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**THE EFFECT OF HEART FAILURE EDUCATION ON REDUCING  
READMISSIONS**

by

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## **DEDICATION**

This paper is dedicated to my mother, Natalia, for her support and inspiration throughout this journey of achieving the Doctor of Nursing Practice degree. Her patience and understanding during the stressful time commitments kept me focused on the final reward. I also thank my sisters, brothers, and their spouses, for believing and reassuring me that I could accomplish anything I set out to do. To my nieces and nephews, thank you for surrounding me with your love and presence during this educational quest; you all keep me young. A special thanks to all my friends, especially Betsy Abernathy, for your endless support and encouragement by not letting me give up. Betsy, I wish you were present to see me receive the degree, but I know you were there in spirit. And finally to my late father, Arturo, for nurturing the importance of education in your children, thank you!

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## ABSTRACT

Management of heart failure is a significant financial challenge for the health care industry, costing approximately \$33.2 billion annually. Common reasons for preventable heart failure readmissions include inadequate discharge education and lack of self-care and health management activities. Education at discharge is a vital component of improving heart failure outcomes. Following a review of the literature, high quality evidence supports that heart failure education should focus on medication adherence, sodium and fluid restriction, daily weights, activity tolerance, identification of deteriorating signs and symptoms of heart failure, and smoking cessation. The purpose of this EBP project was to reduce heart failure 30 day readmission rates by implementing an educational intervention to patients with a primary diagnosis of HF prior to discharge. The Rosswurm & Larrabee Model for evidence-based practice change and Orem's Self Care theory guided the implementation of this project. All patients with a primary discharge diagnosis of HF were referred to the APNs from the heart failure clinic located in Northwest Indiana from October to November 2012. The intervention utilized a teaching tool developed by the University of North Carolina at Chapel Hill highlighting the best practices related to educating patients and their families on the management of heart failure to potentially reduce hospital readmission rates. Participants were monitored for 30 days post discharge and readmission rates were evaluated. The data were analyzed using descriptive statistics to describe the sample and to compare the effect of the educational intervention on readmission rates. The results of this EBP project positively supported that heart failure education significantly reduced readmission rates.

Key words: Heart failure, readmission, education, self-care

## CHAPTER 1

### INTRODUCTION

Management of heart failure proves to be a significant challenge for the health care industry. The aging population and increasing prevalence of heart failure adds to the financial burden shared by the individual and third party payers (O'Connell, 2000). It is estimated that there are approximately 1.1 million annual emergency department visits in the United States for heart failure with approximately 80% requiring hospital admission (Peacock et al., 2011). The American Heart Association published that there was an estimated 5,700,000 Americans  $\geq$  20 years of age with heart failure, in reported data from National Health and Nutrition Examination Survey 2005 - 2008. Heart failure incidence approaches 10 per 1000 population after age 65, with one in nine deaths due to heart failure (American Heart Association [AHA], 2012). The cost to treat heart failure is approximately \$33.2 billion annually (McEntee, Cuomo, & Dennison, 2009).

Readmissions for heart failure cost the hospitals approximately an average of \$13,000 and the total cost is more than \$800 million in the 15 states participating in the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (Agency for Healthcare Research & Quality [AHRQ], 2010). The Centers for Medicare & Medicaid Services (CMS) report the risk-standardized readmission rates (RSRRs) within 30 days for the year 2009 median as 24.9% for heart failure (CMS, 2011). Readmission rates are counted for any reason within 30 days regardless if admitted to same hospital or different acute care facility (CMS, 2011). The challenge is to reduce readmissions, improve outcomes, and ultimately reduce costs.

#### Background

Heart failure has a high rate of readmissions, adding to the financial burden to all stakeholders. Interventions should be identified to reduce the impact and to improve

morbidity and mortality of the individual with heart failure. It is important to teach patients with heart failure the warning signs to manage their condition before they decompensate to the point of admission to the hospital. The Joint Commission (2012) has four heart failure core measures: HF-1 discharge instructions; HF-2 assessment of left ventricular function; HF-3 angiotensin-converting enzyme inhibitor (ACEI) or angiotensin receptor blocker (ARB) for left ventricular systolic dysfunction (LVSD) and smoking cessation counseling (HF-4). These core measures require patients with heart failure to receive written instructions or educational materials at discharge that will adequately address all of the components (Paul, 2008).

Care for chronic conditions, such as heart failure, is becoming a priority for our health care systems (Slyer, Concert, Eusebio, Rogers, & Singleton, 2011). The Affordable Care Act of 2010 added section 1886(q) to the Social Security Act establishing the Hospital Readmissions Reduction Program, which requires CMS to reduce payments to hospitals with excess readmissions, effective for discharges beginning on October 1, 2012 (CMS,2011). Reducing payment for chronic conditions such as heart failure accentuates the need to redesign our discharge processes.

Common reasons for heart failure readmissions include delays in symptom recognition, medication and dietary noncompliance, and lack of knowledge and skills for self-care (Dennison, McEntee, Samuel, Johnson, Rotman, Keilty, & Russell, 2011). Comprehensive discharge planning plus post discharge support for the older adult patients with heart failure resulted in a 25% relative reduction in the risk of readmission without increasing the cost of medical care (Phillips, Wright, Kern, Singa, Sheppard, & Rubin, 2004). Factors such as noncompliance with medications, diet, and delay in seeking preventative care may contribute to readmissions and premature mortality (Krumholz et al., 2002).

Promotion of compliance through adequate patient education and discharge planning from the acute care hospital can contribute to improved patient outcomes (Kent, Cull, & Phillips, 2011). Part of this plan is for patients to take an active role in their self-care. Education at discharge is a vital component of improving outcomes in heart failure. The education of patient and family should include medication adherence, sodium and fluid restrictions, daily weights, signs and symptoms of worsening heart failure, activity tolerance, and smoking cessation (Paul, 2008). Discharge instructions appear to have a positive outcome over the effect of prescribing an ACEI (VanSuch, Naessens, Stroebel, Huddleston & Williams, 2006).

### **Statement of the Problem**

This evidence based project (EBP) was proposed in order to decrease readmission rates to the acute hospital setting by increasing the knowledge and self-care activities of the heart failure patient. This EBP focused on reducing preventable readmissions for heart failure by incorporating best practices related to education. Educating the patient and his/her family regarding the management of their heart failure and early intervention will potentially reduce readmissions and improve outcomes.

### **Data from the literature supporting the need for the project**

Heart failure is a chronic condition, with increased prevalence due to improved medical management therapies, but it is one of the most expensive cardiovascular illnesses in the United States and major reason for hospitalization (Manning, 2011). According to Manning (2011), approximately half of all readmissions are preventable and result from inadequate discharge teaching, nonadherence to diet to medication, or lack of follow up for heart failure condition. Hospitals must surpass the basic discharge plan and focus on a more comprehensive discharge plan transitioning from hospital to home in order to positively impact readmission rates (Manning, Wendler, & Baur, 2010).

In order to reduce readmission rates, it is imperative heart failure patients and their families receive comprehensive, individualized education that focuses on self-care. Self-management is critical in reducing acute exacerbations and improves quality of life for heart failure patients (Goodlin, Trupp, Bernhardt, Grady, & Dracup, 2007). The advanced practice nurse uses a holistic approach utilizing clinical decision-making, early symptom recognition and treatment which promotes positive self-care behaviors in the patients and families (Anderson, 2007). The APN uses nonpharmacological interventions such as weight scales and aggressive patient educational materials to increase the heart failure knowledge of the patient (Crowther, 2003). These educational strategies should contribute to decreasing preventable readmissions in the heart failure population.

In order for the heart failure patient to manage his/her condition, a comprehensive discharge education plan must be initiated before discharge and maintained for a minimum of 30 days post discharge. The diagnosis of heart failure causes anxiety for the patient, which may interfere with his/her ability to learn, retain, and act on information provided (Manning, 2011). Optimal discharge education should be structured, one-on-one session with a specialized heart failure nurse or advanced practice nurse, and repetition of the information to reinforce the information (Vreeland, Rea, & Montgomery, 2011).

#### **Data from the clinical agency supporting the need for the project**

A 425 bed acute hospital in the northwest corner of a Midwest state was used as the clinical agency for this EBP project. The services included three intensive care units: neurology, cardiovascular, and medical. There were four intermediate cardiac care units and one intermediate neurology unit. There were also seven medical-surgical care units and a family centered maternity care unit that completed the inpatient units. There were inpatient and outpatient surgical services along with inpatient and outpatient cardiac

catheterization labs. It was rated as one of HealthGrades® America's 50 Best Hospitals 5 years in a row and a Thomsen Reuter Top 100 Hospital for 3 years in a row. It is also an accredited Chest Pain and Stroke Center. The emergency department saw approximately 160 patients per day in the year 2011.

The hospital is located within an affluent community where the crime rate and unemployment is not as high as the rest of the county. The data on percentage of people without health insurance coverage in the state of Indiana for the years 2008-2010 was 12.8% as compared to the US at 15.8% (US Census Bureau, 2012). Caucasians are the majority race in the town at 85.6% and the County at 70.5% with the state at 86.6%. Blacks in the town are 3.5%, the county 25.9% and the state at 9.1%. Asian population in the town is 5.8%, the county 1.4% and the state at 1.6%. The persons living below the poverty level in the town are 2.7%, county 16.1% and the state at 13.5% (U.S. Census Bureau, 2012).

### **Purpose of the Project**

The purpose of the EBP project was to reduce readmission rates by implementing an educational intervention provided by the advanced practice nurse in the outpatient heart failure clinic, located in an office across the street from the hospital. The heart failure clinic was staffed by a medical director, two staff RNs and two APNs. The HF education was provided by the clinic APNs to all patients with a primary diagnosis of HF on the inpatient side and then followed by the APN on an outpatient basis. There was an average of 65 HF patients per month admitted through the hospital and followed by the clinic APNs for at least 30 days upon discharge in the clinic in 2012 with 8 – 14 readmissions per month. The hospital itself averaged approximately 23% readmission rate despite the protocols in place to educate the heart failure patient, with a goal to reduce present readmissions by 20%. The Centers for Medicare & Medicaid Services (CMS) report the risk-standardized readmission rates (RSRRs) within 30 days for the

year 2009 median as 24.9% for heart failure (CMS, 2011). According to Kommuri, Johnson, and Koelling (2012), heart failure patient education delivered by a nurse educator at the time of hospital discharge leads to lower rates of hospital readmissions. The clinical question for this EBP project in a PICOT (population-intervention-comparison-outcome-time frame) format is: What is the effect of heart failure education on patients referred to the Heart Failure Clinic compared to those with traditional education on readmission rates within 30 days?

