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The Effect of Heart Failure Education on Intermediate Care Unit Nursing Staff's Knowledge of Heart Failure, Self-Care, and Best Practice Guidelines

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DEDICATION

This paper is dedicated to my four children, Angela, Adam, Alex, and Andrew for their loving support and encouragement throughout my quest to earn this doctoral degree in nursing practice. They never complained whenever I was in my focused mode and forgot everything around me. Dinners were made and the house kept clean thanks to my wonderful kids. I also want to thank my parents, Glenn and Eleanor Evans, my brothers, John and Glenn Evans, my sister Cathy Evans and sister-in-law Stacy Evans for their steadfast belief that I could accomplish my goal. A special thank you to my best friend and “sister” of my heart if not of blood, Paula Swenson, who listened to my tales of agony daily without complaint, bolstered me up when I felt like giving up, and cheered me on to the finish. I could not have made it without you. To my Aunt Bette Dzunda who inspired me to begin my nursing journey so many years ago, this is for you.

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ABSTRACT

Heart failure (HF) is a chronic disease affecting nearly six million people in the United States with an annual cost of nearly 33 billion dollars. If nurses are inadequately prepared to care for and/or educate patients with HF, evidence-based (EB) nursing care will be suboptimal and hospital readmission rates with the subsequent increased costs for care will continue to soar. To address their higher-than-national average HF readmission rates, an EB nursing project was implemented at a local, urban community hospital to assess intermediate care unit (IMCU) nursing staff's knowledge of HF, self-care, and best practice guidelines. The Rossworm & Larrabee Model was chosen as the research utilization model for this project to guide health care providers from an assessment of the need for change to implementation and evaluation. Synthesized evidence supported the implementation of educational interventions to improve nurse knowledge of HF self-care. Four 1-1 ½ hour in-services were given to the IMCU nurses on specifics of HF management. Before the first in-service, nurses completed a 20-question survey by Albert et al. (2002) to ascertain their knowledge of HF self-care. After the fourth in-service, the nurses completed the same survey to assess for any changes in their knowledge levels. At the completion of the project, a paired-samples *t* test was calculated that demonstrated significant improvement in nurse knowledge scores ($p < .001$). The results of this EB project demonstrated that disease-specific education has a positive effect on nurse knowledge. Further study can be done in the future to determine if improvement in nurses' knowledge has any effect on HF patient hospital readmission rates, length of stay, and overall cost.

CHAPTER 1

INTRODUCTION

Heart failure (HF) is a complex, expensive clinical problem that affects nearly six million Americans today (Reilly et al., 2009) and the incidence is rising with a staggering 400,000 to 500,000 new cases each year (Albert et al., 2002). At an estimated cost of over $33 billion annually, HF is the most costly cardiovascular disease in the United States (McEntee, Cuomo, & Dennison, 2009). Among those on Medicare, HF is the leading cause of hospitalizations and nearly half of those admissions are preventable (McEntee et al., 2009). In addition, when compared to patients with other disorders, patients with HF have three times as many physician office visits, twice the number of emergency room visits, and are readmitted to the hospital three times as often (McEntee et al., 2009). Heart failure is also one of the most common diagnoses of patients needing home health care and as the population ages, the number of patients requiring such home health services will only increase (Albert et al., 2002).

In 1995, clinical guidelines for the diagnosis and management of HF were developed by the American College of Cardiology (ACC) and the American Heart Association (AHA) and then were subsequently upgraded in 2005 and 2009 (Pierce, Dalton, Duke, & Spaniol, 2009). Despite the demonstrated effectiveness of these evidence-based practice (EBP) guidelines, HF care and outcomes remain suboptimal (McEntee, et al., 2009). Before discussing best practice guidelines, the pathophysiology of HF must be delineated.

Pathophysiology

Heart failure is a term widely used to describe a progressive, deteriorating condition of the heart. It is a clinical syndrome that occurs due to some abnormality in myocardial function (structural or functional) that interferes with the ability of the ventricle to fill with or eject blood (Pierce et al., 2009). Heart failure occurs as the result of a multitude of factors that cause inadequate tissue perfusion: myocardial infarction, prolonged uncontrolled hypertension, viral or bacterial infection, atrial fibrillation, genetic predisposition, infiltrative cardiomyopathies, and thyroid disease to name just a few. The most common causes, however, are uncontrolled hypertension and coronary artery disease (CAD) (Thomas-Kvidera, 2005). When describing HF, there are seven terms that require definitions: preload, afterload, stroke volume (SV), cardiac output (CO), ejection fraction (EF), myocardial contractility, and HF itself (Pierce et al., 2009). These definitions are listed in Table 1.0.

Table 1.0

Definitions of factors affecting heart function (Sherwood, 2004)

Preload: the extent of ventricular filling (or the workload imposed on the heart before contraction begins)
Afterload: the arterial blood pressure (or the workload imposed on the heart after contraction)
Stroke Volume: refers to the amount of blood pumped out of each ventricle with each contraction (the end-diastolic volume minus the end-systolic volume)
Cardiac Output: the volume of blood pumped by each ventricle per minute (SV x HR)
Ejection Fraction: the amount of blood ejected or pumped out of the left ventricle with each heartbeat. A normal EF is equal to the SV divided by the end-diastolic volume (approximately 50%)
Myocardial Contractility: the strength of the contraction and is directly affected by sympathetic stimulation and epinephrine (increased sympathetic stimulation causes a more forceful contraction)
Heart Failure: a decreased contractility of the heart itself or an inability of the CO to keep pace with the body's demands

Whatever the underlying cause of HF, the signs and symptoms are directly related to decreases in CO that subsequently fails to meet the metabolic needs of the patient. Further distinction of what type of HF (systolic, diastolic, right-sided, left-sided or any combination thereof) needs to be made before planning the care of the patient because the treatments for the various types differ. That determination can be made using a simple noninvasive test, the two-dimensional transthoracic Doppler echocardiography or 2D ECHO with Doppler (Crowther, 2003).

Left-Sided heart failure. Left-sided HF is more prevalent than right-sided HF and may be either systolic or diastolic in nature or a combination of both (Pierce et al., 2009). According to Quinn (2007), left-sided *systolic* HF is characterized as an EF of less than 40% and may lead to a decrease in the force of myocardial contractility resulting in diminished CO, thinning of the heart wall and dilatation of the filling chamber. In a cascading event, the left ventricular filling pressures become elevated which in turn causes fluid volume overload and elevated pressures in the left atrium and pulmonary vasculature leading to pulmonary congestion. If untreated, the elevated pulmonary pressures can lead to increased right-side pressures and eventually, to right-sided HF as well.

Left-sided *diastolic* HF occurs due to inadequate filling of the left ventricle during diastole secondary to loss of muscle fiber elasticity (Thomas-Kvidera, 2008). The most common cause of such dysfunction is prolonged uncontrolled hypertension (Fletcher & Thomas, 2001). In diastolic HF, the patient's systolic function may be preserved or even hyperdynamic (an EF of greater than 60%) or the patient may have a combination of both systolic and diastolic dysfunction (Pierce et al., 2009). Common symptoms of left-

sided systolic and/or diastolic HF include progressive dyspnea, paroxysmal nocturnal dyspnea (PND), orthopnea, rales, tachypnea, pulmonary edema, pleural effusions, cyanosis, fatigue, and palpitations (Pierce et al., 2009).

Right-Sided heart failure. Right-sided *systolic* HF results when the right ventricle is not pumping effectively into the pulmonary system secondary to such problems as pulmonary hypertension or after a right ventricular myocardial infarction. Right ventricular filling pressures are high and if left untreated, cause right ventricular hypertrophy, with gradual dilatation and weakening of the right ventricle (Pierce et al., 2009). As with left-sided diastolic dysfunction, right-sided *diastolic* HF occurs when the right ventricle is stiff and unable to relax, leading to increased filling pressures (Thomas-Kvidera, 2008). Right-sided HF symptoms include ascites, peripheral edema, insomnia, anorexia secondary to congestion of the gastrointestinal tract which may eventually lead to weight loss, persistent cough, weight gain, hepatomegaly, impaired liver function, and transient confusion (Pierce et al., 2009).

Classifications and Stages of Heart Failure

In this project, the severity of HF is categorized utilizing the New York Heart Association (NYHA) Functional Classification which is as follows:

I. No physical limitation of activity
II. Slight limitation in ordinary physical activity, resulting in fatigue
III. Marked limitation in activity; patients are comfortable at rest, but ordinary activity leads to symptoms
IV. Symptoms are present at rest; any activity leads to increased discomfort

(Data from the Criteria Committee of the New York Heart Association, 1994, p. 254 as cited in Thomas-Kvidera, 2005, p. 170).

The ACC and the AHA use a classification system depicting four stages of HF as well. Although the nomenclature is slightly different, the NYHA's functional classification system and the ACC/AHA's stages of HF both delineate the progression of the syndrome.

Heart Failure Management

The ACC/AHA guidelines for the management of HF are a four-pronged approach involving pharmacologic therapy, risk factor reduction/lifestyle modification, an implantable cardioverter/defibrillator (ICD), and cardiac resynchronization therapy (CRT) (Pierce et al., 2009) (See Appendix A). Medications used for HF include a combination of the following: digitalis, diuretics, angiotensin-converting enzyme inhibitors (ACEIs), angiotensin II receptor blockers (ARBs), anticoagulation drugs, and beta blockers (Dahl & Penque, 2002). All underlying co-morbidities of patients with HF need to be treated. The most common co-morbidities include CAD, hypertension, obesity, hyperlipidemia, diabetes, and tobacco use.

Barriers to Heart Failure Management

Despite the demonstrated effectiveness of best practice guidelines for HF management recommended by the ACC and the AHA which are readily accessible to health care providers, significant variations in HF management continue (Albert et al., 2002) and outcomes remain suboptimal (McEntee et al., 2009). After a comprehensive search of the databases for information on barriers to HF management, McEntee et al. (2009) reviewed 60 articles and determined that the possible reasons for the suboptimal

outcomes can be categorized into three levels: patient-level barriers, provider-level barriers, and system-level barriers. The following patient-level barriers were described in 45 studies: (1) lack of patient knowledge regarding HF, (2) lack of adherence to the plan of care, (3) lack of communication and/or trust in their health care providers, (4) functional limitations, (5) comorbidities with subsequent polypharmacy and increased costs, (6) psychosocial factors encompassing support systems, anxiety, emotional and distress/depression, and (7) socioeconomic factors related to limited resources, transportation and social support (McEntee et al., 2009). Thirteen studies in the McEntee et al. (2009) review detailed system-level barriers that affect HF management and patient outcomes: (1) organizational structure problems such as lack of continuity of care and incentives to comply with best evidence-based guidelines, (2) poor communication at all levels within the organization and lack of trust amongst health care providers at the bedside, and (3) lack of resources to properly manage HF within the organization and the community. The last barrier delineated in the McEntee et al. (2009) article (provider-level barriers) pertains directly to the DNP student's EBP project. The authors reviewed 23 studies and found five common provider-level barriers to HF management: (1) knowledge limitations regarding HF signs and symptoms, treatment, comorbidities, EBP guidelines and their application at the bedside, (2) diagnostic limitations related to lack of resources for appropriate testing, inexperience of the health care provider, and process-related issues such as timely and appropriate referrals, (3) pharmacological issues such as insufficient knowledge regarding HF medications (side effects, drug interactions, contraindications, titration difficulties, patient risks, and costs), (4) communication between health care providers and patients (limited rapport, lack of

trust, uncertainty of addressing pertinent emotional/psychological issues such as depression that can occur with a diagnosis of HF), and (5) personal factors which include nursing preferences related to patient care (education/training, experience levels, and confidence) (McEntee et al., 2009).

Statement of the Problem

Heart failure is a chronic disease affecting nearly six million people in the United States with an annual cost of nearly $33 billion (Reilly et al., 2009). There are multiple barriers to effective HF management (McEntee, 2009). Patient non-adherence to the medical plan of care with the necessary lifestyle modifications such as dietary and fluid restrictions, daily weights, and compliance with prescribed medications has been implicated in the frequent hospitalizations for decompensated HF (Reilly et al., 2009). While there are many reasons for patient non-compliance, knowledge of the disease, signs and symptoms of decompensation, and self-care management have all contributed to the frequent hospital readmission rates (Reilly et al., 2009).

Nurses play a key role in HF management as they not only care for the patients who are hospitalized, but are also tasked with educating the patients throughout their hospitalizations and at discharge. If nurses are inadequately prepared to care for and/or educate patients with HF, EBP nursing care will be suboptimal and hospital readmission rates with the subsequent increased costs for care will continue to soar (Reilly, et al., 2009).

Clinical Agency Data

St. Catherine Hospital in East Chicago, Indiana is located in the midst of a large urban community. The Catholic-based hospital, under the auspices of the Ancilla

Domini Sisters, first opened its doors to the public in 1928. Although originally thought to only offer treatment to injured factory workers, St. Catherine Hospital expanded its scope of health care services to “all persons regardless of race, creed or color” (St. Catherine Hospital, 2011). The hospital flourished for nearly 60 years. By the end of the 1980s, however, the local economy started spiraling downward as the steel industries experienced drastic cuts in steel demand. Many people were laid off and some never returned to work at what were once giants in the steel industry.

As the community around it suffered, so too did St. Catherine Hospital. As the steel layoffs and restructuring commenced, more and more of the patients who came to the hospital for their health care needs were uninsured or on public assistance. Facing financial ruin, St. Catherine Hospital became absorbed into the Community Healthcare System in 2001 in order to continue its mission to provide quality health care to the community it had served for nearly 60 years. Although the Ancilla Domini Sisters would no longer control their hospital, it still maintained its Catholic traditions as part of the buy-out deal (St. Catherine Hospital, 2011).

The current community unemployment rate is high and the residents suffer from a higher-than-state average crime rate. Only 35.5% of the community is Caucasian. The rest of the population are either African-American, Hispanic, or foreign born. In addition, 36.8% of the locals do not list English as the primary language spoken in the home and only 70.0% have their high school diplomas. A staggering 33.1% live under the poverty line (data retrieved from http://quickfacts.census.gov/qfd/states/18/1819486.html).
As a direct result of these statistics and the high unemployment rate, the majority of patients who enter St. Catherine Hospital through the Emergency Department (ED) are

sicker than the more affluent Caucasian patients who are treated at different area hospitals. The rates of readmission and lengths of stay are correspondingly higher in this urban-centered hospital as well. The majority of patients do not have insurance and those that do have public assistance.

