryl Mitchell, MSN, RN  
 521 Lancaster Avenue, Rowlett 223  
 Richmond, Kentucky 40475  
 PI phone #: (859)509-0065

FROM: Chairperson/Vice Chairperson  
 Medical Institutional Review Board (IRB)

SUBJECT: Approval of Protocol Number 14-0624-P3H

DATE: September 18, 2014


On September 15, 2014, the Medical Institutional Review Board approved your protocol entitled:

*Evaluating the Effectiveness of a Heart Improvement Toolkit Program*

Approval is effective from September 15, 2014 until September 14, 2015 and extends to any consent/assent form, cover letter, and/or phone script. If applicable, attached is the IRB approved consent/assent document(s) to be used when enrolling subjects. **[Note, subjects can only be enrolled using consent/assent forms which have a valid "IRB Approval" stamp unless special waiver has been obtained from the IRB.]** Prior to the end of this period, you will be sent a Continuation Review Report Form which must be completed and returned to the Office of Research Integrity so that the protocol can be reviewed and approved for the next period.

In implementing the research activities, you are responsible for complying with IRB decisions, conditions and requirements. The research procedures should be implemented as approved in the IRB protocol. It is the principal investigators responsibility to ensure any changes planned for the research are submitted for review and approval by the IRB prior to implementation. Protocol changes made without prior IRB approval to eliminate apparent hazards to the subject(s) should be reported in writing immediately to the IRB. Furthermore, discontinuing a study or completion of a study is considered a change in the protocol's status and therefore the IRB should be promptly notified in writing.

For information describing investigator responsibilities after obtaining IRB approval, download and read the document "PI Guidance to Responsibilities, Qualifications, Records and Documentation of Human Subjects Research" from the Office of Research Integrity's IRB Survival Handbook web page [<http://www.research.uky.edu/ori/IRB-Survival-Handbook.html#PIresponsibilities>]. Additional information regarding IRB review, federal regulations, and institutional policies may be found through ORI's web site [<http://www.research.uky.edu/ori/>]. If you have questions, need additional information, or would like a paper copy of the above mentioned document, contact the Office of Research Integrity at (859) 257-9428.

*Ellen Hahn, RN, PhD*   
 Chairperson/Vice Chairperson



Appendix C

Eastern Kentucky University and University of Kentucky Institutional Review Board

Authorization Agreement

IRB Authorization Agreement

Name of Research Project: Evaluating the Effectiveness of a Heart Improvement Toolkit Program

Principal Investigator(s): Cheryl Mitchell, MSN, RN

IRB Protocol Number: 14-0624

Sponsor or Funding Agency, if any: not applicable

Name of Institution Providing IRB Review (Institution A): University of Kentucky
OHRP Federalwide Assurance (FWA) Number: FWA00005295
IRB Registration Numbers: IRB00000423 U Kentucky IRB #1, IRB00000424 U Kentucky IRB #2, IRB00000977 U Kentucky IRB #3, IRB00005975 U Kentucky IRB #6

Name of Institution Relying Upon IRB Review Above (Institution B):
OHRP Federalwide Assurance (FWA) Number: Eastern Kentucky University
IRB Registration #: IRB00002836
FWA #: FWA00003332

Officials signing below agree that Institution B may rely on the above IRB review, approval, and continuing oversight provided by the University of Kentucky under its Assurance for the project identified above.

This agreement applies only to the project named above and to no other research projects in which Institution B may be engaged in at present or in the future.

The review, approval, and continuing oversight performed by the relied-upon IRB satisfy the requirements of the HHS regulations for the protection of human subjects at 45 CFR 46, as well as the requirements of University of Kentucky's OHRP-approved Assurance. Institution B retains the obligation to comply with all other requirements of 45 CFR 46 and as otherwise required by the FWA, or other applicable law or regulations.

Relevant minutes of IRB meetings shall be made available to Institution B upon request. Institution B remains responsible for ensuring compliance with the IRB's determinations and with the terms of its OHRP-approved Assurance.

This document should be kept on file at both institutions and must be provided to OHRP upon request.

Signatures:
Authorized Official of Institution "A" [Signature] Date 9/18/14
Lisa A. Cassis, PhD
Interim Vice President for Research
University of Kentucky

Authorized Official of Institution "B" [Signature] Date 8/18/2014
Dr. Gerald Pogatshnik
Associate Vice President for Research

## Appendix D

## Self-Care of Heart Failure Index

*All answers are confidential.*

Think about how you have been feeling in the last month or since we last spoke as you complete these items.

**SECTION A:**

Listed below are common instructions given to persons with heart failure. How routinely do you do the following?