### **Significance of the Project**

The EBP project identified the best practices related to education of patients and their families to manage their heart failure and potentially reduce readmissions and improve outcomes. Giving patients and their families self-care management support after discharge has been shown to reduce readmissions to the hospital (AHRQ, 2010). Some modifiable factors leading to hospital readmissions for heart failure listed in Ryan, Aloe, and Mason-Johnson (2009) were inadequate patient and family education, poor communication and coordination of care among health care providers, inadequate discharge planning, and failure of clinicians to use evidence-based practice and follow published guidelines to drive practice. The continued education after discharge in an outpatient environment should enhance the learning, and improve self-management of heart failure.

## CHAPTER 2

### THEORETICAL FRAMEWORK AND REVIEW OF LITERATURE

The theoretical framework used for this EBP project was Dorothea Orem's Self-Care Deficit Nursing Theory (SCDNT). Orem's conceptual model identifies three main theories: self-care, self-care deficit, and nursing systems theory (Timmins & Horan, 2007). Self-care refers to deliberate actions, behaviors, and skills that allow persons to care for themselves. Self-care deficit exists when the self-care demand exceeds the ability to care for self, indicating a need for nursing care. Nursing systems refers to the system produced to meet the person's self-care demands (Timmins & Horan, 2007). The individual must first have the capacity to perform self-care behaviors. The ability to read, write, verbalize, and reason is basic to understanding patient education materials. If there is a deficit in the basic skills, there must be compensation for this by using verbal or visual communication of the material. Orem also uses the term basic conditioning factors (BCF) to identify internal or external factors affecting the capacity to care for self. These include age, gender, health state, family systems, and socioeconomic status (Wilson, Mood, Risk & Kershaw, 2003).

#### **Apply theoretical framework to EBP project**

This model fits nicely with heart failure patients by encouraging them to be active participants in their care. They must have the capacity to care for themselves in areas such as adherence with medications, sodium and fluid restrictions, daily weights, and identification of worsening symptoms.

Orem's theory follows the nursing process of assessment, diagnosis, planning, implementation and evaluation. In the assessment phase of the theory, collection of the person's health status, the individual's perception of their health, the healthcare provider's perception on the client's health, and the capacity of the person to perform

self-care activities is an essential step. Once the assessment phase is complete, the nurse is able to formulate a nursing diagnosis and design a plan of care where the person is able to: (1) perform activities on their own behalf (self-care), (2) may require assistance by another person, such as nursing care, due to lack of resources or energy (self-care deficit), and (3) define how the person's self-care needs will be met such as through education (nursing system). The implementation and evaluation phase of the theory involves the nurse assisting the patient or family in self-care practices to achieve health within their limitations.

The tool was selected after considering the patient factors of age, education, learning needs, and knowledge about HF. The HF population was older, so selecting an appropriate education tool was an important goal. It was also important to remove memory barriers by assuring verbally communicated information also needed to be provided in a written format (Paul, 2008). The inability to comprehend information about their health and treatment may increase persons' anxiety and prevent them from making decisions regarding their health (Wilson, et al., 2003).

The basic teaching materials were standardized to assure all HF patient received the same message regarding managing their condition. The intervention tool was an adjunct to the basic materials taught in order to reinforce the important concepts. Early identification of worsening symptoms was a key to managing HF self-care. The self-care deficit phase was presented in the material by utilizing heart zones. Anytime they moved to a zone where the self-care demand exceeded the ability to care for themselves, a self-care deficit existed and they needed to access the health care system to assist them to return to a self-care state (nursing system).

#### **Identify strengths and limitations for the theoretical framework for EBP**

One of the strengths of Orem's theoretical framework is in its ability to judge appropriateness of the teaching materials. It follows the nursing process by utilizing the

components of: (1) assessing and analyzing the patient's needs, (2) planning for the appropriate level of comprehension, (3) testing the tool, and (4) finally evaluating the effectiveness of the tool. In addition, the theory can be used by all practitioners to guide and improve their practice.

Orem's theoretical framework limits its application to the emotional or psychological aspect of self-care. Her model focuses on the physical components of self-care and the ability to carry out these behaviors. The theory is also illness oriented which limits its applicability in other situations.

### **EBP model of implementation**

The Model for Evidenced-Based Practice Change by Rosswurm and Larrabee was used due to its systematic approach utilizing six steps in order to change clinical practice (Melnik and Fineout-Overholt, 2011). The model was selected for its similarities to the nursing process. It makes sense to utilize a model that nursing is very familiar with and uses on a daily basis. The model systematically identifies steps to follow in order to guide the change to integrate the new practice.

#### **Step 1--Assess the need for change in practice**

The stakeholders are the hospital administrators, quality manager, nursing staff, educators, case managers, and nursing managers. The DNP student met with this group in a meeting designed to review what measures the hospital needed to take to reduce 30 day readmissions for the heart failure patients keeping in mind the proposed changes in reimbursement scheduled for October 1, 2012. The quality manager reported that the hospital was running between 22 - 24% readmission rate for heart failure compared to the national average of 25%. The target for the hospital was to reduce readmissions by 20%. The group discussed possible reasons for the variance such as lack of education on the part of the patient, incomplete or inadequate discharge

planning, delays in seeking medical intervention, and differences in the medical management of the heart failure patient.

### **Step 2--Link the problem, interventions, and outcomes**

Some members of the group presented evidence from seminars and webinars regarding best practices in reducing readmission rates. The group shared practices from other hospitals that yielded positive results. A common theme emerged on areas the group could impact to reduce readmissions. The group would look at intervening at the hospital level before discharge and continue through at least 30 days post discharge. If we could change our process and provide patients with the tools to engage in positive self-care behaviors, then patients could identify changes in their condition and seek intervention prior to needing hospitalization.

### **Step 3--Synthesize the best evidence**

The DNP student performed a review of the literature using the terms: heart failure, education, readmission, self-care, and decrease reimbursement. The databases used included PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, ProQuest, Cochrane Library, and Joanna Briggs Institute. The time frame was limited to 2000 to 2012. Exclusion criteria included heart failure management, since the focus was on self-care and education of the heart failure patient. The studies were critically appraised as inclusion criteria using the rating system (levels I through VII) for the hierarchy of evidence for intervention (Melnik & Fineout-Overholt, 2011).

### **Step 4--Design practice change**

The original group was convened to discuss the proposed changes in the discharge process. Several strategies were suggested by the multidisciplinary group and feasibility of implementing the practice change. The necessary resources identified included accessing a MIDAS report of patients in house with primary and secondary

diagnosis of heart failure. The report was written for the heart failure clinic nurses, APN, and case managers. When a patient was diagnosed with heart failure, the best practice alert (BPA) was flagged in the EPIC documentation system. The nurse caring for the patient accepted the BPA and the care plan with the education plan populated for the nurse to initiate the teaching plan. The floor nurses educated patients with the secondary diagnosis of heart failure. The heart failure clinic nurses taught the patients with a primary diagnosis of heart failure. All patients received the same printed materials including the heart zones, low sodium diet, heart zone teach back information. The heart failure nurses enrolled the primary diagnosis heart failure patients to the clinic for more education by the advanced practice nurse and received a booklet reinforcing self-care behaviors in managing their disease. The goal included the family members in the clinic setting on the education. The advance practice nurse assessed the patient's educational needs, reviewed medication compliance, and post discharge medical visits. The goal was to decrease preventable readmissions.

#### **Step 5--Implement and evaluate change in practice**

The DNP student, quality manager, and director of case management evaluated the process by assessing the evidence-based materials utilized, the patients received one-on-one education on the inpatient side, and the patients referred to the heart failure clinic received the additional education by the APN. Readmission rates within 30 days were evaluated on the patients that were seen by the heart failure clinic APN and received the additional education. We decided to accept and modify the practice change after reviewing the process and significant outcome of reducing readmission rates.

#### **Step 6--Integrate and maintain change in practice**

A report was communicated to all stakeholders regarding the evaluation of the proposed practice change. The change was accepted, the practice was integrated into

the standards of practice and the facility continues to see decreased readmission rates, and improved self-care management of heart failure.

### **Literature Search**

A comprehensive literature search for relevant research studies was conducted. The purpose of the search was to systematically identify, analyze, and synthesize critically appraised literature to support the EBP project on reducing heart failure readmissions within 30 days. The search engines used were PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, Cochrane Library, and Joanna Briggs Institute.

The key words used were: heart failure, education, readmission, and self-care. The initial search of ProQuest using heart failure and education and readmission yielded 1297 possible sources. PubMed produced 133 sources using heart failure education and readmission with publication date from 2000 to 2012. In addition, self-care had 20 hits, and readmission had 35 hits. Medline yielded 119 sources with heart failure, readmission and education as key words. CINAHL search resulted in 99 sources for heart failure education, 52 for self-care, and 40 for readmission. Joanna Briggs Institute resulted in 3 hits with heart failure education using evidence summaries. Finally, Cochrane Library produced 5 heart failure education synthesis hits.

Inclusion criteria consisted of articles published between 2000 and 2012, abstract included, research or evidence based, and peer reviewed. Articles focused on heart failure education, prevention of heart failure readmission, and self-care were selected. Excluded references were ones that focused only on heart failure cost, and subjects less than 18 years of age. The articles selected were assessed for relevance based on the title and abstract information.

A total of 88 articles were identified as possible sources and narrowed down to ten articles for final sources of relevant evidence for this EBP project. A summary chart

of the literature search can be found in Appendix A. Duplicate articles were removed and inclusion and exclusion criteria were applied. Articles with poor quality of evidence, not peer reviewed, and not focusing on adult heart failure were excluded. The final results of the literature search produced a total of ten for analysis. The articles were appraised using the Melnyk and Fineout-Overholt (2011) rating system for the hierarchy of evidence as listed in Appendix B. There were three level I systematic reviews or meta-analysis of relevant randomized control trials (RCT's), three level II evidence obtained from RCT's, one level V evidence from systematic reviews of descriptive and qualitative studies, and three level VI evidence from single descriptive or qualitative studies for this review. A summary of the studies can be found in Appendix C describing the level of evidence, sample, setting, design, interventions, and findings.