There are several reasons for the disparity in readmission rates and overall patient outcomes for disadvantaged patients living in this community. The educational levels of minority patients living at or near the poverty level are decidedly less than those of white patients living in more affluent neighborhoods. Compliance with the plan of care requires that patients have the means to purchase their medications on a regular basis and adhere to the dietary restrictions that are more expensive to buy. Compliance also necessitates that patients have the education that is necessary to fully comprehend the signs and symptoms of disease processes in order to receive the proper treatment before needing to be readmitted. According to a Consensus Statement of the Heart Failure Society of America:

> Low health literacy compromises patient safety, quality health care and desired patient health outcomes. Specifically, low health literacy is associated with decreased knowledge of one's medical condition, poor medication recall, non-adherence to treatment plans, poor self-care behaviors, compromised physical and mental health, greater risk of hospitalization, and increased mortality (Evangelista et al., 2010, p. 9).

Table 1.1 demonstrates the demographics of East Chicago and underscores the external forces that directly affect the provision of care at St. Catherine Hospital.

Table 1.1

Demographics of East Chicago, Indiana (2010 census)

	East Chicago, IN	Indiana
Persons >65 years	11.3%	13.0%
Caucasians	35.5%	84.3%
Black	36.1%	8.4%
Hispanic	50.9%	6.0%
Foreign Born	15.1%	4.4%
Language in Home not English	36.8%	7.8%
High School Graduates	70.0%	86.2%
Bachelor's Degree	8.6%	22.4%
Median Household Income	$28,999	$47,697
Per Capita Income	$13,850	$24,058
Persons Under Poverty	33.1%	13.5%
Persons per Square Mile	2108.0	181.0

Note. Focused data obtained online on April 25, 2012 at the following link: http://quickfacts.census.gov/qfd/states/18/1819486.html

Purpose of the Evidence-Based Project

This EBP project was designed to determine if disease-specific education would improve the knowledge levels of intermediate care nurses at St. Catherine Hospital with regards to HF, self-care, and best practice guidelines. Following an assessment of the hospital's HF readmission rates (28% compared to the current national 30-day readmission rate for HF which is 25%) (P. Swenson, CNO, personal communication, June 15, 2012) and an abbreviated review of the literature, the following PICO (patient population, intervention, comparison intervention, and outcome) question format was developed to assist in guiding the project: What is the effect of heart failure education on intermediate care unit nursing staff's knowledge of heart failure, self-care, and best practice guidelines?

Significance of the Evidence-Based Project

Numerous studies have demonstrated that there are three types of barriers (patient-level, provider-level, and system-level) that can lead to variances in HF management and suboptimal patient outcomes (McEntee, 2009). The nursing volunteers for this pre- and post-survey educational project will benefit from increasing their knowledge of HF, self-care, and best practice guidelines. Increased knowledge can improve self-esteem and self-confidence when caring for patients with HF, positively impacting provider-level barriers. The ultimate benefit, however, will be to the patients with HF who will have more knowledgeable nurses caring for them. The anticipated improvements in discharge planning and patient education may lead to improvements in patients' self-care, positively impacting patient-level barriers. If the post-survey demonstrates improvements in HF and best practice guidelines knowledge acquisition, then that method of improving knowledge in other disease entities can be utilized not only in this organization, but also in other health care systems, positively impacting system-level barriers. Nursing education in hospitals may need to be changed to periodically include a series of specific disease-focused seminars. Further research can then be done to determine if knowledge improvement has any effect on HF patient hospital readmission rates, patient lengths of stay, and overall cost.

CHAPTER 2

THEORETICAL FRAMEWORK AND REVIEW OF LITERATURE

Evidence Based Practice Model

The Rossworm and Larrabee model was chosen as the research utilization (RU) model for this project because it guides health care providers through the process of EBP from assessment of the need for change to implementation and evaluation of an evidence-based protocol (Melnyk and Fineout-Overholt, 2005). Because it closely resembles the nursing process and thus is easy for clinical nurses to understand and follow, the DNP student determined that it was an appropriate framework for a project that assesses nurses' knowledge of a specific disease and best practice guidelines pre- and post-educational interventions.

Step 1

The DNP student (project coordinator) met with the hospital administrator, the Chief Nursing Officer (CNO), and the nurse manager (NM) of the intermediate care unit (IMCU) of a local community hospital to discuss the hospital's HF readmission rates as compared to the national average. According to information obtained from the hospital's finance department, the HF readmission rate was 28%, three percent higher than the national average (Paula Swenson, personal communication, June 25, 2011). Possible reasons for the higher-than-average rates were posited: (1) the poor socioeconomics of the community with subsequent lack of education and financial means to comply with the medical plan of care, (2) HF management variance per physicians, and (3) nursing knowledge deficits regarding HF, self-care, and best practice guidelines.

Step 2

McEntee et al. (2009) identified three barriers to effective HF management and optimal patient outcomes: (1) patient-level, (2) provider-level, and (3) system-level. Since this EBP project was nurse-driven, the chose was made to intervene at the provider-level barrier to improve HF management and patient outcomes. The project attempted to link nursing knowledge of HF with patient outcomes through a series of educational interventions and use of a pre- and post-survey of nurses' knowledge of HF, self-care, and best practice guidelines.

Step 3

Once the key stakeholders and the problem were identified, the project coordinator performed an extensive review of the literature utilizing three key phrases: HF management, nurse knowledge, and self-care. The other qualifiers during the literature search were (1) a time frame from 2001 to 2011, (2) peer reviewed studies on HF self-care, nurse knowledge, and disease-specific education, and (3) best practice guidelines. Exclusion criteria included lack of quality evidence and a focus of disease management instead of self-care and nurse knowledge of self-care. The pertinent studies were critically appraised utilizing the hierarchy of evidence for intervention studies (levels I through VII) (Melnyk & Fineout-Overholt, 2005).

Step 4

The project was developed as follows: The project coordinator (PC) solicited IMCU nurses (both RN and LPN) to volunteer to participate without compensation. During the first session, the volunteers completed a demographic sheet to ascertain their ages, gender, types of nursing degrees, certifications, and experience levels. The

nurse volunteers then completed a survey by Albert et al. (2002) to assess their knowledge of HF and self-care before the presentation of the first intervention—an education in-service on HF pathophysiology. The following three one-hour in-services consisted of education on HF pharmacology, HF treatment recommendations as per AHA/ACC (2009) consisting of lifestyle modification, medications, internal cardiac defibrillators (ICDs)/cardiac resynchronization therapy (CRT), and HF best practice guidelines. After the conclusion of the fourth in-service, the nurse volunteers again completed the same survey by Albert et al. (2002) to determine if disease-specific education improved their knowledge. The PC was assisted by the CNS for the IMCU who served as the facilitator for the project.

Step 5

Once the post-survey was finished, descriptive statistics including frequencies, means, and a paired-sample *t* test were calculated using the Statistical Package for the Social Sciences (SPSS) 19 to assess for nurses' knowledge of HF self-care pre- and post-educational interventions.

Step 6

Ongoing evaluation of disease-specific seminars would be based on pre- and post-intervention scores, improvements in patient and staff satisfaction, as well as by eventually assessing for improvements in hospital readmission rates, patients' length of stay, and overall costs.

Theoretical Framework

Imogene King's Theory of Goal Attainment and Transaction Process, the framework for this nurse-driven project, is a system's theory that includes human beings

interacting with each other to attain mutual goals. In her conceptual system, King focused on three interconnected systems: individuals (personal systems), two or more persons (interpersonal systems such as nurse and patient), and organized systems (hospitals) that regulate behavior, roles, and values (Fawcett & Swoyer, 2005).

As the Rossworm and Larrabee model for RU closely parallels the nursing process, so too, does King's Theory of Goal Attainment and Transaction Process which incorporates four essential concepts that are useful in the implementation of the nursing *Perception* is the process of interpreting and organizing information into meaningful information. It influences one's senses of reality and behavior and thus is an essential concept for nurses to understand as they develop and initiate nursing plans of care (Fawcett & Swoyer, 2005). C*ommunication* is essential to verify the accuracy of the perception. *Interaction* is identified as two or more persons working together to achieve mutual goals (Fawcett & Swoyer, 2005). *Organization* refers to a system with all activities directed to achieve a mutual goal (Fawcett & Swoyer, 2005).

King's Theory of Goal Attainment was derived from her Conceptual System and focuses on the personal and interpersonal system concepts which include the nurse-patient interactions that lead to goal setting and attainment (Fawcett & Swoyer, 2005). The theorist's Model of Transaction identifies key behaviors that are necessary for success: (1) mutual goal setting, (2) exploration of means to achieve goals, and (3) agreement on means to achieve goals (Fawcett & Swoyer, 2005). As a *method*, the nursing process refers to a system of five interrelated steps or actions: assess, diagnose, plan, implement, and evaluate (King, 2007). The nursing process *as a theory*, according to Fawcett and Swoyer (2005), is a system of interrelated concepts between

the nurse and patient: perception, communication, interaction, decision-making, agreement to attain goals, transactions, and goal achievement. The nursing process, in effect, identifies a problem and then seeks to resolve it using a multidisciplinary approach that includes not only others on the health care team, but also the patients and families. Objective nursing outcomes are quantifiable and can be defined as the attained goals.

King's Theory of Goal Attainment and Transaction Process can be used as a strong framework with which to guide this project centered on disease-specific education interventions and their effect on nurses' knowledge. The theory supports the six steps of the Rossworm and Larrabee model for RU and organizational change. The first steps of the nursing process (assess and diagnose) were made by the project coordinator and the CNO of the health care facility: higher-than-national average HF readmission rates. The review of literature identified three barriers to optimal HF management: patient-level, provider-level, and system-level (McEntee et al., 2009). This evidence-based project sought to intervene at the provider-level to determine if disease-specific education interventions for intermediate care nurses have a positive effect on nurses' knowledge. The ultimate goal would be to see an improvement in patient outcomes as evidenced by decreased HF readmission rates, decreased patient length of stays, and decreased costs, but the time constraints of this project did not allow for that type of data collection.

Literature Search

A search for relevant research studies regarding HF pathophysiology, disease-specific education, nurse knowledge of patient self-care, and best practice guidelines

was undertaken to identify, critically review, and synthesize the best available evidence for use in the project coordinator's educational interventions. Database search engines included ProQuest Nursing and Allied Health Source, CINAHL, the Joanna Briggs Institute, MEDLINE via PubMed, and National Guidelines Clearinghouse. Searches included peer-reviewed, meta-analyses, systematic reviews, randomized control trials (RCTs), clinical guidelines, qualitative/descriptive studies, and expert opinion/consensus.

Key words used in the search were nurse knowledge, HF, HF self-care, and best practice guidelines. In ProQuest, using the key words initially resulted in 6,427 hits. The date range was subsequently restricted to 2002 – 2011, which decreased the hits to 4,783. The researcher further restricted the search to peer reviewed studies using the following MeSH terms "questionnaires, patient education, best practice guidelines, and disease management" that resulted in 527 hits. The search was again restricted to scholarly journals or periodicals and that finally brought the hits down to 135. Those results were restricted to studies with abstracts available, decreasing the hits to 75. Upon further review of the abstracts with full texts available, the hits dropped to 55 after which the findings were hand sorted until only one was chosen to be included in this project. In CINAHL, the same initial search words were used, resulting in 18 hits but no relevant sources. In MEDLINE via PubMed, the initial search resulted in 57 hits which were then restricted to the same time range with full text available, bringing the total hits to 15 with seven relevant sources obtained. Heart failure guideline synthesis and evidence summaries of disease management programs (DMPs) were obtained from the National Guideline Clearing from the Agency for Healthcare Research and Quality

(AHRQ) and the Joanna Briggs Institute respectively. The HF guidelines from the American College of Cardiology (ACC) and the American Heart Association (AHA) were obtained from the AHA website during a hand search.

Appraisal of Relevant Evidence

Melnyk and Fineout-Overholt's (2005) hierarchy of evidence for intervention studies was used to critically analyze each study include in this project. Ten pieces of evidence were included for analysis: one evidence summaries of disease management programs (DMPs) (level I), one systematic review (level I), one review of literature (level V), five descriptive studies (level VI), one cross-sectional survey design (level VI), and one expert opinions/consensus (level VII). See Appendix B for the summary of evidence from levels I through VII.

Level I Evidence

Brown (2010) used evidence summaries that answered the question: "What is the best available evidence regarding HF management programs in reducing mortality rates or rates of hospitalization?" Key words used in the search for HF programs were the following: HF, DMPs, mortality, hospitalization, multidisciplinary management, multidisciplinary team, and congestive HF. A meta-analysis of 36 trials, a systematic review of 29 trials, a multicenter RCT consisting of 1023 volunteers, and an expert opinion paper made up the evidence in the summary. Being an evidence summary from the Joanna Briggs Institute (JBI), the report did not supply the specific statistics for each of the studies or groups of studies, but simply categorized the results of the above mentioned reviews and scored them according to the JBI levels of evidence and grading

of recommendations. The JBI levels of evidence and grading recommendations can be found in Appendix C.

The meta-analysis consisted of 11 studies focused on the effect of DMPs on hospitalizations and found strong evidence to support the favorable effect of such programs. The meta-analysis also demonstrated DMPs clinically and statistically significant effect on mortality reduction in the HF patient population (JBI Level I). The evidence summary delineated the results of a systematic review on a multidisciplinary approach for HF and found that DMPs were associated with a 27% reduction in hospitalization rate and a decrease of 43% in the total number of hospitalizations. The systematic review demonstrated three factors necessary for the success of the programs—specially trained HF nurses, patient and caregiver education, and easy access to HF-trained health care providers (JBI Level I). Statistically significant all-cause mortality rates for patients enrolled in DMPs were noted in four studies out of 30 (Level I). In a RCT at a large, multicenter healthcare facility that had a DMP focused on specially trained HF nurses, there was a non-significant *potential r*eduction in mortality along with a slight reduction in hospital readmission rates in the intervention group when compared to a standard group (Level I). The study concluded that more research utilizing RCT designs was needed to support the development of effective DMPs among differing patient populations and settings (Level I). The evidence summary ended with best practice recommendations as follows: While DMPs have demonstrated a reduction in mortality and hospital readmission rates, the benefit of this intervention is influenced by other factors such as patient age, HF Class (per NYHA classification), and type of DMP. JBI grading recommendation for this summary of evidence is Grade B.