	Never or rarely	Sometimes	Frequently	Always or daily
1. Weigh yourself?	1	2	3	4
2. Check your ankles for swelling?	1	2	3	4
3. Try to avoid getting sick (e.g., flu shot, avoid ill people)?	1	2	3	4
4. Do some physical activity?	1	2	3	4
5. Keep doctor or nurse appointments?	1	2	3	4
6. Eat a low salt diet?	1	2	3	4
7. Exercise for 30 minutes?	1	2	3	4
8. Forget to take one of your medicines?	1	2	3	4
9. Ask for low salt items when eating out or visiting others?	1	2	3	4
10. Use a system (pill box, reminders) to help you remember your medicines?	1	2	3	4

**SECTION B:**

Many patients have symptoms due to their heart failure. Trouble breathing and ankle swelling are common symptoms of heart failure.

In the past month, have you had trouble breathing or ankle swelling? Circle one.

0) No

1) Yes

If you had trouble breathing or ankle swelling in the past month...

(circle **one** number)

	Have not had these	I did not recognize it	Not Quickly	Somewhat Quickly	Quickly	Very Quickly
How quickly did you recognize it as a symptom of heart failure?	N/A	0	1	2	3	4

Listed below are remedies that people with heart failure use. If you have trouble breathing or ankle swelling, how likely are you to try one of these remedies?

(circle **one** number for each remedy)

	Not Likely	Somewhat Likely	Likely	Very Likely
11. Reduce the salt in your diet	1	2	3	4
12. Reduce your fluid intake	1	2	3	4
13. Take an extra water pill	1	2	3	4
14. Call your doctor or nurse for guidance	1	2	3	4

15. Think of a remedy you tried the last time you had trouble breathing or ankle swelling.

(circle **one** number)

	I did not try anything	Not Sure	Somewhat Sure	Sure	Very Sure
How <u>sure</u> were you that the remedy helped or did not help?	0	1	2	3	4

**SECTION C:**

In general, how confident are you that you can:

	Not Confident	Somewhat Confident	Very Confident	Extremely Confident
16. Keep yourself <u>free of heart failure symptoms</u> ?	1	2	3	4
17. <u>Follow the treatment advice</u> you have been given?	1	2	3	4
18. <u>Evaluate the importance</u> of your symptoms?	1	2	3	4
19. <u>Recognize changes</u> in your health if they occur?	1	2	3	4
20. <u>Do something</u> that will relieve your symptoms?	1	2	3	4
21. <u>Evaluate</u> how well a remedy works?	1	2	3	4

## Appendix E

*Heart Failure International Classification of Disease Codes – 9*


<i>ICD-9 Classification Code</i>	<i>Diagnosis</i>
402.01	Malignant Hypertensive Heart Disease with HF
402.11	Benign Hypertensive Heart Disease with HF
402.91	Unspecified Hypertensive Heart Disease with HF
404.01	Hypertensive Heart and Chronic Kidney Disease, Malignant, with HF and with Chronic Kidney Disease Stage I through Stage IV, or Unspecified
404.03	Hypertensive Heart and Chronic Kidney Disease, Malignant, with HF and with Chronic Kidney Disease Stage V or End Stage Renal Disease
404.11	Hypertensive Heart and Chronic Kidney Disease, Benign, with HF and with Chronic Kidney Disease Stage I through Stage IV, or Unspecified
404.13	Hypertensive Heart and Chronic Kidney Disease, Benign, with HF and with Chronic Kidney Disease Stage V or End Stage Renal Disease
404.91	Hypertensive Heart and Chronic Kidney Disease, Unspecified, with HF and with Chronic Kidney Disease Stage I through Stage IV, or Unspecified
404.93	Hypertensive Heart and Chronic Kidney Disease, Unspecified, with HF and with Chronic Kidney Disease Stage V or End Stage Renal Disease
428	Congestive HF Unspecified
428.1	Left HF
428.20	Unspecified Systolic HF

428.21	Acute Systolic HF
428.22	Chronic Systolic HF
428.23	Acute on Chronic HF
428.30	Unspecified Diastolic HF
428.31	Acute Diastolic HF
428.32	Chronic Diastolic HF
428.33	Acute of Chronic Diastolic HF
428.40	Unspecified Combined Systolic and Diastolic HF
428.41	Acute Combined Systolic and Diastolic HF
428.42	Chronic Combined Systolic and Diastolic HF
428.43	Acute on Chronic Combined Systolic and Diastolic HF
428.9	Heart Failure Unspecified

Centers for Medicare and Medicaid Services. (n.d.). ICD-9 code lookup. Retrieved from [www.cms.gov/medicare-coverage-database/staticpages/icd-9-code-lookup.aspx](http://www.cms.gov/medicare-coverage-database/staticpages/icd-9-code-lookup.aspx)

## Appendix F

## HIT Program Brochure for Patients



## Heart Improvement Toolkit Program

Cheryl Mitchell, MSN, RN, at Eastern Kentucky University; and a partner with the University of Kentucky HealthCare, Division of Cardiovascular Services and the UK HealthCare Don and Cathy Jacobs Health Education Center, is conducting a heart failure education program to teach you how to manage your heart problems at home and keep you out of the hospital. Two phone calls will be necessary to learn how you take care of yourself at home.