### **Level I Evidence**

Kent, Cull, and Phillips (2011) examined the evidence to answer the question: "What are the most effective interventions for helping adults with heart failure comply with therapy and enhance self-care behaviors?" A total of thirteen studies, eight RCT's and five quasi-experimental pre-test post-test studies were included in the review. The studies provided a detailed description of the education to participants about signs and symptoms of heart failure except for one study provided a brief description of the education. There were four types of intervention strategies used compared to usual care: supportive education, video education, motivational interviewing, and telephone delivered empowerment.

Supportive education consisted of education on heart failure (8 studies), and daily weights (6 studies). The outcome indicated an educational intervention aimed at increasing participant's knowledge of heart failure, increases the likelihood of performing daily weight measurements. In order for daily weights to be performed, scales must be available to the patient. Two studies reported the provision of a diary in addition to daily

weight participants in the intervention group demonstrated statistically significant improvements in performance of daily weight measures. Two studies showed supportive education had little influence on compliance with medication regime. Three studies indicated supportive education intervention had the greatest effect on self-care behaviors at one month and diminished over time.

Participants of the video education intervention had a significant reported increase in their self-care behavior score from baseline. Scores on some aspects of care were similar for the control and intervention group. Some aspects included adherence to sodium restriction, and contacting a health professional about weight gain.

Motivational interviewing involves providing motivation, skill building and support to the participants through developing knowledge and engaging in self-care behaviors. Motivation and support also involves engaging family members in the education intervention. There was an improvement in the heart failure self-care scores.

Telephone delivered empowerment, or the capacity to make informed decisions, showed a significant increase in self-management of heart failure behaviors in the intervention group as compared to the control group. Those patients receiving the intervention were able to better self-manage their condition by using self-care behaviors.

Self-care behaviors that have a strong evidence base in heart failure patients are daily weights, restricting salt, restricting fluid, engaging in regular exercise, contacting a physician if experiencing symptoms of fluid accumulation, and taking medications as prescribed. The review concluded that education, as a standalone intervention, is less effective than when used in conjunction with other interventions.

Syler, Concert, Eusebio, Rogers, and Singleton (2001) performed a systematic review to identify the best available evidence on the effectiveness of nurse coordinated transitioning of care between hospital and home on hospital readmission rates for all causes in adult patients hospitalized with heart failure. Sixteen randomized clinical trials

of heart failure patients were included in the systematic review. All studies included a control group receiving usual care and an intervention group receiving inpatient education and comprehensive discharge planning coupled with telephone contact, home visits, or a combination of both post discharge interventions. The measured outcome was hospital readmission rates for patients with heart failure within 30 days, three, six, nine, twelve, and eighteen months. Ten of the sixteen studies demonstrated nurse coordinated transitioning of care interventions reduced readmission rates for heart failure patients with two being statistically significant. The analysis showed that using only telephone calls as a means of discharge follow up did not show a reduction in readmission rates. The findings suggest that nurse coordinated transitioning of care interventions for patients with heart failure from the hospital to home can demonstrate a reduction in readmission rates. Interventions carried out by a heart failure trained nurse who conducts at least one home visit and follows the patient by telephone at least weekly for a minimum of 30 days post discharge demonstrate improved outcomes.

Phillips, Wright, Kern, Singa, Sheppard, and Rubin (2004) conducted a meta-analysis of eighteen randomized controlled trials. The objective was to evaluate the effect of comprehensive discharge planning plus post-discharge support on the rate of readmission in patients with heart failure, all-cause mortality, length of stay (LOS), quality of life (QOL), and medical costs. Most of the studies did not explicitly describe usual care. The intervention was comprehensive discharge planning plus post-discharge support. It was not always possible to separate the components of the education conducted pre- and post-discharge. Duration of follow-up was clearly stated but the post discharge support was inconsistent ranging 1 to 3.5 hours. Components for discharge support varied from a single home visit in three studies and six studies used a home visit and/or frequent telephone contacts. Patients randomized to the intervention group receiving comprehensive discharge planning plus some form of post

discharge support experiences fewer readmissions. The analysis showed that comprehensive discharge planning plus post discharge support for older patients with heart failure resulted in a 25% relative reduction in the risk of readmission, a trend toward 13% relative reduction in all-cause mortality.

### **Level II Evidence**

Domingues, Clausell, Aliti, Dominguez, and Rabelo (2011) conducted a single randomized clinical trial in a tertiary university hospital in Brazil during January 2005 to July 2008. They compared an educational nursing intervention during the hospitalization period followed by telephone contact after discharge to the educational intervention without the telephone monitoring. There were 48 heart failure patients in the intervention group and 63 heart failure patients in the control group. The intervention group received a telephone call once per week for one month, one call every fifteen days in the second and third month, for a total of eight calls within three months of discharge. Self-care behaviors were assessed without any changes to medication or treatment. If there was a change in heart failure symptoms, the patient was directed to see the physician or present to the emergency department. The control group received usual care which included a return appointment to the clinic without any telephone follow up for three months. The outcomes assessed were level of heart failure awareness and self-care knowledge, as well as the effect of the strategies on the frequency of visits to the emergency room, readmissions, and deaths in a three month period. The primary outcome was observed improvement in the level of heart failure awareness, and self-care knowledge in both groups. There was no significant difference in the level of heart failure awareness and self-care knowledge in the intervention group who received post discharge telephone contact compared to control who did not receive any telephone monitoring post discharge. The study showed both groups improved from baseline in their level of heart failure awareness and self-care knowledge after the three month

period of the study regardless of telephone contact. The data suggests that the time during hospitalization may be the best time to begin a health education program.

Kommuri, Johnson, and Koelling (2012) performed a randomized controlled trial on 113 intervention and 114 control patients with primary diagnosis of heart failure at the University of Michigan hospital. The control group received usual care or standardized discharge information while the intervention group received usual care plus a one hour heart failure education program taught by nurse educator. The additional content included basic principles of heart failure, role of dietary sodium and restriction to 2000 milligrams or less, importance of fluid restriction to 2000 milliliters or less, and the role of diuretics in controlling heart failure symptoms. The nurse covered the importance of daily weight monitoring, self-care behaviors, medication adherence, smoking cessation, alcohol limitation, and heart failure management guidelines written in layman's terms. All subjects completed the heart failure knowledge questionnaire during hospitalization and at three months post discharge. The tool contained a total of 30 questions to complete within ten minutes. The first 15 questions assessed general heart failure knowledge, self-care management behaviors, and medications used in the treatment of the disease. The final fifteen questions assessed the patient's knowledge of dietary recommendations in heart failure and specific sodium content in common foods. The results showed baseline knowledge was similar in the two groups. The control group did not demonstrate any improvement in their disease management knowledge (DMK) or dietary and sodium knowledge (DSK) in the three month follow up. The intervention group demonstrated a significant improvement in their DMK during the three month follow up. Neither group demonstrated improvements in their DSK during the study. In conclusion, nurse led face to face, one hour educational session leads to improved heart failure disease management knowledge at the three month follow up compared to the control group. Patients with high heart failure knowledge scores are less likely to be

readmitted to the hospital over a six month follow up period than patients with low scores.

In the prospective, randomized controlled trial conducted by Krumholz et al., (2002) the authors studied the effect of a targeted education and support intervention on the rate of readmission within one year and costs of care in heart failure patients. The sample randomized 44 intervention and 44 control patients with diagnosis of heart failure between October 1997 and September 1998 at Yale-New Haven Hospital. The intervention occurred in two phases. During the first phase, an experienced cardiac nurse instructed the patients during a one hour session within two weeks of hospital discharge using a teaching booklet. If the patient was unable to travel to the hospital, a home visit was performed in 45% of the patients. Phase two consisted of the patient being contacted by the nurse by telephone on a weekly basis for four weeks, biweekly for eight weeks, and monthly for a total period of one year. The interventions did not include any changes in medications or treatment other than recommending them to contact their physician if they experienced deterioration in their heart failure. In the study, 25 patients (56.8%) in the intervention group and 36 patients (81.8%) in the control group had at least one readmission or died during the follow up period. The percentage of all cause readmissions was reduced by over 30% and heart failure readmissions reduced by 40%. Hospital readmission costs were higher in the control group by an average of \$7,515 per patient. Heart failure to heart failure readmissions, costs per patient were \$9,575 in the control group and \$5,232 in the intervention group. The study's findings report an education and support intervention without medical management components was highly effective in reducing readmissions and hospital costs among patients with heart failure.

### **Level III and Level IV Evidence**

There was no level III or level IV studies identified for this EBP project.

**Level V Evidence**

The evidence from the level V review of literature studies by McEntee, Cuomo, and Dennison (2009) substantiated the high prevalence of barriers to heart failure care and identified obstacles at the patient, provider, and system levels. In other words, barriers to care were present at all levels. Patient level barriers (75% of all studies) related to self-care behaviors, monitoring symptoms, and seeking treatment. Identified barriers impacting the management of heart failure at the patient level included: (1) knowledge of heart failure disease process, symptoms, and self-care (23 studies), (2) adherence with treatment, such as diet, exercise, medication, and daily weights (17 studies), (3) communication with providers, such as difficulty integrating information from multiple providers, limited communication skills, and health literacy (8 studies), (4) functional limitations, such as confusion, limited mobility, and lack of energy (9 studies), (5) comorbidities like polypharmacy, and increased risk of rehospitalization (18 studies), (6) psychosocial factors like emotional distress, anxiety, and depression (33 studies), and (7) socioeconomic factors such as limited income, transportation, education/literacy, and social support (15) studies. There were 23 studies (38%) that reported provider level barriers. The primary care provider and nurses were the focus at this level. The barriers included: (1) knowledge deficit of heart failure treatment guidelines, applying research into practice and management of comorbidities (11 studies), (2) diagnostic challenges like limited access to echocardiograms, time constraints, provider inexperience, and logistical problems with referrals (7 studies), (3) pharmacological concerns such as potential adverse effects, drug interactions, and contraindications, minimizing polypharmacy, patient risks, and costs (12 studies), (4) communication with limited rapport with patients, and lack of trust with other providers (14 studies), and (5) personal factors such as individual preferences influenced by training, confidence, and prior experience (3 studies). System level barriers (22% of studies) consisted of: (1)

organizational structure where there was a lack of continuity/integration, poorly defined roles and responsibilities, and lack of incentives to follow evidence based guidelines ( 9 studies), (2) communication such as delayed exchange of information, incomplete documentation, and perceived lack of trust among providers (8 studies), and (3) lack of resources like deficits in funding, time, and community support, lack of planning and access to services, in addition to limited community knowledge of heart failure (8 studies). The review by the authors identified that barriers to heart failure care were common and pervasive throughout the continuum of care. In order to decrease hospital readmissions and improve patient outcomes, obstacles to heart failure care must be addressed at all three levels.