Boyde, Turner, Thompson, and Stewart (2011) systematically reviewed educational interventions that had been implemented for patients with HF to assess their effectiveness. Patient education, education, educational intervention, and self-care associated with HF were the key words used by two reviewers to search the following databases for RCTs from 1998 to 2008: CINAHL, MEDLINE, PsychInfo, EMBASE and Cochrane. A total of 1515 abstracts were subsequently reviewed. A total of 2686 participants in 19 studies that met inclusion criteria were reviewed. There was a variety of educational materials used with the most common being one-on-one didactic sessions led by nurses and utilizing written and multimedia approaches. As with the educational material, there were a variety of outcomes in the various studies which made a proper comparison of patient outcomes difficult. Of the 19 studies reviewed, 15 demonstrated significant effects post-interventions. The reviewers concluded that it was difficult to adequately evaluate the outcomes secondary to the varying educational interventions and outcomes measures utilized in the studies. The authors recommended a more homogenous approach to future research utilizing a patient-centered approach to educational needs that are built on education theory with specified outcomes.

Level II through Level IV

No studies in these levels were deemed relevant to the project.

Level V Evidence

McEntee et al. (2009) posited that although the multiplicity of studies and HF guidelines are widely disseminated, patient care and outcomes remain suboptimal. In order to evaluate the reason(s) behind the lack of progress in effective HF

management, the authors conducted a search using PubMed, MEDLINE, and CINAHL databases to discover and review studies on barriers to HF care published from 1998 to 2007. Key words or terms utilized in the search were the following: HF, treatment, self-care, barriers, management, limitations, and obstacles. The authors were interested in three perceived barriers to HF care: patient-level, provider-level, and system-level. Studies that included those barriers were included in the review. Exclusion criteria included patients with a primary diagnosis other than HF as well as studies that discussed the effectiveness of interventions or quality of care. Sixty articles from the United States, Europe, Australia, New Zealand, and Canada met the criteria and were included in the review. Of the 60 articles, only three reported obstacles at all levels and 18 assessed barriers at two levels of care. Forty studies were quantitative and of those, 82% reported on barriers at only one level of care (usually patient-level). Thirteen studies were qualitative and 85% of those studies reported barriers at multiple levels. Only two studies used mixed methods.

Patient-level barriers were reported in 45 studies and were divided into seven categories: (1) knowledge—23 studies, (2) adherence—17 studies, (3) communication—8 studies, (4) functional limitations—9 studies, (5) comorbidities—18 studies, (6) psychosocial factors—33 studies, and (7) socioeconomic factors—15 studies. Provider-level barriers were reported in 23 studies and were divided into the following categories: (1) knowledge—11 studies, (2) diagnostic challenges—7 studies, (3) pharmacological concerns—12 studies, (4) communication—14 studies), and (5) personal factors—3 studies. System-level barriers were reported in 13 studies with the

following categories: (1) organizational structure, (2) communication, and (3) lack of resources.

As one can see, there were multiple areas with overlapping barriers, namely knowledge and communication. The authors concluded that multiple barriers to effective HF management and improved outcomes were pervasive throughout the continuum of care. In order to improve the quality of care and improve patient outcomes, the barriers to HF management must be addressed at all levels (McEntee et al, 2009).

Level VI Evidence

Albert et al. (2002) conducted a study to assess nurses' knowledge of HF self-care and HF education. The authors utilized a descriptive, exploratory design and convenience sample that included 300 nurses who care for patients with HF in a large, Midwestern health care system. A 20-item, true or false survey form was used to assess outcome measures: general, topic-specific, and perceptions of basic information vital to HF management. Specific topics included diet, fluids, weighing, signs or symptoms of decompensation, medications, and exercise. Of the 300 nurses in the study, 92% were registered nurses (RNs) and 8% were licensed practical nurses (LPNs); 38% worked in a large university-based hospital, 44% were employed at five community hospitals, and 18% worked in home health or hospice/palliative care. Outcomes measures for the nurses' overall and topic-specific perceptions of HF self-management were as follows: mean HF patient self-care knowledge score was 15.2 $\pm$ 2.0. RNs scored significantly higher than LPNs (15.3 vs. 14.1); p =0.004. Individual questions scoring < 30%: (1) Dry vs. ideal weight in daily weight monitoring (24%), (2) Non-symptomatic hypotension (26%), (3) Short-term orthostatic dizziness (19%), (4) Nurses requested more

information (5-8%). Individual questions scoring > 30% but ≤ 75%: (1) Non-steroidal anti-inflammatory inhibitor use (49%), (2) potassium-based salt substitute use (52%), rest vs. activity (72%), (3) Lean delicatessen meat use in a low sodium diet (75%). Overall analysis of variances between HF nurses and the following nurses: (1) critical care (16.2 ± 1.7) ($P < 0.001$), (2) medical/surgical (15.1 ± 1.8) ($P < 0.001$), (3) telemetry (14.7 ± 2.0) ($P < 0.001$). Overall analysis of variances between home health nurses and the following: (1) hospital (15.9 ± 1.5) ($P = 0.006$), (2) palliative care (15.1 ± 2.0) ($P = 0.006$). The authors concluded that nurses may not be adequately educated in HF self-management and that should be corrected so improvements can be made in HF care and patient outcomes.

In another descriptive and exploratory study, Annema, Luttik, and Jaarsma (2009) used interviews and questionnaires to collect data on reasons for hospital readmissions from the perspectives of patients, caregivers, cardiologists, and HF nurses. The research was actually a substudy of the Coordinating Study Evaluating Outcomes of Advising and Counseling in HF (COACH), a multicenter study of HF patients in 17 Dutch hospitals evaluating the effects of education and counseling in HF. 1023 patients with HF from 17 Dutch hospitals were in the COACH study. Of that number, only patients who were readmitted with HF were included in the substudy (n = 260). Patients in the COACH study were randomized to one of three study groups: basic support, intensive support, or control. An end-point committee (four cardiologists, a geriatrician, and a general practitioner) assessed all the readmissions on basis of preset conditions. Readmissions categorized into three groups: (1) HF, (2) other cardiovascular reason, (3) non-cardiovascular reason. Each readmission was judged

by two independent members of the committee and the chair of the committee used their assessments as final judgment. Of the 1023 patients in the COACH study, there were 1161 readmissions during the 18-month follow-up. Of these, 375 readmissions (32%) of the 260 patients in the substudy were related to HF. Qualitative data of patients and caregivers were documented by two investigators independently of each other. If investigators disagreed on an answer, they discussed it until agreement was reached. The investigators classified the different perspectives on readmission reasons into agreement or no agreement. All data was entered into an SPSS database. Nonparametric tests were used to compare categorical variables and differences on the reason for readmission between study groups. The student *t* test was used for the continuous demographic variables. The authors concluded that it is vitally important to comprehend the reasons for repeated hospitalizations in the HF patient population. Only by considering the perspectives of all those involved in HF management can we gain insight and develop interventions to prevent frequent decompensated HF.

Delaney, Apostolidis, Lachapelle, and Fortinsky (2010) evaluated home care nurses' knowledge of evidence-based topics for HF management by utilizing the 20-item survey tool introduced by Albert et al. (2002). The researchers used a convenience sample of 94 nurses (RNs and LPNs) from a total of 163 nurses who worked for four home care agencies in Connecticut (two agencies from urban settings and two from rural settings). The design was descriptive and cross-sectional to evaluate home care nurses' knowledge of EB education in managing HF to determine/identify if differences occurred due to: (1) nurses' education, (2) work experiences, or (3) home health care nurses' educational needs. Ninety-four home care nurses completed the

survey of knowledge of HF for a response rate of 57.6%. The participants: (1) were predominantly female (95.7%), (2) had a mean age of 47.3 years, (3) were RNs (82.9%) and LPNs (4.3%), (4) Baccalaureate-prepared (BSN) (32.6%), and (5) had five or more years of nursing experience (64.9%). The HF knowledge mean score was15.78 $\pm$ 1.69 out of a possible 20 points (78.9%). Correct responses to individual survey questions ranged from 24.5% to 100% and there was a 90% to 100% correct response rate on ten questions. Three questions resulted in correct responses of > 40% but < 75% and another three questions had a < 40% correct response rate. Nurses' knowledge was evaluated further in the five education themes as in Albert et al. (2002) and individual questions within each topic were analyzed to identify high-scoring (> 90%) and low-scoring (> 40% to < 75%), or $\leq$ 40%. Only on the topic of exercise did all nurses respond correctly. In the other four topic themes, there was a great deal of variation regarding depth of knowledge. Level of education made no significant statistical difference (ANOVA). Nurses with 11 to $\geq$15 years of nursing experience scored higher than nurses with less work experience but that result was not statistically significant. Home care nurse requested further information in all five education topics, unlike the nurses in the Albert et al. (2002) study. The authors concluded that home care nurses had a general knowledge base of HF but that there was substantial room for improvement in all five categories explored. Educational programs for HF management for home care nurses may be important antecedents for improvements in HF patient outcomes.

Although the Delaney et al. (2010) study was centered on nurses in the home health care field, they utilized the same survey used in the Albert et al. (2002) research.

That instrument's validity and reliability were established in the original study. Face and content were assessed using a panel of six content experts. Four nurses who were experts in HF were tasked with establishing interrater agreement on the scoring of the survey—that was reported to be 100%. Delaney et al. (2010) added one question at the end of the study to identify common themes in home care nurses need for further education: "What information would be most beneficial to you in managing a patient with HF" (p. 287)?

Dickson and Riegel (2009) applied qualitative descriptive meta-analysis techniques to themes from three of the researchers' previous studies to reexamine and translate them to create a broader and more complete understanding of the development of skill in HF self-care. Eighty-five adults with chronic HF were enrolled in three prior studies by the researchers. The sample's characteristics included the following: (1) mean age—55.62 years, (2) sex—58.8% male, (3) race—63.5% Caucasian, 34.1% African American, and 2.4% Hispanic. The setting was not specified in any of the three previous studies. Key concepts and themes related to self-care and skill were examined within each of the original studies and then across studies to identify commonalities. Tactical skills such as diet, diuretic titration, and exercise and situational skills such as how to manage HF on a vacation are needed to perform self-care. The authors concluded that self-care evolves over time and with practice, patients learn how to make self-care practices fit into their daily lives. Proficiency in these skills was acquired primarily through input from family and friends. Health care providers rarely made significant contributions to patients' abilities to learn self-care skills. This conclusion may have some bearing on the higher-than-average HF readmission rates that are seen at the

facility where this DNP project will take place. In applying this information to the DNP project, the more obvious question is what barriers prevent health care providers from contributing to self-care proficiency in the HF population? Is it a patient-level barrier, provider-level barrier, system-level barrier, or a combination?

In the Willette, Surrells, Davis, and Bush (2007) study, the authors used a descriptive, correlational design and the Albert et l. (2002) survey to determine nurse knowledge of HF self-care. A convenience sample of 49 nurses who worked in the telemetry unit and cardiac care unit of a large, southeastern medical center was obtained. Demographics used in the study were education level, years of experience, work environment (telemetry or cardiac care), and work status (full-time or part-time). The nurses in this study only completed the survey once and there were no educational interventions, although the authors delineated areas of concern in nursing education. The mean score for all nurses was 15.97 $\pm$ 1.94 or 79.8% correct. Of the 20 questions, participants had scored of > 90% on ten questions. On two questions related to diet, nurses had scores of > 60% and < 70%. On one question concerning medications, only 64.9% answered correctly. Two questions dealing with signs and symptoms of decompensation and physician notification were only answered correctly by 58.3% and 16.3% respectively. One question was concerned about whether weight should be compared to yesterday's weight versus dry weight. Only 36.2% of participants answered correctly. As noted on other studies utilizing the Albert et al. (2002) survey, on the three lowest scores (scores of < 60%), requests for more information on those topics occurred < 8%. Furthermore, on the question related to notifying the physician of transient dizziness that no one answered correctly, there were no requests for further information.

The authors concluded that the nurses in this study did not possess sufficient knowledge to care for and educate patients with HF.

Washburn et al. (2005) utilized a descriptive exploratory study to assess 51 nurses' knowledge of HF education in a small, Midwestern community hospital. Nurses' knowledge of evidence-based education topics for HF management was assessed using the 20-item survey tool introduced by Albert et al. (2002). Fourteen nurses worked in an ICU and 41 nurses worked on a general medical unit. Mean self-care knowledge was 14.6 $\pm$ 2 (range = 9-19). There were no statistical differences in mean score between ICU nurses and medical floor nurses. Correct responses to individual survey items ranged from 20% to 100%. Six questions resulted in mean scores > 90% correct, nine questions had mean scores >70% but < 90% correct, and 5 questions had mean scores < 70% correct. Most respondents (90%) answered six questions correctly. Two questions (the need for daily weight monitoring when asymptomatic and the importance of notifying the health care provider of new onset or worsening of symptoms of fatigue) were answered correctly by all. Frequently missed questions were the use of nonsteroidal anti-inflammatory drugs, use of potassium-based salt substitutes, assessment of weight results, and physician notification of asymptomatic low blood pressure and momentary dizziness when rising. The authors concluded that nurses working in a small community hospital may not be sufficiently knowledgeable in HF self-care management. Disease-specific education in an ongoing manner may improve the quality of patient education.