**You are eligible to participate if you:**

- Are 18 or older
- Have a diagnosis of heart failure
- Are available by phone for follow-up

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**Cheryl Mitchell, MSN, RN will provide you with detailed information about the heart failure education program. Educational materials are supplied by the UK HealthCare Don and Cathy Jacobs Health Education Center.**

For more information, please contact Cheryl Mitchell:

Email: [cheryl.mitchell@eku.edu](mailto:cheryl.mitchell@eku.edu)

Phone: (859) 622-8903

Eastern Kentucky University  
Department of Baccalaureate & Graduate Nursing  
521 Lancaster Avenue, Rowlett 223  
Richmond, Kentucky 40475

## Appendix G

### Statement of Mutual Agreement for Capstone Project

The purpose of a Statement of Mutual Agreement is to describe the agreement between a designated clinical agency and the DNP student regarding the student's Capstone Project. The guide provides a format and an outline of components that should be included in the statement.

---

#### **I. General Information**

Student Name: Cheryl Mitchell, MSN, RN, DNP Student

Project Title: Evaluating the Effectiveness of a Heart Improving Toolkit Program: A Pilot Project

Agency: University of Kentucky Chandler Medical Center, Lexington, Kentucky

Agency Contact: Peggy Hardesty, APRN, MSN

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#### **II. Brief description of the project**

The purpose of this evidence-based implementation project is to implement the Heart Improvement Toolkit (HIT) Program which is a one-on-one, comprehensive HF-specific education program, for patients with a HF diagnosis who have been admitted to non-cardiac specialty units. Program evaluation will include 30-day recidivism rates, adverse clinical events, and self-care behavior (SCB). The framework for the HIT program is Langley, Nolan, Nolan, Norman, and Provost's (2009) model for process improvement. The model represents a systematic process that incorporates a specific aim, measures, and appropriate change processes that correspond with action steps: Plan-Do-Study-Act (PDSA).

- Expected project outcomes (products, documents, etc.)
  - Decreased HF recidivism rates
  - Decreased adverse clinical events (HF-related Emergency Department (ED) visits, unscheduled outpatient cardiology clinic or urgent treatment center visits, length of stay for HF-related readmissions, myocardial infarction, and death).
  - Increased Self-Care of Heart Failure Indices (SCHFI) scores.

- On-site Activities (DNP student role, required meetings, access to agency records, non-disclosure expectations)
  - The project leader will identify prospective patients admitted to designated units (7E, 6S, GCDU, 2CDU) with designated ICD-9 codes via Sunrise Clinical Manager (SCM) or cardiology census report (10 week time frame).
  - Project leader will seek informed written consent from eligible patients.
  - Pre-intervention SCHFI, a valid and reliable instrument (Riegel, B., Lee, C., Dickson, V., & Carlos, 2009), will be completed by project leader.
  - The project leader will conduct 20-30 minute comprehensive education sessions with verbal and written instructions. Instruction will include presentation and explanation of the HIT using health literacy teaching principles.
  - At least 15 days post-discharge, the project leader will:
    - Administer SCHFI via telephone
    - Collect patient/caregiver self-report of HF-related readmissions, HF-related emergency room visits, unscheduled acute outpatient cardiology visits, myocardial infarction, and death via phone.
  - At least 30 days post-discharge, the project leader will:
    - Administer SCHFI via telephone
    - Collect patient/caregiver self-report of HF-related readmissions, HF-related emergency room visits, unscheduled acute outpatient cardiology visits, myocardial infarction, and death.
    - Submit request for UK HealthCare data extraction for 15-day and 30-day HF-related readmissions, HF-related emergency room visits, myocardial infarction, and death.
- Products resulting from DNP Capstone Project with potential market value. Any products produced from collaboration with the agency must be discussed with the student, Capstone Advisor, and appropriate agency representative. The ownership of intellectual property rights must be determined prior to the implementation of the project.

Only aggregate data will be used for publishing results of the project