#### **Level VI Evidence**

The descriptive, comparative study by Dennison, McEntee, Samuel, Johnson, Rotman, Keilty, and Russell (2011) examined the prevalence of inadequate health literacy and to determine the reliability of the Dutch Heart Failure Knowledge Scale (DHFKS) and Self Care of Heart Failure Index (SCHFI) in the convenience sample of heart failure patients from a large urban teaching hospital. The analysis showed that the level of health literacy was significantly correlated with age, education level, and heart failure knowledge. The subjects with adequate health literacy were significantly younger than those with inadequate or marginal health literacy. Participants with at least a high school education had higher health literacy. In conclusion, adequate health literacy is associated with higher heart failure knowledge and self-care confidence in hospitalized patients.

The descriptive study using retrospective hospital charts by Manning, Wendler, and Bauer (2010) was performed to determine if a comprehensive program of heart failure support using a three step approach during acute care led by an advanced practice nurse improves outcomes. Their goal was to implement the Centers for

Medicare and Medicaid Services (CMS) recommendations for all heart failure patients, reduce variation, and increase quality of care. The study was performed using 200 retrospective hospital chart reviews from 2003 to 2008 at Memorial Medical Center, a 534-bed tertiary care, level I trauma, academically affiliated institution regional leader in providing heart related care in Springfield, Illinois. One of the core measures by the Joint Commission on Accreditation of Healthcare Organizations (2002) identified discharge instruction as a key measure. The discharge instructions were to consist of six components: (1) a written list of medications, (2) limited fluid and salt intake, (3) weighing daily, (4) exercise, (5) reporting worsening signs and symptoms, and (6) making a follow up appointment with the physician. In order to assure all primary heart failure patients received the discharge instruction core measure, they had to be identified with a diagnosis of heart failure. The challenge occurred when patients were admitted with one diagnosis, but discharged under the diagnosis of heart failure. The heart failure support team (HFST) needed to be developed in order to successfully implement the discharge plan. An advanced practice nurse was hired to lead the team due to the advanced clinical assessment skills, graduate education in research, and evidence based practice to initiate, develop, and evaluate the project. A three step approach served as the foundation for consistent management of heart failure patients. Step 1 was to identify all patients with heart failure. They searched daily for admitting diagnosis for heart failure but discovered patients were not always identified as heart failure patients. They tapped into the case manager for referrals or identification of possible heart failure subjects. The lab was involved in identification of possible heart failure patients by using elevated B-type natriuretic peptide (BNP) and notifying the HFST daily of levels >800 pg/mL. The team would then evaluate if the patient was a possible heart failure patient. Step 2 was to verify the diagnosis of heart failure and flag the chart for any future admissions. A standardized documentation tool for heart failure quality

measures was developed. All heart failure patients received education including a heart failure booklet taught by the advanced practice nurse. Step 3 consisted of daily monitoring of the patient through discharge. Quality measure tools such as having an echocardiogram result on the chart, use of ACEI/ARB, low sodium diet, and follow up appointments were created. Facilitating early identification, teaching, and ongoing patient monitoring by standardizing heart failure care allows for continuity of care and maximizing of heart failure therapies.

VanSuch, Naessens, Stroebel, Huddleston, and Williams (2006) conducted a retrospective, descriptive study to determine the effect of all six required discharge instructions on readmission. The study used 1121 randomly chosen charts from July 2002 to September 2003 with a primary diagnosis of heart failure at St. Mary Hospital, a tertiary care academic center in Rochester, Minnesota. Patients should receive written discharge instruction in the areas of activity, weight, diet, discharge medications, follow up appointment, and worsening symptoms. The findings in the chart indicated 91% of the patients with diagnosis of heart failure received drug instructions and the lowest (70%) indicator was weight monitoring. Sixty-eight percent of all eligible patients had documentation of all six types of instructions, and 6% had no documentation of any discharge instructions. Patients with all instructions were significantly less likely to be readmitted for any cause ( $p=0.003$ ) and readmission for heart failure ( $p=0.0035$ ) than those who were missing documentation of at least one type of discharge instruction. Documentation of discharge instructions is correlated with reduced readmission rates.

### **Level VII Evidence**

There was no level VII evidence identified for this EBP project.

### **Synthesis of Appraised Literature**

Analysis of the literature identified that a comprehensive discharge plan plus post discharge support for heart failure patients significantly reduces readmission rates as

seen in Phillips et al. (2004), Krumholz et al. (2002), VanSuch et al. (2006), and Manning et al. (2010). The EBP project utilized these measures in the implementation of the educational intervention. The education booklet was administered post discharge only to the patients with a primary diagnosis of heart failure after referral to the heart failure clinic.

The studies by Kommuri et al. (2012), Kent et al. (2011), and Slyer et al. (2001) support the importance of a nurse coordinated transition of care from hospital to home improves heart failure knowledge and is strongly associated with appropriate self-care behaviors. Patients with high heart failure knowledge are less likely to be readmitted to the hospital. Transitioning care includes being in contact with the heart failure nurse at least weekly for a minimum of 30 days post discharge. The EBP project was led by an advanced practice nurse, with 14 years of experience as an adult NP and presently a doctoral student, and a heart failure clinic APN. The education was conducted post discharge in the heart failure clinic. The additional education of the patient and family encouraged self-care behaviors such as monitoring daily weights, sodium and fluid restriction, medication adherence, identification of worsening symptoms, exercise, and follow up appointments.

Finally, the studies by Manning et al. (2010), Dennison et al. (2011), and McEntee et al. (2009) identified barriers that must be overcome in order to improve heart failure patients' knowledge, understanding of the disease, self-care knowledge, and confidence. The EBP project resulted in decreased readmission rates, reduced adverse clinical outcomes, and improved quality of life. The EBP project utilized an educational tool written in grade school level language, used large print, pictures, and uncluttered information for the patient and their family member to follow during the class. It had multiple areas for writing by the patient. The booklet was also available in Spanish for

the patient to follow and in English for the family to follow, since many of the Spanish speaking patients brought their caregivers to the class.

### **Best Practice Model**

The Model for Evidenced-Based Practice Change by Rosswurm and Larrabee guided this project because it systematically identified steps to guide change and integrate into practice (Melnyk & Fineout-Overholt, 2011). The EBP project integrated best practices identified from the literature search in the implementation of the educational tool. The comprehensive education should enhance the patient and family's understanding of heart failure, increase self-care behaviors, and ultimately reduce readmissions. The goal was to answer the PICOT question: What is the effect of heart failure education on patients referred to the heart failure clinic compared to those with traditional education on readmission rates within 30 days?

## **CHAPTER 3**

### **IMPLEMENTATION OF PRACTICE CHANGE**

The purpose of the EBP project was to implement an educational intervention by an advanced practice nurse in the outpatient heart failure clinic in order to reduce readmission rates. The project was to identify best evidence, provide additional education beyond the traditional instructions, and measure 30 day readmission rates for heart failure referred to the clinic.

#### **Sample and Setting**

The evidence-based project took place in an acute care setting in a Midwest hospital. The suburban hospital was located within an affluent community. The persons living below the poverty level in the community was 2.7%, the county at 16.1%, and the state at 13.5%. The median household income between the years of 2006 to 2010 was \$70,231 for the city, \$48,723 for the county, and \$47,697 for the state. High school graduates for persons age 25+ was 93.6% for the city, 86.1% for the county, and 86.2% for the state (U.S. Census Bureau, 2012). The sample was to be from discharged heart failure patients from the acute hospital referred to the heart failure clinic for education by the clinic advanced practice nurse. There were approximately 60 - 70 patients per month with a primary diagnosis of heart failure. Attendance for the heart failure class at the clinic had been poor with 1- 3 persons. One issue may have been the time of the class which was the second and fourth Thursday of the month at 2:00 PM. The patients and families were surveyed to identify if there was a better time. It was suggested to have an evening class in order for the families to attend with the patient. It made sense to include the family since most were caregivers and had to transport them to the class. The heart failure nurses enrolled patients at the time of their discharge teaching instead of having the patients call to register for the free class. Historically, most patients did not

make appointments after discharge due to the inconvenience of making a call and not finding the class important due to the optional nature of the class.

### **Outcomes**

The outcome measure of this EBP project was to measure readmission rates for those patients receiving additional education in an outpatient setting compared to just the traditional education received as an inpatient. The expected outcome was to also yield an increased knowledge of self-care behaviors, early identification of symptoms needing attention of the primary care provider, medication and diet compliance, and better control of heart failure condition. The data was obtained from the director of case management, data from a reported generated from a computer program, and the quality director who prepared monthly reports on readmissions to a heart failure subcommittee.

### **Intervention**

The intervention of this EBP project was the utilization an educational tool in the heart failure clinic as part of the educational experience by the clinic advanced practice nurse. The advanced practice nurse used a teaching tool developed by the University of North Carolina at Chapel Hill that was available free of charge at <http://www.nchealthliteracy.org/hfselfmanage.html>. The APN used version 1 which was available in both English and Spanish. The intervention period started October 22 to November 23, 2012. The data was collected until December 23, 2012 to cover the 30-day readmission period.