Level VII

Quinn (2007) used expert opinion/consensus from the National Institute of Healthcare Improvement (NIHI) and the ACC/AHA in her article on pharmacological treatment of HF. Since this project's educational in-services will cover all four approaches to HF management, this opinion article is appropriate for use. Heart failure treatment recommendations by the NIHI and ACC/AHA are being used as national medical bench-marks by the Joint Commission (JC) and the Centers for Medicare and Medicaid Services (CMS) (Quinn, 2007). Because of this close scrutiny to meet the benchmarks in health care facilities throughout the United States, attention must be paid to ways in which facilities can improve patient outcomes as reimbursement rates will be tied to meeting those national standards. Standards of care set forth by the ACC/AHA: (1) will be evaluated by core measures/indicators and (2) healthcare institutions' performances in providing recommended care will be collected by the JC and CMS (Quinn, 2007). Seven key indicators of quality measures for HF identified by NIHI include: (1) LV systolic heart function assessment, (2) angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs) at discharge, (3) anticoagulant for HF patients with chronic or recurrent atrial fibrillation, (4) record of influenza vaccine, (5) record of pneumococcal immunization, (6) smoking cessation counseling, and (7) discharge instructions including activity, diet, discharge medications, follow-up appointment, weight monitoring, and what to do if symptoms worsen (Quinn, 2007).

Synthesis of Appraised Literature

The ten studies reviewed and analyzed demonstrated many similar findings with regards to patient education, self-care, and nurse knowledge. The three barriers to optimal HF management (patient-level barriers, provider-level barriers, system-level barriers) also have an overlapping of problems that should be addressed at all levels. Nursing education on disease-specific care, self-care, and best practice guidelines can be a useful tool to improve patient's self-care and nursing care. Although one of the studies (Delaney, et al., 2010) focused on home health nurses instead of hospital nurses, the authors used the original survey developed by Albert et al. (2002). In fact, four of the ten studies (40%) analyzed incorporated the Albert et al. (2002) survey into their designs and all of those studies concluded that nurses were not adequately prepared to educate patients on HF and HF self-care. Since the survey instrument has already been tested and has documented validity and reliability, it will be used in this project as the way of measuring effects of disease-specific education and outcomes.

Best Practice Model

The best practice model, Rossworm and Larrabee, that guided RU in this project was synthesized from a review of literature and has been proven to guide RU using a similar step progression that compares well to the nursing process (Melnyk & Fineout-Overholt, 2005). The six steps in the model were used as a framework for this project on the effect of disease-specific education on nurses' knowledge. Although this project has time constraints that make collecting data on HF patient readmission rates, lengths of stay, and overall cost for care impossible, further research should be done on those

measured outcomes in the future. This DNP project can serve as the baseline for further research.

CHAPTER 3

METHOD

Setting and Sample

This evidence-based project (EBP) took place on the Intermediate Care Unit (IMCU) of a local, small community hospital. The nurses' levels of experience on the unit ranged from novice to expert as per Benner's theory (Altman, 2007). Since the healthcare facility is located in an urban environment with a poor socioeconomic class, high unemployment rates, and less-than-state average high school graduation rates, the hospital's leadership was battling higher-than-national average HF readmission rates (Paula Swenson, CNO, personal communication, June 25, 2011). The PC petitioned for and obtained IRB approval from both Valparaiso University's and the hospital system's IRBs for exempted review. The PC met with the CNO and the IMCU's nurse manager (NM) to discuss the project and obtain permission to proceed. Both nurse leaders were receptive to the project's design and focus and proved to be supportive during its implementation. The facilitator for this project was the CNS of the critical care units. To prepare for this role, the selected facilitator studied the National Institute of Health's (NIH) requirements for the protection of human subjects and read "The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects in Research" (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979). The facilitator was instrumental in the initial set-up of the educational in-services and fielded questions from the nursing staff and relayed those questions to the PC.

The PC designed posters to explain the project and solicit nurse volunteers. Those posters were placed in the nurses' conference room, restrooms, and break room. The facilitator assisted the PC in sending emails to all nurses on the IMCU to more fully explain the project and to solicit volunteers. Seventeen nurses volunteered to participate, but four of the 17 did not attend any of the four educational in-services and were dropped from the project. Reminder emails were sent to the volunteers two days prior to each in-service to remind the participants on the date and time.

Safeguards were put in place to protect the nurse volunteers' identities. Each of the nurses chose a random number that was then used as the only identifier for the demographic information and both the pre- and post-survey results. The participants' numbers were kept in a locked drawer in the PC's office and only the PC was cognizant of the nurse volunteers' chosen number.

Outcomes

The PC requested and obtained permission to use a 20-question survey from the authors of the Albert et al. (2002) study that was utilized as the instrument in this project. Nurses' knowledge of HF, self-care, and best practice guidelines were measured both before and after the four scheduled disease-specific educational in-services utilizing the Albert et al. (2002) instrument. The expected outcomes of this project were (1) an increase in nurse knowledge of HF, (2) an increase in nurse knowledge of patient self-care, and (3) an increase in nurse knowledge of HF best practice guidelines.

Data

Demographic data was collected from nurse volunteers in the IMCU after they were provided a thorough and complete explanation of the project and signed, informed consents were obtained. Nurses' knowledge of HF, patient self-care, and best practice guidelines (both before the first in-service and after the fourth in-services) was assessed using the Albert et al. (2002) survey (Table 3.0). Once the post-survey was finished, descriptive statistics including frequencies, mean, and a paired-sample *t* test were calculated to assess for nurses' knowledge of HF self-care pre- and post-educational interventions.

Table 3.0

Survey of Nurses' Knowledge of Heart Failure (True or False)

1) Patients with HF should drink plenty of fluids each day. (F)
2) As long as no salt is added to foods, there are no dietary restrictions for patients with HF. (F)
3) Coughing and nausea/poor appetite are common symptoms of advanced HF. (T)
4) Patients with HF should decrease activity, and most forms of active exercise should be avoided. (F)
5) If the patient gains more than 3 pounds in 48 hours without other HF symptoms, they should not be concerned. (F)
6) Swelling of the abdomen may indicate retention of excess fluid due to worsening HF. (T)
7) If patients take their medications as directed and follow the suggested lifestyle modifications, their HF will not return. (F)
8) When patients have aches and pains, aspirin and nonsteroidal anti-inflammatory drugs (NSAIDs like ibuprofen) should be recommended.
9) It is okay to use potassium-based salt substitutes (like "No-Salt" or "Salt Sense") to season food. (F)
10) If patients feel thirsty, it is okay to remove fluid limits and allow them to drink. (F)
11) When a patient adds extra pillows at night to relieve shortness of breath, this does not mean that the heart failure condition has worsened. (F)
12) If a patient wakes up at night with difficulty breathing, and the breathing difficulty is relieved by getting out of bed and moving around, this does not mean that the heart failure condition has worsened. (F)
13) Lean deli meats are an acceptable food choice as part of the patient's diet. (F)
14) Once the patient's HF symptoms are gone, there is no need for obtaining daily weights. (F)
15) When assessing weight results, today's weight should be compared with the patient's weight from yesterday, not the patient's ideal or dry weight. (F)

The following 4 statements are signs and symptoms that patients may have. Please mark yes or no to reflect if the patient **should notify their heart failure physician of these symptoms:**
16) BP recording of 80/50 without heart failure symptom (N)
17) Weight gain of 3 pounds in 5 days without symptoms. (Y)
18) Dizziness or lightheadedness when arising that disappears within 10-15 minutes. (N)
19) New onset or worsening of fatigue. (Y)
20) New onset of worsening leg weakness or decreased ability to exercise. (Y)

True (T); False (F); Yes (Y); No (N) Reproduced with permission from Albert et al. (2002)

Project Change Implementation

After the PC requested and obtained permission from nursing administration to provide specific HF education to IMCU nurses who volunteered to participate in the project, a face-to-face orientation session was provided at the beginning of the project to do the following: (1) introduce participants to the in-service sessions, (2) provide the nurse volunteers with PC's access via phone and email, (3) provide information regarding the four one-hour in-services that would cover different aspects of HF, HF self-care, and best practice guidelines using PowerPoint slide handouts, tables/figures with key information, and best practice guidelines, (4) allow each participant to pick a random number from a container to be used by the PC only when the pre- and post-surveys were done to assure anonymity, (5) collect demographic data, (6) discuss the pre- and post-surveys for evaluating outcomes, and (7) have the participants complete the pre-education survey consisting of 20 True of False questions related to patient self-care as used in the Albert et al. (2002) study.

The initial implementation of the EB project, entitled "The Effect of Heart Failure Education on Intermediate Care Unit Nursing Staff's Knowledge of Heart Failure, Heart Failure Self-Care and Best Practice Guidelines" began on August 15, 2011 and continued through the end of November, 2011. The nurse participants signed an informed consent (Appendix D), completed a demographic sheet (Appendix E), and completed both a pre- and post-intervention survey by Albert et al. (2002) (Table 3.0). The PC developed four PowerPoint presentations, each focusing on different aspects of HF: (1) introduction and overview of HF pathophysiology; (2) pharmacologic management of HF; (3) HF treatment recommendations as per AHA/ACC (2009)

consisting of lifestyle modification, medications, internal cardiac defibrillators (ICDs), and cardiac resynchronization therapy (CRT); and (4) HF best practice guidelines (Jessup et al., 2009). The first three in-services were each an hour long allowing time for question and answer sessions. The fourth in-service on best practice guidelines lasted 90 minutes and again allowed time for a question and answer session.

Data Collection

The 20 question survey developed by Albert et al. (2002) utilizing a true or false format was completed by the volunteers during the orientation session and after the completion of the last session of this project's educational HF in-services. The four in-services occurred at prescribed dates and times. In-services one through three were limited to one-hour presentations. The last session was two hours long since the presentation detailed the HF best practice guidelines (90 minutes) and then the volunteers took the post-education survey.

CHAPTER 4

FINDINGS

The purpose of this EBP project was to determine if disease-specific education would improve the knowledge levels of intermediate care nurses at St. Catherine Hospital with regards to HF, self-care, and best practice guidelines. The anticipated outcome was to see improvements in nurse knowledge of HF, self-care, and best practice guidelines. After the participants' completion of the post-survey, descriptive statistics including frequencies, mean, and a paired-sample *t* test were calculated using the Statistical Package for the Social Sciences (SPSS) 19 to assess for nurses' knowledge of HF self-care pre- and post-educational interventions.

Sample Characteristics

Demographic Information

Seventeen nurses agreed to participate in the project but only 13 completed both the pre- and post-education surveys. The four nurses who were lost to the study only took the pre-survey and did not attend any of the four in-services due to scheduling conflicts. The data collected was therefore based on a sample size of 13. After explaining the project and obtaining informed consent (see Appendix C), demographic data was collected (see Appendix D). The mean age of the participants was 42.5 (SD = 11.4). Females were predominant (92%) while males made up only 8% of the sample population. The various nursing degrees were represented as follows: Licensed Practical Nurse (LPN) (15%), Associate Degree in Nursing (ASN) (23%), Diploma (8%), and Bachelor of Science in Nursing (BSN) (54%) (Figure 4.0). Of those with BSNs, 23% had additional bachelor degrees in another field of study. As mandated by the

hospital policy, 100% of the nurses were certified in basic life support (BLS). Seventy-seven percent also obtained certification in advanced life support (ACLS). The total years of nursing experience and years of critical care experience were also assessed. The mean for total number of nursing experience was 16 years (SD = 12.26) and for critical care experience was 15 years (SD = 11.6) (see Table 4.0).

Figure 4.0

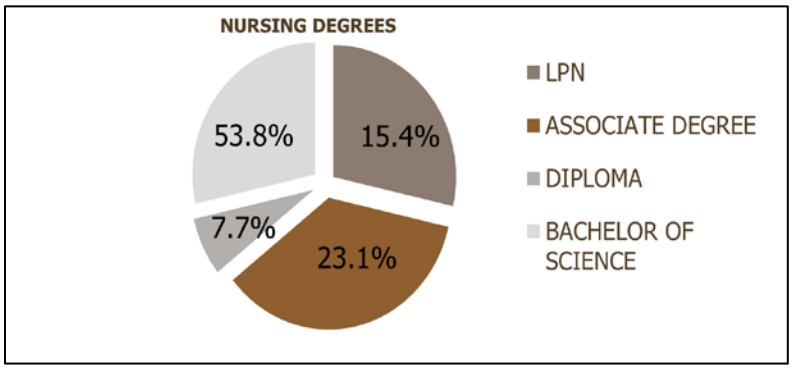

Table 4.0

Demographic Data

Characteristics	N	Percentage
Age Mean	42.46	
Gender		
Female	12.0	92
Male	1.0	8
Highest Degree		
LPN	2.0	15
ASN	3.0	23
Diploma	1.0	8
BSN	7.0	54
BSN + other degree	3.0	23
Certifications		
BLS	13.0	100
ACLS	10.0	77
Mean Total Years of Nursing Experience	16.15	
Mean Years of Critical Care Experience	14.62	

Pre-Intervention

Pre-intervention testing of the 13 participants' HF knowledge was done using a survey by Albert et al. (2002) (see Table 3.0) that measured nurses' knowledge of diet, fluids/weight, signs and symptoms of decompensation, medications, and exercise. The survey instrument was originally tested for face validity before the first published study by Albert et al. (2002) using four HF experts. In addition, two education experts also reviewed the tool for wording. The tool was piloted for test-retest reliability using HF expert nurses from nine hospitals. Two weeks later, the same nine nurses retook the survey and had a 100% test-retest score. Cronbach's alpha reliability testing was not done since there was not a single theme and each of the questions was considered unique (N. M. Albert, personal communication, August 18, 2011). However, since the first published study in 2002, the survey was used in three other studies: Washburn et al. (2005), Willette et al. (2007) and Delaney et al. (2011). Results from those studies were compared to those of Albert et al. (2002). Participants in all studies had similar scores, demonstrating consistency in their responses to the various statements (N. M. Albert, personal communication, August 18, 2011).

In this project, the participants were instructed to answer each question even if they were unsure of the answer. Despite clear instructions, some participants did not answer all of the questions. These "no answer" responses were counted as incorrect in the data analysis. The paired-sample *t* test was calculated using percentage values for the survey scores. The mean pre-intervention survey score was 79.6% (SD = 8.03). There was no statistical difference in mean scores based on education levels, experience levels, certifications, age or gender. Correct responses on individual survey

questions ranged from 0% to 100%. Seven questions resulted in scores of 100% while one question regarding weight comparison was answered incorrectly by all. Respondents scored > 90% on nine questions (including the scores of 100%) and > 80% and < 90% on one question (Table 4.1). Four questions had scores > 70% and < 80%; two had scores > 60% and < 70%; two questions scored > 40% and < 50%; one had scores > 30% and < 40% (Table 4.2). The survey by Albert et al. (2002) also provided an opportunity for the participants to request more information on each of the 20 questions. No participant asked for any information on the post-survey, but there were requests on the pre-survey. As one can see from the data in Table 4.3, there were marked discrepancies between incorrect responses and requests for further information on a particular topic. Similar inconsistencies were noted in the previous published studies.