The patients with a primary diagnosis of heart failure were seen by the advanced practice nurse within one to two days of admission and given the traditional heart failure folder of educational materials. The APN reviewed one-on-one the contents of the folder. The APN discussed with the patient and family member the participation in the additional class at the heart failure clinic. The class emphasized the current material and reinforced self-care and behaviors to manage heart failure symptoms. They were

told they would receive additional materials and a scale for attending the class. They seemed pleased with the additional information and the idea of a digital scale. If the participant needed additional education regarding meal planning, they were referred to a dietician for a meal planning class. The HF one-on-one class was 20 –30 minutes long and presented as a PowerPoint session with a copy of the information in a booklet form with areas to take notes. Only 1 person attended the scheduled class. Upon review, the DNP student offered a gift card for gasoline to cover the trip to the clinic and another card for food if they attended the menu planning class as an incentive. Unfortunately, this strategy was not successful. It was decided that the goal was to provide information and the tools to manage heart failure, so the only way to accomplish the goal was to teach them before discharge from the hospital. The APNs reviewed the basic information, then reviewed the additional evidenced based booklet the day before discharge or day of discharge and included family members as much as possible. The strategy seemed to work and all patients, with a primary diagnosis of heart failure agreed to participate in the additional education session. The patient also received the digital scale and a lesson on how to use it before discharge.

### **Planning**

The plan was to implement to EBP in mid-September but the heart failure clinic lost its APN. Ultimately, two APNs were hired for the clinic and educated on the EBP as well as the basic HF educational tools. The educational tool did progress through the heart failure subcommittee for acceptance. Once accepted, the tool was printed in color both in English and in Spanish. The information was converted to a power point presentation so the heart failure advanced practice nurse could deliver the educational material to the participants. All HF participants were recruited from the inpatient side and were given the booklet to take home for reference as well as a digital scale. The participant's agreement to take part in the education component was their consent to

participate in the project. The APN explained the project and obtained their consent after addressing any questions. The project received an exempt status through the Institutional Review Board (IRB). The information was collected without identification to any individual and reported as a group.

### **Data**

Data collected was found in the daily MIDAS report identifying the primary and secondary diagnosis of heart failure patients on the various units within the hospital. The patients with a primary diagnosis of heart failure were seen by the heart failure advanced practice nurses and referred to the heart failure clinic upon discharge, initially. The nurse made an appointment for the patient and added the date to their calendars prior to discharge. The clinic kept an electronic log of all patients registered for the heart failure class and recorded no shows. After calling and reminding the patients of their educational session, the patients did not show up for their appointment. The strategy was therefore changed and the patients agreed to participate in the additional session on the day before discharge or on the day of discharge. When the patient was readmitted within 30 days, the electronic medical record was flagged and information sent to the daily MIDAS report as a readmit. The statistical data was calculated by identifying frequencies, means and percentage of readmissions. The reported data only labeled the number of readmissions instead of any personal identifiers. Since all primary diagnosis of heart failure patients were seen by the heart failure clinic APNs, they were able to identify the readmitted patients. Documentation of attendance in the interventional education session was also part of the medical record.

### **Protection of Human Subjects**

The educational intervention underwent Institutional Review Board (IRB) approval from Valparaiso University and Community Hospital. After IRB approval, the

educational tool was implemented for use by the heart failure clinic APNs. The DNP student successfully completed the National Institutes of Health (NIH) Office of Extramural Research web-based training course, "Protecting Human Research Participants". The intervention group was recruited once the individual was identified as a HF patient on admission and the APN did the initial standard teaching. The APN explained to each person that there was an additional education session available to them and their families before discharge, if they chose to take advantage of learning how to better manage their HF. It would take 35 to 45 minutes, it would be a one-on-one session, and they would receive an additional booklet to keep after discharge. Every HF patient agreed to participate in the educational component and some had family members present once a time for the session was identified. The additional education took place the day prior or on the day of discharge. The participant was identified by a number with demographic information such as gender, age, readmission status within 30 days of discharge, and readmission diagnosis. The information was kept in an electronic password protected file by the project coordinator. Descriptive statistics, *t* tests, and Chi-square tests were used to describe the groups and determine significant differences on key variables.

## **Chapter 4**

### **FINDINGS**

The purpose of the EBP project was to implement an educational intervention by an advanced practice nurse from the heart failure clinic in order to reduce hospital readmission rates. The project used best evidence to provide additional education beyond the traditional instructions and measured 30 day readmission rates for heart failure patients. The clinical question was: What is the effect of heart failure education on 30 day readmission rates for patients referred to the heart failure clinic compared to the those patients with traditional education? The sample characteristics, descriptive statistics including frequencies, mean, Chi-square, and independent *t* test were calculated using the Statistical Package for the Social Sciences (SPSS) 18.

#### **Sample Characteristics**

The participants in the intervention group consisted of 49 inpatient participants identified with a primary diagnosis of heart failure and followed for 30 days post discharge. The intervention participants ranged from 27 to 90 years of age ( $M=72.31$  years). There were slightly more males (53.1%) compared to females (46.9%). The majority of the group was married (46.9%), followed by those who were widowed (32.7%), divorced (12.2%) and, single (8.2%). All participants (100%) received the basic educational materials, as well as, the evidenced based educational tool taught by one of the heart failure clinic advanced practice nurse. The language read and spoken by the participants was English (100%). There were five (10.2%) interventional participants readmitted during the 30 days post discharge.

The control group consisted of 35 participants the 30 days prior to the implementation of the educational tool. The information was collected from medical records post discharge as a baseline comparison, and therefore not all variables were

measured in this group. The control group age ranged from 66 to 95 years (M=83.60 years). The majority were male (54.3%) compared to female (45.7%). All participants (100%) received the standardized education materials for patients with a primary diagnosis of heart failure. Thirty day readmission rate for the control group was 22.9% for the month prior to the implementation of the EBP project. See Table 4.1 for the demographic data summary.

Table 4.1

## Demographic Characteristics

Characteristics	Frequency	Percent
Gender (Interventional Group)		
Male	26	53.1
Female	23	46.9
Gender (Control Group)		
Male	19	54.3
Female	16	45.7
Marital Status (Interventional Group)		
Married	23	46.9
Widowed	16	32.7
Divorced	6	12.2
Single	4	8.2
Age Category (Interventional Group)		
20-59	11	22.4
60-79	19	38.8
80-99	19	38.8
Age Category (Control Group)		
60-79	7	20.0
80-99	28	80.0
Readmit Rate (Interventional Group)		
Yes	5	10.2
No	44	89.8
Readmit Rate (Control Group)		
Yes	8	22.9
No	27	77.1

Table 4.1 (continued)

## Demographic Characteristics

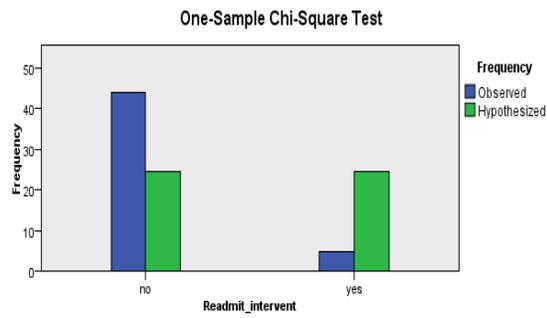
Characteristics	Frequency	Percent
Basic HF Education Materials Received		
Interventional Group	49	100
Control Group	35	100
CHF Educational Tool		
Interventional Group	49	100
Control Group	0	0
Support Member Present		
Interventional Group	17	34.7

### **Changes in Outcomes: Statistical Testing and Significance**

Since the purpose of the EBP was to implement an educational intervention to improve heart failure self-management and reduce hospital readmission within 30 days, an analysis of the frequency of readmission rates was conducted. Nominal data was analyzed using frequencies, mean scores, and *t* tests. Variables such as age, gender, and readmission rates were entered for analysis.

A *t* test was performed and a significant difference was found ( $t(48) = -6.101, p = .001$ ) between the mean ages of the groups (84 years for the control group and 72 years for the intervention group). In other words, the control mean of 84 years of age was significantly greater than the interventional sample mean of 72 years of age.

A Chi-square analysis of gender showed no significant differences between the control and intervention group: ( $\chi^2 (1) = .084, p=.666$ ). The Chi-square result supported the frequency and percent of gender similarities for the groups. A Chi-square analysis showed a significant difference in the frequency of hospital readmissions between the control and the intervention group ( $\chi^2 (1) = 31.041, p=.000$ ).



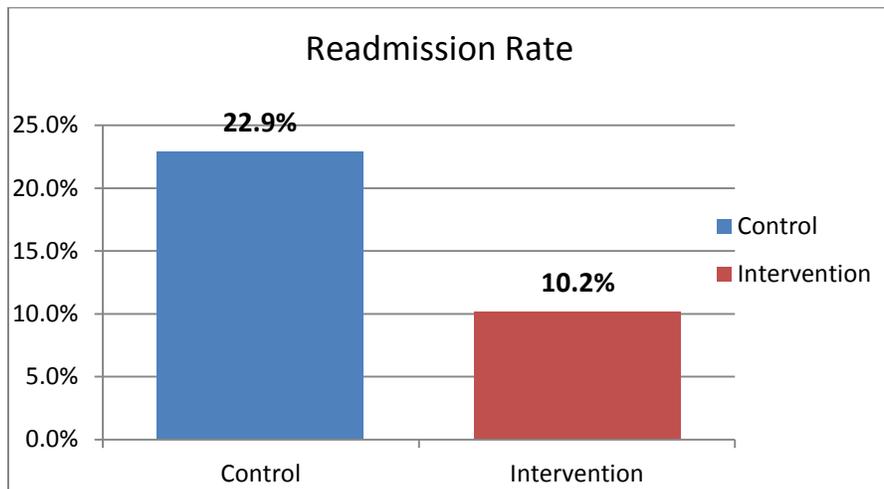
<b>Total N</b>	49
<b>Test Statistic</b>	31.041
<b>Degrees of Freedom</b>	1
<b>Asymptotic Sig. (2-sided test)</b>	.000

1. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 24.500.

**Figure 4.1 Chi-Square Test**

A Chi-square analysis showed a significant difference in the frequency of hospital readmissions between the control and the intervention group ( $\chi^2 (1) = 31.041, p=.000$ ).

The readmission rate prior to the intervention was 22.9% and reduced to 10.2% as noted in the following graph. Reducing readmission rates from 22.9% to 10.2% was a 55.5% reduction from the month prior to the implementation of the educational tool. The educational intervention resulted in a significant reduction in the 30 day hospital readmission rate.