Table 4.1

Pre-Survey Scores > 80% (N = 13)

Question Number	Category	Score (%)
	Diet	
2	No dietary restrictions	100
	Fluids/Weight	
1	Drink plenty of fluids	100
10	Drink fluids when thirsty	100
14	No need for daily weight	100
	Signs/Symptoms of Decompensation	
3	Coughing/Poor appetite	85
6	Swelling of abdomen	92
17	Weight gain >3# in 5 days	92
19	New onset/worsening fatigue	100
20	New onset/worsening of leg weakness	100
	Exercise	
4	HF patients should avoid exercise	100

Reprinted with permission from Albert et al. (2002)

Table 4.2

Pre-Survey Scores < 80% (N = 13)

Question Number	Category	Score (%)
	Diet	
9	Potassium-salt substitutes	62
13	Lean deli meats	77
	Fluids/Weight	
5	Weight gain >3#	62
15	Weight comparison ideal vs. dry	0
	Signs/Symptoms of Decompensation	
11	Extra pillows at night	77
12	Paroxysmal nocturnal dyspnea	77
16	BP 80/56 asymptomatic	46
18	Transient dizziness	38
	Medications	
7	Take meds as directed	77
8	NSAIDs for aches/pains	46

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Table 4.3

Pre-Survey Requests for More Information (N = 13)

Question Number	Category	Score (%)	# of Requests
	Diet		
2	No dietary restrictions	100	0
9	Potassium-salt substitutes	62	5
13	Lean deli meats	77	1
	Fluids/Weight		
1	Drink plenty of fluids	100	0
5	Weight gain >3#	62	1
10	Drink fluids when thirsty	100	0
14	No need for daily weight	100	0
15	Weight comparison ideal vs. dry	0	1
	Signs/Symptoms of Decompensation		
3	Coughing/Poor appetite	85	2
6	Swelling of abdomen	92	1
11	Extra pillows at night	77	2
12	Paroxysmal nocturnal dyspnea	77	4
16	BP 80/56 asymptomatic	46	4
17	Weight gain >3# in 5 days	92	0
18	Transient dizziness	38	1
19	New onset/worsening fatigue	100	1
20	New onset/worsening of leg weakness	100	2
	Medications		
7	Take meds as directed	77	3
8	NSAIDs for aches/pains	46	6
	Exercise		
4	HF patients should avoid exercise	100	1

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Change in Outcomes

The purpose of this project was to answer the following PICO question: *What is the effect of heart failure education on Intermediate Care Unit nursing staff's knowledge of heart failure, self-care, and best practice guidelines?* In the post-survey analysis, "no answer" responses were counted as incorrect. The paired-sample *t* test was again calculated using percentage values. Overall, test scores post-intervention were higher than the pre-intervention scores. The mean post-survey score was 92.7% (SD = 6.96) demonstrating a statistically significant increase from pre-survey results: (t (12) = -5.097, $p < .001$). There were no statistical differences in mean scores based on experience levels, age or gender. Since the sample size was small (N = 13), further assessments of demographics related to scores could not be done in order to protect the participants' confidentiality.

Correct scores on individual questions ranged from 69% to 100%. Ten questions were answered correctly by all participants. Seven questions had scores of 85% to 92% (Table 4.4) and the remaining three questions had scores of 69% to 77% (Table 4.5). Question 5 dealing with a weight gain of more than three pounds in 48 hours without any other HF symptoms had the lowest score in the post-intervention survey (69%). In the pre-intervention survey, question 15 (which had a score of 0% and also was designed to discern nurse knowledge of weight gain) had a score of 77% in the post-intervention survey. Table 4.6 compares the pre- and post-intervention scores. Frequencies of pre- and post-intervention scores can be found in Figure 4.1 and Figure 4.2.

Table 4.4

Post-Survey Scores ≥ 85% (N = 13)

Question Number	Category	Score (%)
	Diet	
2	No dietary restrictions	100
9	Potassium-salt substitutes	100
13	Lean deli meats	92
	Fluids/Weight	
1	Drink plenty of fluids	100
10	Drink fluids when thirsty	100
14	No need for daily weight	100
	Signs/Symptoms of Decompensation	
6	Swelling of abdomen	85
11	Extra pillows at night	100
12	Paroxysmal nocturnal dyspnea	100
16	BP 80/56 asymptomatic	85
17	Weight gain >3# in 5 days	92
18	Transient dizziness	85
19	New onset/worsening fatigue	100
20	New onset/worsening of leg weakness	100
	Exercise	
4	HF patients should avoid exercise	100
	Medications	
7	Take meds as directed	92
8	NSAIDs for aches/pains	92

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Table 4.5

Post-Survey Scores < 85% (N = 13)

Question Number	Category	Score (%)
	Fluids/Weight	
5	Weight gain >3#	69
15	Weight comparison ideal vs. dry	77
	Signs/Symptoms of Decompensation	
3	Coughing/Poor appetite	77

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Table 4.6

Comparison of Pre- and Post-intervention Scores

Question	Category	Pre-Intervention Survey Score (%)	Post-Intervention Survey Score (%)
	Diet		
2	No dietary restrictions	100	100
9	Potassium-salt substitutes	62	100
13	Lean deli meats	77	92
	Fluids/Weight		
1	Drink plenty of fluids	100	100
5	Weight gain >3#	62	69
10	Drink fluids when thirsty	100	100
14	No need for daily weight	100	100
15	Weight comparison ideal vs. dry	0	77
	Signs/Symptoms of Decompensation		
3	Coughing/Poor appetite	85	77
6	Swelling of abdomen	92	85
11	Extra pillows at night	77	100
12	Paroxysmal nocturnal dyspnea	77	100
16	BP 80/56 asymptomatic	46	85
17	Weight gain >3# in 5 days	92	92
18	Transient dizziness	38	85
19	New onset/worsening fatigue	100	100
20	New onset/worsening of leg weakness	100	100
	Medications		
7	Take meds as directed	77	92
8	NSAIDs for aches/pains	46	92
	Exercise		
4	HF patients should avoid exercise	100	100

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Figure 4.1

Pre-Intervention Survey Score Frequencies (N = 13)

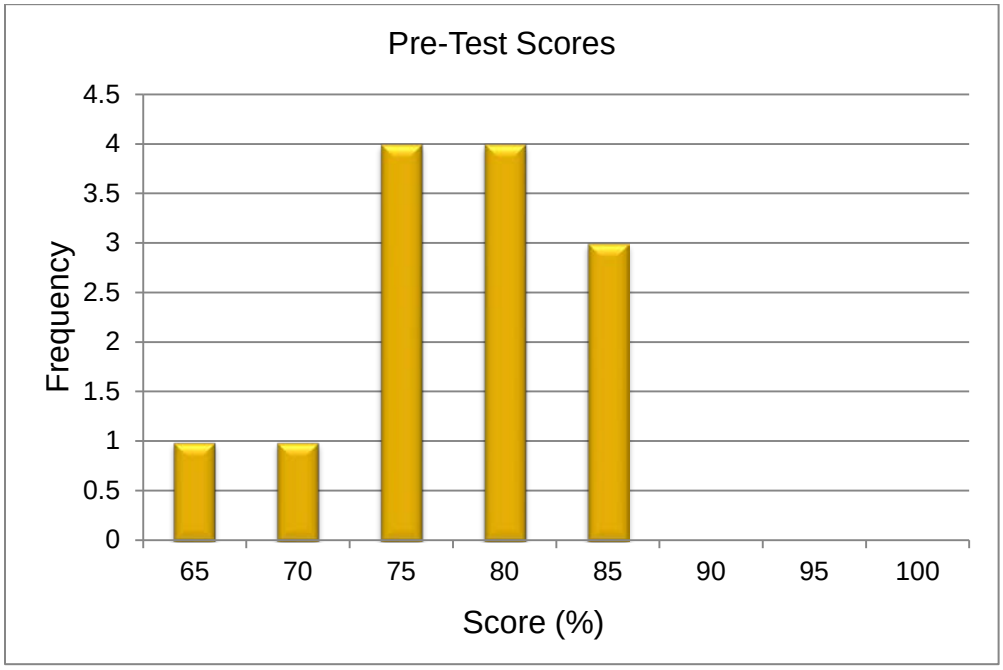
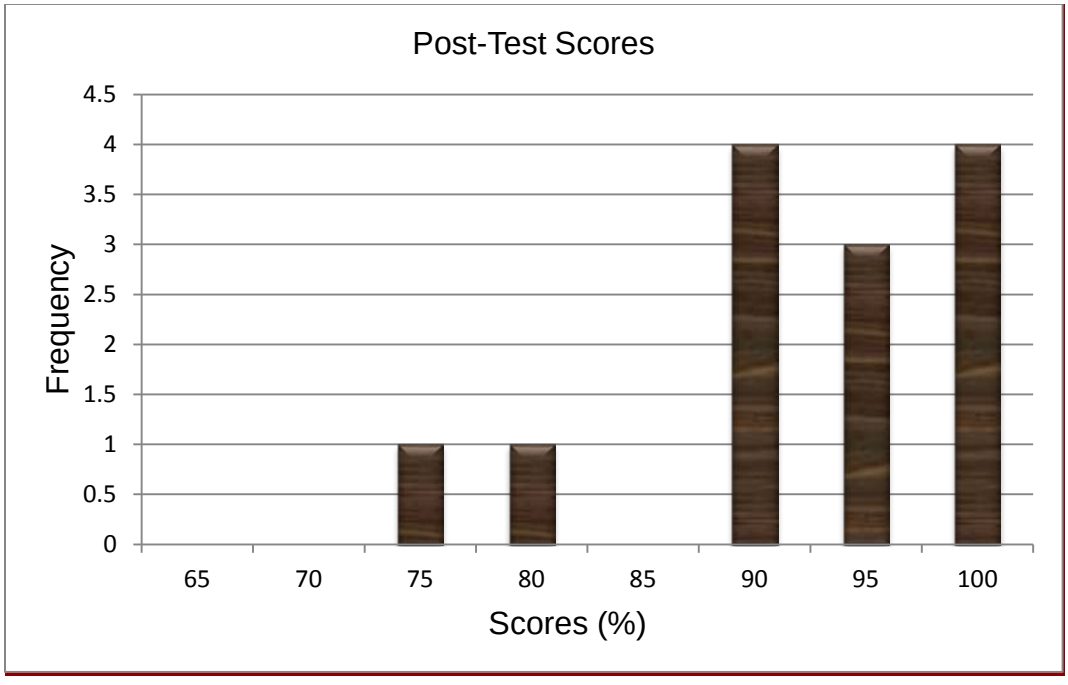


Figure 4.2

Post-Intervention Survey Score Frequencies (N = 13)



CHAPTER 5

The PICO question served as the catalyst for the for this EB project: *What is the effect of HF education on Intermediate Care Unit nursing staff's knowledge of HF, self-care, and best practice guidelines?* Based on the pre-intervention and post-intervention scores, HF-specific education made statistically significant improvements in nurses' knowledge of HF and self-care. The mean pre-intervention survey score was 79.6% (SD = 8.03). The mean post-survey score was 92.7% (SD = 6.96) demonstrating a statistically significant increase from pre-survey results: (t (12) = -5.097, $p < .001$). Best practice guideline knowledge was not directly measured, although aspects of best practice were incorporated into the survey questions.

Discussion

The 20 question survey by Albert et al. (2002) used in this project can be broken down into five categories or themes: (1) diet—three questions, (2) fluids/weight—four questions, (3) signs and symptoms of HF decompensation—nine questions, (4) medications—two questions, and (5) exercise—one question. In the pre-intervention survey, nurses (regardless of differences in demographics) had scores of 77% or less on nine questions out of 20 (45%). Of the nine low scores, four pertained to signs and symptoms of decompensation (44.4%), two dealt with fluids and weight (22.2%), two were related to medications (22.2%), and one pertained to diet (11.2%).

Diet

A low sodium diet is a long-accepted standard of care for patients with heart disease and HF. Close monitoring of electrolytes is another important part of HF management not only because of the concerns with sodium, but also because of the

medications utilized in the treatment of HF—in particular, angiotensin converting enzyme inhibitors (ACEIs) which can elevate potassium levels. Question nine specifically posited that the use of potassium-based salt substitutes was acceptable. Despite the well-known standards, nurses in the four previous studies by Albert et al (2002), Washburn et al. (2005), Willette et al. (2007) and Delaney et al. (2011) were unsure of the use of salt substitutes in the management of HF (> 40% to <70% answered correctly) and < 25% of the nurses asked for more information. In this project, a similar score was achieved, with only 62% of the nurses answering that question correctly. Five nurses (38.5%), however, asked for further information on the subject. Question 13 discussed the use of lean deli meat as an acceptable food choice for patients with HF. The participants yielded higher scores (77%) with that question but only one asked for additional information (7.7%). Again, this score was similar to those found in the previous studies.

Fluids and weight

Patient's management of fluids and weight is of utmost importance for maintaining HF stability and preventing frequent hospital readmissions. Patient education on this topic during hospitalization and at discharge is a vital component in the management of HF. If the nurses who are responsible for HF education are not cognizant of proper self-care, the patients may experience more frequent readmissions for decompensated HF. There were five questions related to fluids and weight on the survey. Questions one, ten, and fourteen were answered correctly by all participants in this project and there were no requests for additional information. Similar scores were obtained in the previous studies with the exception of Washburn et al. (2005) where

question one yielded a score of 70.6%. Questions five and fifteen, however, were specifically related to weight gain concerns and the percentage of those who answered correctly were low: question five (62%) with one request for additional information (7.7%) and question 15 (0%) with again only one request for more information (7.7%). The nurses in the previous studies by Albert et al (2002), Washburn et al. (2005), Willette et al. (2007) and Delaney et al. (2011) all scored > 80% on question five related to a patient's weight gain of greater than three pounds in 48 hours without any other HF symptoms. Question 15, however, was problematic for nurses in all studies with < 60% answering it correctly.

Signs and Symptoms

Early recognition of the signs and symptoms of HF decompensation is important not only for patients at home, but also for nurses who care for HF patients in the hospital. If recognized early, interventions to prevent a downward spiral can prevent frequent hospital readmissions and/or decrease length of stay. The signs and symptoms of HF decompensation category (questions 3, 6, 11, 12, 16, 17, 18, 19, and 20) was problematic for all nurses in the project, with questions 16 and 18 being particularly difficult with correct scores of only 46% and 38% respectively. This finding was similar to the four previous studies using this survey. Albert et al. (2002), Washburn et al. (2005), and Delaney et al. (2011) reported correct scores of < 30% for questions 16 and 18. Willette et al. (2007), however, yielded a low correct response score for question 16 (16.3%), but a much higher score (albeit still low) for question 18 (58.3% correct). Interestingly, in this project, despite the low scores, only four participants requested

further information on question 16 (30.8%) and only one made a request on question 18 (7.7%).

There were two other questions in this category that scored < 80%. Questions 11 and 12 pertained to symptoms of decompensation (orthopnea and PND) that are imperative for patients to know. Both questions yielded scores of 77%. Two participants requested additional information on question 11 (15.4%) and there were four requests for question 12 (30.8%). In the last five questions related to signs and symptoms of worsening HF, the participants scored ≥ 85%: question 3 (85%) with two requests for additional information (15.4%); question 6 (92%) with one request for additional information (7.7%); question 17 (92%) with no requests for more information (0%); and questions 19 and 20 (100%) with one (7.7%) and two (15.4%) requests for more information respectively. These overall scores were consistent with the scores yielded on the four previous studies. Interestingly, the discrepancy between scores and requests for additional information was also noted in the previous studies.

Medications

The use of ACEIs, angiotensin receptor blockers (ARBs), beta blockers, and diuretics are the primary medications used in the pharmacologic treatment of HF. If hospitalized patients with HF are not prescribed one or more of these medications, documentation as to the reason must be done if hospitals wish to maintain the standard of care and receive reimbursement from Medicare and other insurance providers. Nurses who care for patients with HF, therefore, must be knowledgeable regarding the medications, their uses and side effects in order to properly educate patients on self-care. On this project's survey, questions seven and eight pertained to medications.

Seventy-seven percent of the participants correctly answered question seven and three asked for further information (23.1%). Question eight dealing with the use of non-steroidal anti-inflammatories (NSAIDs) was problematic for the nurses with only 46% scoring correctly. Six participants (46.2%) asked for more information however, indicating that close to half of those involved were aware of their lack of knowledge on this particular question. The correct score results mirrored those in the four previous studies, but there were more requests for further information in this project compared to those in the past.

Exercise

Exercise in a structured manner under the guidance of a properly trained health care provider is another aspect of HF management that is essential to the overall well-being of the patient. Question four was the only question pertaining to exercise in this project's survey. All participants answered it correctly and there was only one request for additional information (7.7%) and that was consistent with the scores in the previous studies.

Synthesis of Scores

The mean HF score in this project was similar to those in the previous four studies by Albert et al. (2002), Washburn et al. (2005), Willette et al. (2007) and Delaney et al. (2011), attesting to the reliability of the survey as an instrument to discern nurse knowledge of HF self-care. What is concerning, however, is the fact that despite years of best practice guidelines for HF management, there is no improvement in nurse knowledge scores on the pre-survey today when compared to the first use of the survey in 2002. It is not until after HF-specific education was provided at these various

locations over the past ten years that improvement in nurse knowledge scores was seen. Another disturbing observation is the discrepancy in requests for additional information in relation to scores. Some of the questions which had very low scores had minimal or no requests for further information on those topics. This discrepancy was noted in all of the previous studies as well, perhaps indicating that nurses who instruct patients with HF do not fully grasp what they do not know.

Evaluation of the Applicability of the Theoretical Framework

EBP Model of Implementation

Rossworm and Larrabee Model for Organizational Change. The Rossworm and Larrabee model for organizational change was used as the research utilization model for this DNP project. There are six phases or steps in the model: (1) assess the needs of the stakeholders, (2) build bridges/make connections, (3) synthesize the evidence/determine relevance, (4) plan the practice change, (5) implement & evaluate the practice change, and (6) integrate & maintain the practice change (Melnyk & Fineout-Overholt, 2005). During step 1, the hospital and nursing administration acknowledged that the hospital's rate for heart failure readmissions was three percent higher than the national average. A PICO question was formulated to determine if disease-specific education increased nurse knowledge of HF, HF self-care, and best practice guidelines.

The key stakeholders in this project were the hospital/nursing administration and the nurses on the IMCU. Nursing administration in particular was very interested in knowing the level of nurses' knowledge of HF, self-care, and best practice guidelines as they strove to improve the hospital's HF readmission rates. The IMCU nurses were

assured that there would be strict confidentiality of all findings. Anonymity in the project was accomplished by assigning random numbers to each volunteer. Because the sample size was small, no data would be published that linked demographics to results. Prior to implementation of the HF education, permission to proceed was granted by the hospital system's IRB.

Internal factors that affected this DNP project were evaluated. Prior to the implementation of the HF in-services, nurses on the IMCU were educated on the focus of the DNP project and the hospital's high readmission rate for HF. While many nurses initially voiced their enthusiasm for the project and their willingness to participate, when it came to the actual time for volunteers to sign consents, only 17 nurses did so. Of that number, only 13 completed the education and took both the pre- and post-education survey.

External factors that affected the project were assessed: (1) cost and (2) time constraints. The cost of the project was minimal consisting of money for the PowerPoint handouts and refreshments served during the presentations. Time constraints were more problematic. The participants in this project were nurses who worked on an IMCU that had three separate physical locations in the hospital. The nurses (some full-time and others part-time) all worked different shifts, making it difficult to provide the education on specific aspects of HF (pathophysiology, pharmacology, HF tests/lifestyle modification/invasive devices, and best practice guidelines) via four one-hour in-services. Because of the variances in nurse schedules, the in-service dates and times were scheduled for four Wednesdays in November and were given twice on those days: once in the early morning for the midnight nurses and once in the late afternoon for

nurses who worked the day and evening shifts. Reminder notices were posted in the nurses' lounges and restrooms and reminder emails were also sent out to all nurse participants two days prior to each in-service.

Despite the various times of each in-service and the reminder notices, not all of the participants were able to attend all four sessions. Four of the original 17 volunteers never came to even one in-service and thus were dropped from the project. For those who missed one session, the PowerPoint presentation for that topic was given to them for review on their own time with the knowledge that post-education survey scores might be affected.

Step 2 of the Rossworm and Larrabee model for organizational change involved linking the identified problem (nurse knowledge of HF and self-care) with the interventions and the outcome (Melnyk & Fineout-Overholt, 2005). Four earlier studies by Albert et al. (2002), Washburn et al. (2005), Willette et al. (2007) and Delaney et al. (2011) utilized the 20-question survey devised by Albert (2002) and her colleagues had similar results both pre- and post-educational interventions. The goal of this EB project was to link nurse knowledge of HF and self-care using the identical survey.

In Step 3, an extensive review of the literature was done (Melnyk & Fineout-Overholt, 2005). While there was a plethora of studies on HF, the search was narrowed to include only studies that related to the PICO question. Two studies demonstrated the highest level of evidence: an evidence summary and a systematic review of relevant random control trials (RCTs). The summary evidence concluded with the following best practice recommendation: While DMPs have demonstrated a reduction in mortality and hospital readmission rates, the benefit of this intervention is influenced by other factors

such as patient age, HF Class (per NYHA classification), and type of DMP (Brown, 2010). The systematic review of educational interventions for HF and their outcomes by Boyde et al (2010) demonstrated varying outcomes due to the variety of educational material used in the multitude of studies. The authors therefore concluded that it was difficult to evaluate the outcomes and recommended the need for a more homogenous approach to HF education.

Six of the ten studies chosen for inclusion in this project were level VI. In a substudy of a larger, multi-center Dutch study, Anema et al. (2009) sought to determine common reasons for hospital readmissions from the perspectives of patients, caregivers, cardiologists, and HF nurses. The authors concluded that in order to prevent frequent readmissions for decompensated HF, it was vitally important to fully comprehend the reasons for those readmissions. The Dickson and Reigel study (2009) sought to analyze how HF self-care develops. They found that self-care develops over time and that health care providers rarely made any contribution to its development. Instead, families and friends were more influential to patients' abilities to adapt adequate HF management skills. That conclusion served as the impetus for more research on this topic to determine why health care providers do not play a more significant role in patients' development of HF self-care.

In a systematic review of qualitative and descriptive studies, McEntee et al. (2009) reviewed studies on barriers to HF care over the course of nine years and posited that there are three barriers to HF care: patient level, provider level, and system level. The authors concluded that in order for HF outcomes to improve, all three barriers must be addressed. The McEntee (2009) study served as the foundation for this project

with its primary focus on provider level barriers to optimal EB HF care. The last four level VI studies by Albert et al. (2002), Washburn et al. (2005), Willette et al. (2007) and Delaney et al. (2011) were at the core of this project as well. The survey instrument used in this project was also the tool utilized in these prior studies. All four studies concluded that (1) nurses may not be sufficiently knowledgeable in HF self-care management and (2) disease-specific educational programs for nurses improve their knowledge of HF self-care.

In the final study included in this project, Quinn (2007) used expert opinion from the NIH and the ACC/AHA to provide nurses with knowledge of current best practice guidelines of HF management utilizing a four-pronged approach: (1) pharmacologic therapy, (2) risk factor reduction/lifestyle modification, (3) an implantable ICD, and (4) CRT. The focus in Quinn's (2007) study was pharmacologic management although the recommendation was for nurses to be cognizant of best practice guidelines as those will be used as a benchmark to assess the quality of HF care rendered to patients in all hospital settings.

Step 4 of the Rossworm and Larrabee model was to plan the educational interventions (Melnyk & Fineout-Overholt, 2005). Synthesis of the best available evidence recommended specific nurse education for HF, HF self-care, and best practice guidelines. After meeting with the CNO, NM and the CNS of the IMCU, four one-hour educational in-services were devised using Power Point format to cover all aspects of HF management: (1) pathophysiology, (2) pharmacologic management, (3) lifestyle changes and routine HF tests, and (4) best practice guidelines.

Implementation and evaluation of the plan occurred during Step 5 (Melnyk & Fineout-Overholt, 2005). The four educational interventions were scheduled on Wednesdays in November, 2011. There were two in-services covering the same topic on each day: one in the early morning for those finishing the midnight shift and one in the late afternoon for those working the day and evening shifts. If a participant was not able to attend on a particular day, he/she was given the Power Point material for that topic. All participants took the pre-intervention survey on HF nurse knowledge prior to attending the first in-service and then once again after completing the fourth in-service. Each of the in-services was designed to be one hour long with time for group discussion or questions at the end of each topic.

The educational interventions were completed by the end of November, 2011. Analysis of the pre- and post-survey data was concluded by March 1, 2012. The anticipated outcome was to see improvements in nurse knowledge of HF after the conclusion of all four in-services. The paired-sample *t* test was calculated using percentage values for the survey scores. The mean pre-intervention survey score was 79.6% (SD = 8.03). The number of requests for more information on each of the questions was incongruent with the scores received, indicating a lack of self-awareness. Both the pre-intervention score and the incongruence of requests were quite similar to the results in the four prior studies using the Albert et al. (2002) survey. The mean post-survey score was 92.7% (SD = 6.96) demonstrating a statistically significant increase from pre-survey results: ($t(12) = -5.097$, $p < .001$). Since the sample size was small ($N = 13$), further assessments of demographics related to scores could not be done in order to protect the participants' confidentiality.

Step 6 of the Rossworm and Larrabee model of organizational change, integration and maintenance of change (Melnyk & Fineout-Overholt, 2005), cannot be initiated until after the conclusion of this EB project. According to the CNO of the hospital, since the data analysis has shown a statistically significant improvement in nurse knowledge scores, the plan is to repeat the educational in-services hospital-wide, using the Albert et al. (2002) survey again both pre- and post-intervention. Once that has been done, data can be collected on HF readmission rates, length of stay, and cost of care to assess for any improvements linked to nurse knowledge. Retention of nurse knowledge of HF and HF self-care can be evaluated every six to twelve months by administering the same survey instrument.

Theoretical Framework

King's Theory of Goal Attainment and Transaction Process was used as a strong framework with which to guide this project centered on disease-specific education interventions and their effect on nurses' knowledge. The theory supports the six steps of the Rossworm and Larrabee model for RU and organizational change. The first steps of the nursing process (assess and diagnose) were made by the project coordinator and the CNO of the health care facility: higher-than-national average HF readmission rates. The review of literature identified three barriers to optimal HF management: patient-level, provider-level, and system-level (McEntee et al., 2009). This evidence-based project intervened at the provider-level to determine if disease-specific education interventions for intermediate care nurses have a positive effect on nurses' knowledge. The ultimate goal will be to see an improvement in patient outcomes as evidenced by

decreased HF readmission rates, decreased patient length of stays, and decreased costs, but the time constraints of this project did not allow for that type of data collection.

Strengths and Limitations of the EBP Project

One of the strengths of this EBP project was its simplicity in implementation. The instrument utilized to assess nurse knowledge was already tested for validity and reliability in four prior studies. Although preparing four Power Point presentations featuring HF pathophysiology, pharmacologic management, lifestyle modifications/ routine HF tests, and best practice guidelines was initially time-consuming, once done, scheduling and implementing the in-services was easy. Another strength of this project is that it is easily duplicated and can be initiated in a variety of health care settings: hospital, long-term care, and home health with minimal cost. Lastly, the environment in which the nurses took the pre- and post-intervention surveys was monitored so that nurses could not ask each other for assistance with any of the questions.

One of the limitations of this project was the small sample size. Despite initial verbalized interest in participating, when the time came to sign consents, only 17 nurses agreed to participate and four of the nurses failed to attend any of the in-services and thus were removed from project. A second limitation was that not all of the participants attended all four in-services. Those who could not attend were given the Power Point handouts, but unfortunately missed the additional information that was obtained via the question and answer session following each of the in-services. The final limitation was the limited number of times each in-service was offered due to time constraints of both the project coordinator and the nurses' schedules.