**Figure 4.2 Readmission Rate**

## CHAPTER 5

### DISCUSSION

The purpose of the EBP project was to reduce readmission rates by implementing an educational intervention provided by the advanced practice nurse in the outpatient heart failure clinic. The PICOT question was: What is the effect of heart failure education on patients referred to the HF clinic APNs compared to those with traditional education on readmission rates within 30 days?

The average number of monthly admissions of patients with the primary diagnosis of heart failure in the year 2012 was 30 – 65 for the facility. The EBP project produced 49 individuals with slightly more males (53.1%) than females (46.9%) during the implementation month of the EBP. The month prior to the educational intervention, there were 35 patients identified with almost identical percentages of males (54.3%) compared to females (45.7%). The data indicated there was no difference in the gender of the two groups. The gender distribution of the EBP project was consistent with the studies by Peacock et al. (2011) and Whellan et al. (2011).

A *t* test was conducted and resulted in a significant difference ( $t(48) = -6.101, p = .001$ ) between the mean ages of the groups (84 years for the control group and 72 years for the intervention group), which was a limitation of the project. The difference could be due to the convenience sample from the facility at the time of the project. A secondary finding noted was age. In the intervention group there were 11 or 22.4% of the sample who were between the ages of 20-59 years. The difference may have had an impact in the learning and application of the components for managing their HF in comparison to the older group. A younger mean age in the intervention group could have been a cofounder due to less co-morbidities as compared to the control group. Patient knowledge of HF management enables them to make independent decisions and

achieve an optimal level of health within their limitations, as was seen in Wilson, et al. (2003).

The marital status of the interventional group resulted in 46.9% married and 53.1% widowed, divorced or single. The marital status of the control group was not collected due to the limited availability of the medical record. The significance of marital status between the two groups could not be correlated with this EBP project. Having social support from family and friends may increase self-care behaviors and decrease readmission rates. Any future EBP projects should include the marital status of the participants in order to correlate if there are any significant differences. The marital status characteristic result from the intervention group varied from the literature in which slightly more than half of the patients lived with a spouse (Jaarsma, Abu-Saad, Dracup, & Halfens, 2000). The authors also reported that persons not living alone tended to be more compliant with medication and were motivated by the support from their partners, family, and friends.

The readmission rate of heart failure patients within 30 days of discharge of the interventional group was 10.2% as compared to the control group the month prior to the educational intervention at 22.9%. The decrease in readmission rate was more than half of the baseline. The Chi-square analysis also showed a significant difference in the frequency of hospital readmissions between the control and intervention group. The significant result was expected by the PC. Providing a comprehensive discharge education was essential to reduce readmission rates. The education by the clinic APN incorporated the HF guidelines, the latest evidence, and tools needed to promote self-care behaviors. The intervention was supported by the evidence in which optimal discharge education should be structured, one-on-one sessions with a specialized heart failure nurse, or advanced practice nurse (Vreeland, Rea, & Montgomery, 2011). All patients with a primary diagnosis of HF received the standardized HF education in the

control and intervention group. In addition, the intervention group received the educational tool delivered on a one-on-one basis by one of the HF clinic advanced practice nurses. The educational intervention appears to have resulted in a significant reduction in the readmission rate.

An unexpected finding emerged related to the presence of a support member during the interventional educational session. A support member was present for 34.7% of the intervention group, a limitation of the project. The APN inquired if the individual desired to partake in the additional education tool. All the intervention participants agreed to the teaching session. The APN tried to set up a time when their support member could be present. Unfortunately, many of their support members were only available during the evening hours or not able to attend due to other commitments. The younger group, with 22.4% of the intervention group between the ages of 20 – 59, was in the working age group which could account for the limited presence of a support member. Support from people close to the patient with HF is important to be successful in HF management (Paul, 2008). In future projects, encouraging presence of a support member should be a goal to increase successful HF management.

The findings from this EBP project support the importance of educating patients on HF management before discharge and utilizing tools delivered by a specialized APN. The comprehensive education incorporating EBP guidelines and promoting patient involvement is essential, as seen in this project. The education should promote HF self-care behaviors.

### **Evaluation of the Applicability of the Theoretical Framework**

The theoretical framework used for this EBP project was Dorothea Orem's Self-Care Deficit Nursing Theory (SCDNT). Orem's Self-Care Deficit Nursing Theory is a combination of three theories, self-care, self-care deficit, and nursing systems. Self-care activities are performed by the individual on their own behalf maintaining health and well-

being. Self-care deficit specifies the point when nursing care is required, due to the inability of the individual to provide continuous effective self-care. Nursing system describes how the self-care needs will be met by the nurse, patient, or both. It can be in a: (1) supportive educative way where the individual can and should perform all self-care actions providing total self-care, (2) partially compensated, when the individual can perform some self-care actions and needs help from nursing, and (3) wholly compensated, where the individual is completely dependent and cannot or should not perform any self-care actions (Timmins & Horan, 2007).

The SCDNT theory was a fit because it followed the nursing process. The assessment and diagnosis phase was made by the project coordinator, the HF readmission task force, and the CNO. The data showed a 23% HF readmission rate for 2011 which was higher than the national average. The increased rate meant a decrease in reimbursement and penalty for the facility for 2012, if not decreased. The plan was to reduce HF readmission rates by 20%. In order to implement such a plan, a partially compensatory nursing system needed to be put into place. The key to reducing readmission rates was to increase the self-care practices of the HF patient through education. According to Orem's theory, persons must have the capacity to care for themselves with the help from nursing. The implementation of the EBP project meant identifying the appropriate educational material to be congruent with the needs of the HF patient. The information needed to meet the educational level, comprehension skills, and knowledge base of the individual. The evidence-based teaching tool implemented was developed by the University of North Carolina Chapel Hill and was available free of charge at <http://www.nchealthliteracy.org/hfselfmanage.html>. The APNs from the clinic used version 1 which was available to the patient in English and Spanish. The last phase was the evaluation where the outcome was to decrease HF readmission rates and was

successful with a decrease from 22.9% the prior month to 10.2% the month, or a 55.0% reduction, after the educational implementation.

One of the strengths of the theoretical framework was its applicability to the nursing process. It organized the problem solving process by identifying phases and components in order to strive to achieve successful outcomes. The theory can apply to activities of daily living, adaptation, and goal setting. Additionally, the theory is widely used in practice throughout the world.

A limitation of Orem's theory was its lack of understanding of the model. Timmins & Horan (2007) identified that published studies contributed to the theoretical development of the theory, but did little to neither advance the practical application of the model nor demonstrate its understanding in practice. The project coordinator also had a little difficulty understanding the overlapping of the three theories without accessing other sources.

### **Evaluation of the Applicability of the EBP Framework**

The Model for Evidence-Based Practice Change by Rosswurm and Larrabee was used as the framework for this DNP project. There are six steps to the model: (1) assess the need for change in practice, (2) link the problem, interventions, and outcomes, (3) synthesize the best evidence, (4) design practice change, (5) implement and evaluate change in practice, and (6) integrate and maintain change in practice (Melnyk and Fineout-Overholt, 2011).

#### **Step 1—Assess the need for change in practice**

The hospital administration recognized and reported the hospital HF readmission rate was higher than the national average and prompted the formation a HF readmissions task force. The team and the project coordinator developed a PICOT question to assess the effect of HF specific education on reducing 30 day readmission rates using best practice guidelines.

The key stakeholders were the hospital administrators, quality manager, nursing staff, educators, case managers, advanced practice nurses, and nursing managers. Representatives from these groups were selected for the task force. The group identified patients with the primary diagnosis of heart failure were the target for education. Patients were identified by an assigned number so that no demographic data could be linked to the individual. The EBP project received an exempt status by the hospital's centralized Institutional Review Board (IRB).

The internal factors that affected the EBP project were assessed. Patients with the primary diagnosis of HF and were referred to the HF clinic agreed to attend the additional class at the HF clinic. They received an appointment time and were called the day before the class to remind them and they acknowledged they would attend. None of the scheduled patients presented to the clinic for the additional class (intervention). The strategy was changed and the scheduled patients were told they would receive a \$10.00 gift card for gasoline for attending the class. Again, there were no patients who presented to the clinic. It was decided that the patients would be seen the day before discharge or on discharge day. All HF patients with a primary diagnosis of HF agreed to the additional education session conducted by the APN from the clinic.

External factors that affected the project were evaluated. The cost of the educational materials and the weight scales were absorbed by the facility. The gas cards were provided by the project coordinator which was never distributed to any of the participants since the education was provided at the facility prior to discharge.

### **Step 2—Locate the best evidence**

Evidence from the literature, seminars and webinars was obtained regarding best practices in reducing readmission rates. Searches used the databases of PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, ProQuest, Cochrane Library, and Joanna Briggs Institute.

**Step 3—Synthesize the best evidence**

The evidence was analyzed using Melnyk and Fineout-Overholt (2011) rating system for the hierarchy of evidence and critical appraisal of evidence forms from the book. An evidence table was developed to summarize the selected studies. The strongest level of evidence, as outlined by Melnyk and Fineout-Overholt (2011), Level I systemic review/meta-analysis of relevant RCT's, three studies were used. Education interventions targeted daily weights, salt restriction, fluid restriction, exercise, communication with physician, and medication adherence (Kent et al. (2011). The meta-analysis by Phillips et al. (2004) found that comprehensive discharge planning plus post-discharge support, for the older patients with HF, significantly reduced readmission rates and may improve health outcomes. The third review by Slyer et al.(2001), summarized that patients with HF that received nurse coordinated transitioning of care interventions demonstrated a reduction in readmission rates.

There were three Level II RCT's for inclusion in this EBP project. Domingues et al. (2011), reported that inpatient education benefitted HF patients in their understanding of their disease process. Nurse-led education sessions led to improved HF knowledge and were strongly associated with appropriate self-care behaviors (Kommuri et al., (2012). Krumholz et al. (2002) stated that formal education and additional support post hospital discharge substantially reduced adverse clinical outcomes and financial costs with the HF patient.