Implications for the Future

Practice. Heart failure (HF) is a complex, expensive clinical problem that affects nearly six million Americans today (Reilly et al., 2009) and the incidence is rising with a staggering 400,000 to 500,000 new cases each year (Albert et al., 2002). At an estimated cost of over $33 billion annually, HF is the most costly cardiovascular disease in the United States (McEntee, Cuomo, & Dennison, 2009). Despite the demonstrated effectiveness of best practice guidelines for HF management recommended by the ACC and the AHA which are readily accessible to health care providers, significant variations in HF management continue (Albert et al., 2002) and outcomes remain suboptimal (McEntee et al., 2009).

Theory. APNs must be cognizant of the need for continuing research and match the research with the most appropriate theory or model to be used as a strong framework from which to proceed. The nursing process refers to a system of five interrelated steps or actions that nurses learn during their early formative years in nursing education: assess, diagnose, plan, implement, and evaluate. Because this EB project was nurse-driven and involved only nurses, the structural framework that was chosen for the project closely resembled the nursing process.

Rossworm and Larrabee's model for organizational change is composed of six steps: (1) assess the needs of the stakeholders, (2) build bridges/make connections, (3) synthesize the evidence/determine relevance, (4) plan the practice change, (5) implement & evaluate the practice change, and (6) integrate & maintain the practice change (Melnyk & Fineout-Overholt, 2005). Step 1 is equivalent to "assess" in the

nursing process. Steps 2 and 3 are similar to “diagnose” and Step 4 is equal to “plan”. Steps 5 and 6 are equivalent to “implement” and “evaluate.”

King’s Theory of Goal Attainment and Transaction Process was suitable as the theoretical framework for this project because it also parallels the nursing process. The theorist’s Model of Transaction identifies key behaviors that are necessary for success: (1) mutual goal setting, (2) exploration of means to achieve goals, and (3) agreement on means to achieve goals (Fawcett & Swoyer, 2005). She identified seven interrelated concepts between the nurse and patient: (1) perception, (2) communication, (3) interaction, (4) decision-making, (5) agreement to attain goals, (6) transactions, and (7) goal achievement (Fawcett & Swoyer, 2005) that could also be utilized in a nursing-driven project with the goal of improving nurse knowledge. The Larrabee and Rossworm model in conjunction with King’s Theory of Goal Attainment and Transaction Process served as a strong framework for this EB project.

Research. The first study of nurse knowledge of HF and HF self-care by Albert et al. was published In 2002 and demonstrated statistically significant improvements in such knowledge after disease-specific education. Three other studies by Washburn et al. (2005), Willette et al. (2007) and Delaney et al. (2011) replicated the original research and had very similar findings, as did this EB project. Despite the ten year span between the original study and this EB project, the pre-intervention scores remain low, indicating that these findings are not being universally implemented nationwide.

Education. The importance of applying nursing research became clearly apparent during the implementation of this project. Despite the fact that four prior studies demonstrated statistically significant improvements in nurse knowledge of HF

and HF self-care, nurses in this project had similar scores in the pre-intervention surveys to nurses who took the same survey ten years ago. The fact that there was no improvement in HF nurse knowledge scores underscores the importance of the DNP programs across the nation. There is a great need to take the valuable nursing research to date and implement it in all health care systems. Those with clinical doctorates will be in better positions to move nursing research from publication to the bedside and onto the evaluation process. With evaluation will come the need for further research and a push for standardization of continuing nursing education in our health care systems.

Conclusion

Results of this EB project demonstrated that nurses are not sufficiently knowledgeable regarding HF and HF self-care. This lack of knowledge may be one of the reasons for the persistently high readmission rates for patients with HF despite the many years that have passed since the first best practice guidelines were published. This project also delineated the fact that nurses are lacking a certain self-awareness of what they know or do not know. The incongruence of low scores and few requests for additional information indicate that there must be further continuing nursing education on disease-specific topics. Nurses are the health care providers that spend the most time with patients. It is nurses who are responsible for patient education during hospitalization and at discharge. If nurses are poorly prepared to educate HF patients on self-care, HF readmission rates with the subsequent high cost for care will continue to soar. DNP-prepared APNs are well qualified to improve nurse knowledge and practice by assisting in the implementation of EB practice.

REFERENCES

Albert, N. M., Collier, S., Sumodi, V., Wilkinson, S., Hammel, J. P., Vopat, L., … Bittel, B. (2002). Nurses' knowledge of heart failure education principles. *Heart & Lung 31*(2), 102-112. doi:10.1067/mhl.2002.122837

Altman, T. K. (2007). An evaluation of the seminal work of patricia benner: Theory or philosophy? *Contemporary Nurse, 25*(1-2), 114-123. doi:10.5172/conu.2007.25.1-2.114

Agency for Healthcare Research & Quality (AHRQ) National Guidelines Clearinghouse (2008). Guidelines for the diagnosis and evaluation of chronic heart failure. Retrieved from http://www.guidelines.gov/systheses/synthesis.aspx?id=24475

Annema, C., Luttik, M., & Jaarsma, T. (2009). Reasons for readmission in heart failure: Perspectives of patients, caregivers, cardiologists, and heart failure nurses. *Heart & Lung, 38*(5), 427-434. doi: 10.1016/j.hrtlng.2008.12.002

Belmont Report retrieved on July 24, 2011 from www.ohsr.od.nih.gov/guidelines/belmont.html

Boyde, M., Turner, C., Thompson, D. R., & Stewart, S. (2011). Educational interventions for patients with heart failure: A systematic review of randomized controlled trials. *Journal of Cardiovascular Nursing, 26*, E27-E35.

Brown, H. E. (2010). Evidence summaries. Joanna Briggs Institute. Adelaide: Sept. 11, 2010. Retrieved on August 28, 2011 from http://proquest.umi.com/pqd.weh?did=2314661091&sid=1&Fmt=3&clientd=5302&RQT=309&VName=PQD

Crowther, M. (2003). Optimal management of outpatients with heart failure using advanced practice nurses in a hospital-based heart failure center. *Journal of the American Academy of Nurse Practitioners, 15*(6), 260-267.

Dahl, J. & Penque, S. (2002). APN spells success for a heart failure program. *Nursing Management, 33*, 46-48.

Delaney, C., Apostolidis, B., Lachapelle, L., & Fortinsky, R. (2011). Home care nurses' knowledge of evidence-based education topics for management of heart failure. *Heart & Lung, 40*(4), 285-292. doi:10.1016/j.hrtlng.2010.12.005

Dickson, V. V., & Riegel, B. (2009). Are we teaching what patients need to know? Building skills in heart failure self-care. *Heart & Lung, 38*(3), 253-261. doi:10.1016/j.hrtlng.2008.12.001

U. S. Census Bureau. East Chicago Census retrieved on April 25, 2012 from http://quickfacts.census.gov/qfd/states/18/1819486.html

Evangelista, L. S., Rasmussen, K. D., Laramee, A. S., Barr, J., Ammon, S. E., Dunbar, S.,…Yancy, C. W. (2010). Health literacy and the patient with heart failure—Implications for patient care and research: A consensus statement of the heart failure society of America. *Journal of Cardiac Failure, 16*, 9-16.

Fawcett, J. & Swoyer, B (2008). *Evolution and use of formal nursing knowledge* (4th Ed). Advancing your career: Concepts of professional nursing (pp. 55-57). Retrieved from www.fadavis.com

Fletcher, L. & Thomas, D. (2001). Congestive heart failure: Understanding the pathophysiology and management. *Journal of the American Academy of Nurse Practitioners, 13*(6), 249-257.

Jessup, M., Abraham, T., Casey, D. E., Feldman, A.M., Francis, G. S., Gaviats, T. G.,…Yancy, C. W. (2009). Guidelines for the diagnosis and management of heart failure in adults: A report of the american college of cardiology foundation/ american heart association task force on practice guidelines: Developed in collaboration with the international society for heart and lung transplantation. *Journal of the American College of Cardiologists, 53*, 1343-1382. doi:10.1016/j.jacc.2008.11.009

Joanna Briggs Institute (2008). The jbi approach to evidence-based practice. Retrieved on August 28, 2011 from www.joannabriggs.edu.au

King, I. M. (2007). King's conceptual system, theory of goal attainment, and transaction process in the 21st century. *Nursing Science Quarterly, 20*(2), 109-116. doi:10.1177/0894318407299846

McEntee, M. L., Cuomo, L. R., & Dennison, C. R. (2009). Barriers to heart failure care. *Journal of Cardiovascular Nursing 24*(4), 290-298.

Melnyk, B. M. & Fineout-Overholt, E. (2005). *Evidence-based practice in nursing & healthcare.* Lippincott, Williams, & Wilkins: Philadelphia, PA.

National Commission for the Protection of Human Subjects retrieved on July 7, 2011 from www.hhs.gov/ohrp/archive/nationalcommission.html

Pierce, J. D., Dalton, K., Duke, K., & Spaniol, J. R. (2009). Heart failure guidelines and implications for surgically treating heart failure. *AORN Journal, 90*(6), 874-892.

Quinn, B. (2007). Pharmacological treatment of heart failure. *Critical Care Nurses Quarterly, 30*(4), 299-306.

Reilly, C. M., Higgins, M., Smith, A., Gary, R. A., Robinson, J., Clark, P. C.,…Dunbar, S. B. (2009). Atlanta heart failure knowledge test. *Journal of Cardiovascular Nursing, 24*(6), 500-509.

Sherwood, L. (2004). *Human physiology from cells to systems* (5th Ed.) Brooks/Cole-Thompson Learning: Belmont, CA.

St. Catherine Hospital (2011). Retrieved online on June 28, 2011 from http://www.comhs.org/about_us.asp

Thomas-Kvidera, D. (2005). Heart failure from diastolic dysfunction related to hypertension: Guidelines for management. *Journal of the American Academy of Nurse Practitioners, 17*(5), 168-175.

Washburn, S. C., Hornberger, C. A., Klutman, A., & Skinner, L. (2005). Nurses' knowledge of heart failure education topics as reported in a small midwestern community hospital. *Journal of Cardiovascular Nursing, 20*(3), 215-220.

Willette, E. W., Surrells, D., Davis, L. L., & Bush, C. T. (2007). Nurses' knowledge of heart failure self-management. *Progress in Cardiovascular Nursing, 22*, 190-195.

AUTOBIOGRAPHICAL STATEMENT

Carol Budgin graduated from Valparaiso University with a Bachelor of Science degree in nursing in 1982. She began her nursing career on an intermediate care unit before transferring to intensive care three years later. Caring for the needs of the critically ill became her passion. Ms. Budgin spent the next twenty-five years in critical care where she specialized in cardiovascular care. When not working at the bedside, she has been involved in many projects and committees that served to advance nursing knowledge through evidence-based practice and also to advance the profession of nursing through the development of a shared governance model of nursing practice. Working to establish shared governance sparked her interest in returning to school. She earned a master's degree of science from Purdue University Calumet in 2006 and received an award as the most outstanding student in the clinical nurse specialist program. While attending Purdue University Calumet, Ms. Budgin accepted the position of nurse manager of the intensive care and neuroscience intensive care units where she was able to improve nursing knowledge and patient care by utilizing a multidisciplinary approach to establish ventilator-associated pneumonia prevention and sepsis protocols and to develop and implement an acute response team. She is a co-author of a journal article on preventing catheter-related bloodstream infections. Since completing her master's degree, Ms. Budgin has been working in a cardiology practice as a clinical nurse specialist in critical care where she sees patients in both the clinic and acute care settings. She also is responsible for the practice's heart failure clinic. Ms. Budgin received her certification from the American Association of Critical Care Nurses, of which she is a member. She is also a member of the National Association of Clinical

Nurse Specialists, the American Nurse Association, and the Sigma Theta Tau International Nursing Honor Society, Mu Omega chapter. In 2009, Ms. Budgin joined the Timmy Foundation in Indianapolis and traveled to Ecuador where she spent time caring for the medical needs of an indigent population. Ms. Budgin is currently in the DNP program at Valparaiso University and will complete her studies in 2012.

ACRONYMS

ACC: American College of Cardiology

ACEI: Angiotensin Converting Enzyme Inhibitor

ACLS: Advanced Cardiac Life Support

AHRQ: Agency for Healthcare Research & Quality

AHA: American Heart Association

ANOVA: Analysis of Variance

APN: Advanced Practice Nurse

ARB: Angiotensin Receptor Blocker

ASN: Associate of Science in Nursing

BLS: Basic Life Support

BP: Blood Pressure

BSN: Baccalaureate of Science in Nursing

CAD: Coronary Artery Disease

CINAHL: Cumulative Index to Nursing and Allied Health Literature

CMS: Centers for Medicare and Medicaid Services

CNO: Chief Nursing Officer

CNS: Clinical Nurse Specialist

COACH: Coordinating Study Evaluating Outcomes of Advising and Counseling in Heart Failure

CO: Cardiac Output

CRT: Cardiac Resynchronization Therapy

DMP: Disease Management Program

DNP: Doctorate if Nursing Program

EB: Evidence-Based

EBP: Evidence-Based Practice

ED: Emergency Department

EF: Ejection Fraction

EMBASE: Online information source of published literature designed to support information managers and pharmaco-vigilance in complying with the regulatory requirements of a licensed drug

HF: Heart Failure

ICD: Internal Cardiac Defibrillator

ICU: Intensive Care Unit

IMCU: Intermediate Care Unit

IRB: Institutional Review Board

JBI: Joanna Briggs Institute

JC: Joint Commission

LPN: Licensed Practical Nurse

LV: Left Ventricle

MeSH: Medical Subject Headings

MedLine: National Library of Medicine

NIH: National Institute of Health

NIHI: National Institute of Healthcare Improvement

NM: Nurse Manager

NSAID: Nonsteroidal Anti-Inflammatory Drugs

NYHA: New York Heart Association

OvidSP: Ovid Technologies, Inc. provides access to online bibliographic databases, journals and other products, chiefly in the area of health sciences

PC: Project Manager

PICO: Patient Population, Intervention, Comparison, Outcome

PND: Paroxysmal Nocturnal Dyspnea

PubMed: Free database accessing primarily the MEDLINE database of references and abstracts on life sciences and biomedical topics

RCT: Random Control Trial

RN: Registered Nurse

RU: Research Utilization

SPSS: Statistical Package for the Social Sciences

SV: Stroke Volume

Appendix A
Four-Pronged Approach for HF Management

Pharmacology	• Digitalis & Diuretics • Angiotensin-Converting Enzyme Inhibitors (ACEIs) & Angiotensin II Receptor Blockers (ARBs) • Anticoagulation Drugs & Beta Blockers (Dahl & Penque, 2002)
Risk Factor Modification Lifestyle Changes	• Dietary sodium restriction of <2000 mg/day • Avoid salt substitutes as they contain potassium instead of sodium • Weigh daily: Notify physician of a > 2# overnight or > 5# in a week or follow prescribed PRN diuretic orders • Alcohol abstinence strongly recommended since alcohol is cardiotoxic • Although several studies found no correlation between alcohol consumption and the risk of developing HF, the ACC/AHA guidelines advise alcohol abstinence in any patient with a history of heavy alcohol use or abuse and new onset HF without other obvious causes • Exercise at the level recommended by your exercise physiologist, doctor or nurse • Avoid exercising in extreme heat or cold • Smoking cessation (Pierce, et. al., 2009)
Implantable Cardioverter/ Defibrillator (ICD)	• Used to treat problems with the heart's rhythm • According to the Multicenter Automatic Defibrillator Implantation Trial II (MADIT II), survival increases when an ICD is inserted in patients with an EF of < 35% who have had a previous MI • This trial demonstrated that patients treated with an ICD had a 31% reduced incidence of death vs. those treated with conventional medical management alone • The Sudden Cardiac Death in Heart Failure Trial (SCDHFT) compared the outcomes of HF patient with ischemic and non-ischemic cardiomyopathies, an EF of <36%, and NYHA class II or III and found a 23% reduction in mortality compared to patients treated with amiodarone alone (Pierce, et. al., 2009)
Cardiac Resynchronization Therapy (CRT)	Cardiac resynchronization therapy (CRT), previously known as biventricular pacing, is used to treat HF that is caused by a variety of heart muscle diseases (cardiomyopathies) • It is used to re-coordinate ventricular beating, which improves CO • Consists of a device and three insulated wires or leads (i.e., RA, RV, and LV) • If the patient is in chronic atrial fibrillation, the EP MD may not insert a lead into the RA • When added to optimized medical therapy, CRTD therapy has been shown to not only improve EFs for patients with HF, NYHA functional class, and quality of life (QOL), but it also improves the patient's chance of survival Primary indications for a CRT device are: • Presence of HF symptoms (dyspnea, fatigue, exercise intolerance) with an EF of < 35% • A QRS duration of > 0.12 seconds which represents an electrical delay between the right and left ventricles (i.e., an interventricular conduction delay, bundle branch block (Pierce et. al., 2009) • It is important to note that ICDs & CRTs should not be implanted until pharmacological management has been optimized (Jessup et al., 2009)

APPENDIX B
EVIDENCE DATA TABLE

Publication, Level of Evidence	Population, Setting	Design, Intervention(s), Comparisons	Outcomes and Effect Measures
Albert et al. (2002) Descriptive study Level VI	Population:300 IMCU nurses Setting: Large, Midwestern healthcare system	Design: Descriptive and exploratory Sample: Convenience sample Intervention: 20-item True or False survey tool utilized both pre-and post-HF education	Outcomes measures: nurses' overall and topic-specific perceptions of HF self -care Mean HF patient self-care knowledge score was 15.2 $\pm$ 2.0. RNs scored significantly higher than LPNs (15.3 vs. 14.1); $p < 0.004$. Conclusion: Nurses may not be adequately educated in HF self-management
Annema et al. (2009) Descriptive exploratory study Level VI	Population: n = 260 Setting: 17 Dutch hospitals Substudy of the coordinating study evaluating outcomes of advising and counseling in HF (COACH)	Design: Descriptive/exploratory using interviews/questionnaires to collect data on reasons for hospital readmissions from perspectives of patients, caregivers, cardiologists, and HF nurses	Patients in the COACH study were randomized to 1 of 3 study groups: basic support, intensive support, or control. An end-point committee (4 cardiologists, a geriatrician, and a general practitioner) assessed all the readmissions on basis of preset conditions. Of the 1023 patients in the COACH study, there were 1161 readmissions during the 18-month follow-up. Of these, 375 readmissions (32%) of the 260 patients in the Substudy were related to HF.
Boyde et al. (2010) Systematic Review Level I	Randomized control trials (RCTs) from 1998 to 2008 in CINAHL, MEDLINE, PsychInfo, EMBASE, and Cochrane were reviewed	1515 abstracts reviewed independently by 2 reviewers 19 studies were ultimately reviewed	Fifteen demonstrated a significant effect from their intervention in at least one outcome measure. Conclusion: Despite improvements in HF knowledge, there are variable patient outcomes and this can be related to the differences of studies included in the review. It was difficult to identify the most effective educational strategy as the interventions varied considerably in delivery methods and duration with outcome measures that were just as varied. Further research is needed to develop an EB for patient education
Brown (2010). JBI Evidence Summaries of DMPs Level 1	Population: HF patients/HF nurses Setting: Hospitals /Multicenter healthcare systems	Evidence Summaries: Meta-analysis of 36 trials; Systematic review of 29 trials; Multi-center randomized controlled trial (RCT) including 1023 participants; Viewpoint paper/expert opinion	Meta-analysis: provided strong evidence on the favorable effect of DMP on HF hospitalization rates and demonstrated a clinically and statistically significant effect on mortality reduction in HF patients (level 1) Systematic review on multidisciplinary management strategies for HF found these programs were associated with a 27% reduction in hospitalization rates and 43% reduction in total number of hospitalizations (level1) Systematic review on multidisciplinary management strategies included specially trained HF nurses, patient and caregiver education including medication and dietary advice and ready-access to healthcare providers trained in HF (level 1) Four studies out of 30 yielded statistically significant all-cause mortality reduction from DMP for HF Large, multicenter, RCT of DMP that focused on nurse specialists in HF, there was a non-significant potential reduction in mortality accompanied by a slight increase in the number of reduced hospitalizations in the intervention groups compared to a standard group (follow-up by a cardiologist)

Publication, Level of Evidence	Population, Setting	Design, Intervention(s), Comparisons	Outcomes and Effect Measures
Delaney et al (2010) Cross-sectional Survey Level VI	Population: Convenience sample of 94 nurses from 4 home care agencies Setting: Connecticut home health care agencies (2 agencies from urban settings and 2 from rural settings)	Cross-sectional design to evaluate home care nurses' knowledge of EB education in managing HF. Nurses' knowledge of evidence-based education topics for HF management was assessed using the 20-item survey tool introduced by Albert et al. (2002)	. HF knowledge means score: 15.78 + 1.69 out of a possible 20 points (78.9%) Conclusion: Home care nurses have a general knowledge base of HF but there is substantial room for improvement in all 5 categories explored. Educational programs for HF management for home care nurses may be important antecedents for improvements in HF patient outcomes
Dickson and Riegel (2009) Qualitative descriptive meta-analysis techniques Level VI	Population: 85 adults with chronic HF who were enrolled in 3 prior studies by the researchers	Themes from 3 of the researchers previous studies were reexamined using qualitative, descriptive meta-analysis techniques	Tactical skills such as diet, diuretic titration, and exercise and situational skills are needed to perform self-care and were examined. Proficiency in these skills was acquired primarily through input from family and friends. Health care providers rarely made significant contributions to patients' abilities to learn self-care skills.
McEntee et al. (2009) Review of Literature Level V	Population: Patients with HF Setting: A total of 60 articles met the criteria for inclusion from Europe, Australia, New Zealand, Canada, and the United States	Quantitative methods were used in 49 studies Qualitative data was collected in 13 studies Mixed methods were used in 2 studies	82% of quantitative studies examined barriers at only one level of care (most often at the patient-level) 85% of qualitative studies examined barriers at multiple levels Patient-level barriers reported in 45 studies Provider-level barriers reported in 23 studies System-level barriers reported in 13 studies Conclusions: 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

Publication, Level of Evidence	Population, Setting	Design, Intervention(s), Comparisons	Outcomes and Effect Measures
Quinn (2007) Expert Opinion/Consensus: National Institute of Healthcare Improvement (NIHI) ACC/AHA Level VII	Population: Americans with HF Setting: United States	HF treatment recommendations by the NIHI, ACC/AHA to be used as national medical bench-marks by the Joint Commission (JC) and the Centers for Medicare and Medicaid Services (CMS)	Standards of care set forth by the ACC/AHA: Evaluated by core measures/indicators Healthcare institutions' performances in providing recommended care to be collected by the JC and CMS 7 Key Indicators of Quality Measures for HF identified by NIHI
Washburn et al. (2005) Descriptive exploratory study Level VI	Population: n = 51 nurses Setting: small Midwestern community hospital	Design: Descriptive and exploratory Sample: Convenience sample of 51 IMCU nurses who care for patients with HF Intervention: 20-item True or False survey tool utilized both pre-and post-HF education	Mean self-care knowledge was 14.6 + 2 (range = 9-19). There was no statistical difference in mean score between ICU nurses and medical floor nurses. Correct responses to individual survey items ranged from 20% to 100%. Conclusion: Nurses working in a small community hospital may not be sufficiently knowledgeable in HF self-care management. Disease-specific education in an ongoing manner may improve the quality of patient education.
Willette et al. (2007) Descriptive, correlational design Level VI	Setting: Telemetry unit and cardiac care unit of a large, southeastern medical center	Design: Descriptive, correlational Sample: Convenience sample of 49 nurses The Albert et l. (2002) survey was given to determine nurse knowledge of HF self-care	The mean score for all nurses was 15.97 + 1.94 or 79.8% correct. The authors concluded that the nurses in this study did not possess sufficient knowledge to care for and educate patients with HF.

APPENDIX C

JOANNA BRIGGS INSTITUTE (JBI)

Grade of Recommendations	Feasibility	Appropriateness	Meaningfulness	Effectiveness
A.	Strong support that merits application	Strong support that merits application	Strong support that merits application	Strong support that merits application
B.	Moderate support that warrants consideration of application	Moderate support that warrants consideration of application	Moderate support that warrants consideration of application	Moderate support that warrants consideration of application
C.	Not supported	Not supported	Not supported	Not supported

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Retrieved online from http://www.joannabriggs.edu.au/Grades%20of%20Recommendation

APPENDIX D
CONSENT FORM

Study Title: The Effect of Heart Failure Education on Intermediate Care Unit Nursing Staff Knowledge of Heart Failure and Best Practice Guidelines

Researcher: Carol Budgin MS, RN, CCNS
DNP student, Valparaiso University

Purpose: I, _____, understand that I am being asked to take part in an educational intervention project to measure the effect of education on Intermediate Care Unit nursing staff knowledge of heart failure and best practice guidelines.

Procedure: The researcher will provide the following to participants: one face-to-face educational orientation session at the beginning of the project to introduce participants to the in-service sessions, discuss confidentiality of survey, collect demographic data and take a survey related to patient heart failure self-care; four one-hour in-services (each covering different aspects of heart failure and best practice guidelines); PowerPoint slide handouts; tables/figures with key information; at least one article relating to best practice; pre- and post-surveys on heart failure patient self-care for evaluating outcomes; access via phone and email to the DNP student as an educator and expert consultant for the project; and one face-to-face group evaluation session with the DNP student after all in-services have been completed. The intervention and data collection will take place over a period of about 10 – 16 weeks.

Risks: There are no physical or other known risks to participating in the study. There are no invasive techniques used. This project is designed to increase nursing knowledge about heart failure and best practice guidelines and involves collection of data from participants before and after an educational intervention.

Benefits: Participants in the project/study will be engaging in group learning in basic heart failure disease and best practice guidelines and thus are expected to increase their knowledge about nursing the heart failure patient population. This may result in a sense of greater competency, job satisfaction, and personal enrichment, and in turn promote better quality care to the heart failure patients for whom they care.

Voluntary participation/withdrawal: I understand that participating in this project/study is my choice, and I am free to stop at any time without penalty.

Questions: If I have any questions about being in the project/study now or in the future, Carol Budgin may be contacted at 219-776-1670. If I have any questions about my rights as a research participant, Dr. Julie Brandy, Chairman of the Institutional Review Board at Valparaiso University, may be contacted at 464-5481 or Jana Lacera, Director of the Institutional Review Board at Community Hospital, may be contacted at 219-836-6862.

Confidentiality/anonymity: Although the information and answers I give may be used and reported by the researcher, my name and other facts that would identify me will be kept strictly confidential. I understand that due to the nature of this study, the researcher may choose to use my direct quotes when talking about the data. However, I have been assured of anonymity in the reporting of data.

Consent to participate in the research study: I have read or had read to me all of the above information about this research study, the procedure, possible risks, and potential benefits to me, and I understand them. All of my questions have been answered. I give my consent freely, and offer to participate in this project/study.

_____	_____	_____
Participant signature	Date	Project Coordinator signature

APPENDIX E

DEMOGRAPHICS

Project: The Effect of Heart Failure Education on Intermediate Care Unit Nursing Staff's Knowledge of Heart Failure, Heart Failure Self-Care, and Best Practice Guidelines

Project Coordinator: Carol Budgin MS, RN, CCNS, DNP student at Valparaiso University

Volunteer Participant's Demographic Information

1.) Name: _____ Random Number: _____

2.) Sex: _____ Female _____ Male

3.) Age: _____

4.) Highest Nursing Degree Achieved:

_____ Licensed Practical Nurse (LPN) (1 year)
_____ Associate Degree (ASN) (2 year)
_____ Baccalaureate Degree (BSN) (4 year)
_____ Master of Science Degree (MS)
_____ Post-Master's Degree

5.) Degree in other fields (i.e. Psychology, Business, etc.):_____

6.) Experience in nursing in years:

_____ 0-2 years
_____ 3-5 years
_____ 6-8 years
_____ 9-11 years
_____ 12-14 years
_____ ≥ 15 years

7.) Length of time working in critical care in years:

_____ 0-2 years
_____ 3-5 years
_____ 6-8 years
_____ 9-11 years
_____ 12-14 years
_____ > 15 years

8.) Certifications (i.e., CCRN, ACLS etc.,): _____