The only Level V systematic review of descriptive/qualitative studies summarized that in order to decrease hospital readmissions and improve patient outcomes, the obstacles to HF care must address patient-level, provider-level, and system-level barriers (McEntee et al., 2009). Most of the obstacles to HF care in this project were at the patient-level. The inability to attend a scheduled session warranted the need to change the location of the educational intervention. The adjustment of delivering the

educational session at the hospital ultimately resulted in total involvement of the participant and some of their support members. The obstacle at the patient-level was addressed and removed, as identified in this systematic review.

The three Level VI qualitative or descriptive studies were the last studies utilized for the project. Dennison et al. (2011) found that adequate health literacy is associated with higher HF knowledge and self-care confidence in hospitalized patients. In the study by Manning et al. (2010), education of the HF patient was important in maximizing HF therapies and improved quality of life. The last study by VanSuch et al., reported that patients who received discharge instructions were significantly less likely to be readmitted for any cause than those who missed at least one type of instruction. Documentation of discharge instructions was correlated with reduced readmission rates. The health literacy issue was addressed with the selection of the appropriate tool. Since all the patients with primary diagnosis of HF participated in the educational intervention, the result was a significant reduction in readmissions. The evidence supported the feasibility of a new practice in the EBP project workplace.

#### **Step 4—Design practice change**

The task force defined that education was the key to changing practice and decreasing readmission rates. The education plan was to administer the same basic HF education to all HF patients. The information included heart zones, low sodium diet, daily weights, fluid restriction, exercise, medication adherence, and self-care management. The patients were referred to the HF clinic APNs for further education utilizing the interventional tool. The end target would be measured by decreased readmission rates. It appeared that the outcome of this design change was a reduction of readmission rates.

#### **Step 5—Implement and evaluate change in practice**

The educational tool was implemented from October 2012 to November 2012 for 30 days. The HF APNs met with the patients with a primary diagnosis of HF on the day of discharge or the day before discharge. The tool was administered to the patient and implemented which took approximately 45 minutes. The patient's family or support person was invited to attend the teaching session. The patients' involvement in the educational session was their consent to participate in the educational component and informed consent was obtained. They were informed that readmission information would be collected on them for a period of 30 days post discharge. They were identified in the data by an assigned number in order to maintain confidentiality.

The intervention data was collected until December 2012, as a result of having to wait for 30 days post discharge. The expected outcome was decreased readmission rates. There were 5 participants (10.2%) readmitted for all causes as compared to 22.9% in the control group. The result of this EBP project was supported in the studies by Kommuri et al. (2012), Phillips et al. (2004), and VanSuch et al. (2006) in which the evidence revealed that patients who received a comprehensive discharge education significantly reduced readmission rates. The decision was made to accept the practice change of utilizing the educational tool administered by the HF clinic APN.

### **Step 6—Integrate and maintain change in practice**

The result of the EBP project was reported to the stakeholders including hospital administrators. It was decided to integrate the teaching tool into the standards of practice for the facility. The education continues to be utilized by the APNs of the HF clinic. Data collected since the conclusion of the EBP project continues to report a 10% to 14% readmission rate. The project resulted in decreased readmission rates by promoting self-care behaviors through education as supported in the systematic review by Kent et al. (2011). The plan is to disseminate the results of this EBP project outside the organization through a regional conference in which the facility participates quarterly.

One of the strengths of the EBP framework was the integration of quality improvement and evidence-based strategies to promote adoption of a new practice in the workplace (Melnyk and Fineout-Overholt, 2011). Working with the task force on reducing readmissions and members of the quality improvement team strengthens the support of evidence in the workplace.

An area of improvement with the framework would be to reduce the six steps to five steps. Steps 2 and 3 could be combined since they entail finding the evidence and then analyzing the evidence. They flow easily without having to separate them and would simplify the model.

Modifications during the implementation of the project included administering the teaching tool the day of or day prior to discharge. Since there was no attendance at the HF clinic by the patients, the strategy was to provide the comprehensive discharge education by the APN during their hospitalization as seen in the evidence reported by Phillips et al. (2004).

If the EBP project were to be repeated, the education would definitely need to be done prior to discharge. Most of the HF patients in the project were older and required someone to drive them to the clinic. The weather and time of year played another factor in the lack of participation since it was winter. The family members should be questioned on their availability for the educational intervention. As noted by Orem's theory, when there is a self-care deficit and the individual is unable to perform all self-care actions, help and support should be provided by other members. In addition, more data on quality of life, such as a tool could be utilized in future projects.

### **Strengths and Limitations of the EBP Project**

One of the strengths of the EBP project was in the identification of the implementation timeline. The timeliness of the presentation of the problem of readmission rates and financial implications for the organization facilitated the

formulation of the PICOT question. There was much information on readmission rates, education, and self-care behaviors that it was simple to find studies. Another one of the strengths of the project was the availability of the participants. Once it was decided to implement the teaching tool just before discharge, we were able to capture all patients with primary diagnosis of HF and provide the additional education to reinforce the self-care management behaviors. The availability of APNs from the HF clinic was a definite win for the project. The APNs were hired just prior to the implementation of the project. The use of APNs was supported by the evidence presented in Phillips et al. (2004), in which comprehensive discharge planning by APNs plus post-discharge support for older patients with HF significantly reduced readmission rates. Finally, the resources to implement the project were facilitated by the organization. The printed material was obtained after review of the evidence along with the weight scales necessary to monitor fluid balance. The group decided to purchase audio scales for those individuals who could not bend forward to read a scale. The availability to provide the tools needed to successfully promote self-care behaviors was a positive aspect in reducing readmission rates.

A weakness of this project was the small sample size from a single organization. The convenience sampling may have contributed to the limited sample size. The mean age difference between the control and intervention groups was also a limitation in generalizing the project results. Another limitation of the EBP project was the lack of family participation during implementation of the tool. Since the APNs work the day shift, the family members present were those who could visit on the day shift, thus reducing the opportunity of other family members to be present for the educational intervention in order to support the patient in their self-care behaviors.

### Implications for the Future

**Practice.** APNs are vital in managing HF failure patients. They can supervise HF care by teaching and monitoring medication adherence, checking of daily weights, understanding of dietary restriction, and early identification of worsening symptoms (Paul, 2008). The APN is the gatekeeper for coordinating the care of the HF patient. It makes sense that the individual who takes time to assess the needs of the HF patient; implements the educational elements necessary to manage the chronic condition; and evaluates the patient's adherence to self-care management behaviors, is the appropriate first line provider. DNPs have the knowledge and skills necessary to advance evidence-based practice in the workplace, in order to affect self-care behaviors and promote positive health care practices.

**Theory.** Orem's theory can offer a conceptual framework for judging appropriateness of teaching materials for the HF patient (Wilson et al., 2003). The theory was appropriate for this EBP project since it followed the nursing process for problem solving. The individual must have the capacity to make decisions regarding health care. Heart failure self-care concept identifies the process where the patient actively participates in management of the chronic condition (Moser and Watkins, 2008). Patients with HF are usually elderly and may have limited cognitive function such as in learning and memory tasks. Orem's theory does not account for the psychosocial factors that can affect self-care such as depression, anxiety, education level, and socioeconomic status (Moser and Watkins, 2008). Future EBP projects by DNPs should look at using more than one theory from more than one discipline-specific framework, in order to account for factors that influence self-care.

Conceptual models or frameworks should also be used to facilitate change in practice. There are several models available which identify a process to facilitate change (Melnik and Fineout-Overholt, 2011). The Model for Evidence-Based Practice

Change by Rosswurm and Larrabee was used as the framework for this EBP project. There are commonalities in all the models and selection of the appropriate model should be based on its usefulness in implementing change. The DNP is in position to facilitate implementation of a framework in the workplace.

**Research.** Additional research is needed to provide evidence-based health education for patients with low literacy skills (Wilson et al., 2003). Research is needed to determine if APN-led education improves quality of life outcomes for HF patients (Manning et al., 2010). The doctorally prepared APN is in the best place to conduct studies on issues that affect practice. The research studies replicate previous studies but fail to progress answering the same question (Moser and Watkins, 2008). Research must be built upon using findings of existing studies and should be implemented to guide change in practice.

**Education.** Education is an integral component of increasing the HF patient's knowledge and management of HF (Crowther, 2003). There is a need to tailor educational interventions to improve HF self-care behaviors. Health literacy is important to consider when promoting HF knowledge in the older adult when there is less than a high school education (Dennison et al., 2011). Health literacy affects how individuals understand and participate in self-care management behaviors (Moser and Watkins, 2008). The APNs with clinical doctorates are the future leaders to facilitate change from the research arena to the bedside in the form of best practice.

### **Conclusion**

In summary, the EBP project demonstrated that a comprehensive discharge education utilizing best practices resulted in reduced readmission rates. The evidence supported the outcome of this project. Implementing a comprehensive APN-led patient management for HF promotes adherence to self-care behaviors and reduces readmissions (Manning et al., 2010). The project provided general HF education but

implemented an additional education session by an APN. It utilized a tool to standardize the content and reinforce the self-care management practices of the disease. Reducing readmission rates was the goal of the project and it was achieved with the intervention of a HF clinic APN. The use of the educational tool will be continued as a best practice at the project facility due to its success. A pneumonia task force to reduce readmissions was formed and will follow the lead of the HF task force as a result of the successful outcome of HF readmissions.

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## BIOGRAPHICAL MATERIAL

Ms. Villarruel graduated from Indiana University Northwest with an Associate of Science degree in Nursing in 1977 and a Bachelor of Science degree in Nursing in 1987. She worked as a staff nurse in critical care in various Indiana community hospitals and at University Hospital academic medical center in Indianapolis. Ms. Villarruel transitioned into nursing administration as a house supervisor and nurse manager. She received her Master of Science in Nursing in 1991 from Indiana University/Purdue University at Indianapolis with a focus on nursing administration. Upon graduation, she was a clinical instructor in the undergraduate nursing program at Indiana University Northwest. She completed the Post Masters Adult Nurse Practitioner (ANP) program at IUPUI in 1998 and worked as a Nurse Practitioner for the Veterans Administration in Crown Point and Chicago. Ms. Villarruel is dual certified as an adult nurse practitioner and an advanced nurse executive through the American Nurses Credentialing Center (ANCC). She currently works as a director of patient care services at a local community hospital and as a nursing consultant presenting nursing reviews nationally to graduates to successfully pass their national licensing exam. Mayola is a member of the American Nurses Association (ANA), Sigma Theta Tau International Honor Society of Nursing®, Alpha Chapter, and the Society of Nurses in Advanced Practice (SNAP). She serves as a commissioner on the Commission on Certification for the ANCC and was appointed by the governor as a member of the Indiana Medical Education Board. Ms. Villarruel is a contributor to several nursing books related to pharmacology and nursing education. Her Evidence Based Practice (EBP) project on reducing heart failure readmission rates was presented as an education poster at the Northwest Indiana Research Consortium 2012. Mayola is currently attending Valparaiso University and will graduate with her Doctorate of Nursing Practice (DNP) in 2013.

**ACRONYM LIST**

ACC: American College of Cardiology

ACEI: Angiotensin Converting Enzyme Inhibitor

AHA: American Heart Association

AHRQ: Agency for Healthcare Research & Quality

APA: American Psychological Association

APN: Advanced Practice Nurse

ARB: Angiotensin Receptor Blocker

BCF: Basic Conditioning Factors

BNP: B-type Natriuretic Peptide

BPA: Best Practice Alert

CAD: Coronary Artery Disease

CDC: Centers for Disease Control

CINAHL: Cumulative Index to Nursing and Allied Health Literature

CMS: Centers for Medicare and Medicaid Services

CNO: Chief Nursing Officer

DHFKS: Dutch Heart Failure Knowledge Scale

DMK: Disease Management Knowledge

DNP: Doctor of Nursing Practice

DSK: Dietary and Sodium Knowledge

EBP: Evidence-Based Practice

HCUP: Healthcare Cost and Utilization Project

HF: Heart Failure

HFST: Heart Failure Support Team

IRB: Institutional Review Board

JBI: Joanna Briggs Institute

JC: Joint Commission

LOS: Length of Stay

LVSD: Left Ventricular Systolic Dysfunction

Medline: National Library of Medicine

NIH: National Institute of Health

NP: Nurse Practitioner

PC: Project Manager

PICOT: Population, Intervention, Comparison, Outcome, Timeframe

PubMed: Free database accessing Medline database of references and abstracts on life sciences and biomedical topics

QOL: Quality of Life

RCT: Random Control Trial

RN: Registered Nurse

RSRR: Risk-standardized Readmission Rates

SCDNT: Self-Care Deficit Nursing Theory

SCHFI: Self-Care of Heart Failure Index

SPSS: Statistical Package for the Social Sciences

S-TOFHLA: Test of Functional Health Literacy in Adults – short form

**Appendix A***Summary of Literature Search*

Search Engines	Key Words			Included Literature After Abstract Review	Included Literature After Full Text Review
	Heart Failure Education	Self-Care	Read-mission		
Cochrane Library	5	0	0	0	0
CINAHL	99	52	40	40	4
PUBMED	133	20	35	35	3
JBI	3	0	0	3	2
Medline	119	0	0	10	1
ProQuest	1297	0	0	0	0
Handsearch					
Total After Abstract Review				88	
Total After Full Text Review					10

**Appendix B***Rating System for the Hierarchy of Evidence*

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<b>Level</b>	<b>Description</b>
Level I	Evidence from a systematic review or meta-analysis of all relevant RCTs
Level II	Evidence obtained from well-designed RCTs
Level III	Evidence obtained from well-designed controlled trials without randomization
Level IV	Evidence from well-designed case-control and cohort studies
Level V	Evidence from systematic reviews of descriptive and qualitative studies
Level VI	Evidence from single descriptive or qualitative studies
Level VII	Evidence from the opinion of authorities and/or reports of expert committees

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*Note:* Melnyk, B. M., & Fineout-Overholt. (2011). *Evidence-based practice in nursing and health care*, p. 12. Philadelphia: Lippincott, Williams, and Wilkins.

**Appendix C***Summary of Studies*

<b>Authors, Level of Evidence</b>	<b>Sample, Setting</b>	<b>Design, Interventions</b>	<b>Findings</b>
Dennison et al. (2011) Descriptive comparative study Level VI	Sample: 95 convenience sample patients primary diagnosis of HF Setting: Large urban teaching hospital	Design: descriptive, comparative study Intervention: DHFKS 15-item multiple choice HF knowledge; 22-item SCHFI self-care; and 36-item S-TOFHLA health literacy	Adequate health literacy is associated with higher heart failure knowledge and self-care confidence in hospitalized patients.
Domingues et al. (2011) Randomized clinical trial Level II	Sample: 48 HF patient in the intervention group and 63 HF patients in the control group Setting: tertiary university hospital in Porto Alegre, Brazil from January 2005 to July 2008	Design: randomized clinical trial Intervention: all patients received inpatient education while the intervention group received telephone contact post discharge	There was no significant difference in the intervention group that received telephone contact post discharge compared to those who received only inpatient education. Both groups improved their level of HF awareness and self-care knowledge regardless of telephone contact post discharge. Therefore, inpatient education benefitted all HF patients in understanding their disease.

<p>Kent et al. (2011) Systematic Review Level I</p>	<p>Sample: 13 studies were independently assessed by two reviewers using the JBI Meta Analysis of Statistics Assessment and Review Instrument (MAStARI)</p>	<p>Design: randomized control trials (RCTs), quasi-randomized designs, and pre-test post-test studies from 1990 to 2010 Intervention: Strategies used compared to usual care were supportive education, video, motivational interviewing , and telephone delivered empowerment</p>	<p>Meta-analysis provided strong evidence that education enhanced self-care behaviors. Education interventions targeted were daily weights, salt restriction, fluid restriction, exercise, communication with physician when experiencing changes in condition, and taking medications as ordered.</p>
<p>Kommuri et al. (2012) Randomized controlled trial Level II</p>	<p>Sample: randomized 113 intervention and 114 control patients with primary diagnosis of heart failure at the setting: University of Michigan Hospital</p>	<p>Design: control group received standardized discharge instruction while the intervention group received additional education materials and hour long education session with nurse educator. Heart failure knowledge questionnaire (HFKQ) administered at start and 3 months after hospital discharge. Intervention: the extended education material covered sodium and fluid restriction, importance of med adherence, daily weight monitoring, smoking cessation, alcohol limitation, and measure to take with HF worse symptoms</p>	<p>Nurse led education sessions leads to improved heart failure knowledge and is strongly associated with appropriate self-care behaviors. Patients with high HF knowledge scores are less likely to be readmitted to the hospital over a 6 month follow up period.</p>

<p>Krumholz et al. (2002) Prospective randomized controlled trial Level II</p>	<p>Sample: randomized 44 intervention and 44 control patients with diagnosis of HF between October 1997 and September 1998. Setting: Yale-New Haven Hospital</p>	<p>Design: prospective randomized sample of HF patients. Intervention: two phases of intervention. Phase one consisted of experienced cardiac nurse educating patient face to face over one hour using a teaching booklet and phase two telemonitoring by the nurse contacting patient weekly for one month then biweekly for eight weeks and monthly for total of one year</p>	<p>Formal education and additional support post hospital discharge substantially reduced adverse clinical outcomes and financial costs with the HF patient.</p>
<p>Manning et al. (2010) Descriptive Study Level VI</p>	<p>Sample: 200 retrospective hospital chart reviews 2003 to 2008 Setting: Memorial Medical Center, a 534-bed, tertiary care, level I trauma, academically affiliated institution regional leader in providing heart-related care in Springfield, Illinois.</p>	<p>Design: retrospective chart review Intervention: Identify HF patients using a heart failure support team in order to implement CMS core measures to increase quality of care</p>	<p>A heart failure support team (HFST) was established to identify HF patients in the hospital in order to implement and assure the CMS recommendations for HF care . Discharge instructions included a written list of meds, limitations of salt and fluids, daily weights, exercise, and reporting of worsening symptoms. Education of the HF patient important in maximizing HF therapies and improved quality of life.</p>

<p>McEntee et al. (2009) Review of literature Level V</p>	<p>Sample: Patients with primary diagnosis of heart failure between 1998 and 2007. Setting: studies from Europe, Australia, New Zealand, Canada, and the United States</p>	<p>Design: Quantitative data from 49 studies and qualitative data from 13 studies, and mixed methods from 2 studies.</p>	<p>Barriers to HF care were common and pervasive throughout the continuum of care. To decrease hospital readmissions and improve patient outcomes, obstacles to HF care must be addressed at all three levels. Patient-level barriers were found in 45 studies, provider-level barriers in 23 studies,; and system-level barriers in 13 studies. 82% of quantitative studies examined barriers at one level of care (most at the patient-level), and 85% of qualitative studies examined barriers at multiple levels.</p>
<p>Phillips et al. (2004) Meta-analysis Level I</p>	<p>Sample: 3304 HF patients 1966 to 2003 Setting: hospitalized patients in the United States, Australia, Canada, England, Holland, Ireland, Italy, and Sweden.</p>	<p>Design: 18 Randomized controlled clinical trials for meta-analysis Intervention: usual care compared to comprehensive discharge planning plus post-discharge support</p>	<p>Comprehensive discharge planning plus post-discharge support for older patients with HF significantly reduced readmission rates and may improve health outcomes.</p>
<p>Slyer et al. (2001) Systematic Review Level I</p>	<p>Sample: 16 randomized clinical trials of adult HF patients from 1993 to 2008 Setting: acute hospitals in the United States, Canada, Europe, Australia, and Asia</p>	<p>Design: systematic review of RCTs. Intervention: control group with usual care while the intervention group received inpatient education, comprehensive discharge planning along with telephone contact, home visits, or a combination of all</p>	<p>Patients with HF receiving nurse coordinated transitioning of care interventions from hospital to home can demonstrate a reduction in readmission rates. The transitioning care should include contact with the HF nurse at least weekly for a minimum of 30</p>

		above.	days post discharge.
VanSuch et al. (2006) Retrospective descriptive study Level VI	Sample: 1121 randomly selected charts but only 782 used with primary diagnosis of HF from July 2002 to September 2003 Setting: St. Mary Hospital, a tertiary care academic center in Rochester, Minnesota.	Design: retrospective descriptive study Intervention: Study the effect of discharge instruction on readmission	Patients who received all discharge instructions were significantly less likely to be readmitted for any cause than those who missed at least one type of instruction. Documentation of discharge instructions is correlated with reduced readmission rates.