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Effectiveness of Heart Failure Clinics on Reducing Hospital Readmissions

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EFFECTIVENESS OF HEART FAILURE CLINICS ON REDUCING HOSPITAL READMISSIONS

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EFFECTIVENESS OF HEART FAILURE CLINICS ON REDUCING HOSPITAL READMISSIONS

An Abstract of the Scholarly Project by
Sarah Stoughton, BSN, RN

The purpose of this study was to determine if follow up visits at the AdventHealth Heart Failure Clinic in Shawnee Mission, Kansas were effective in reducing the 30-day readmission rate of heart failure patients. It was also to determine if a patient's BMI, EF, GFR, and A1c would improve or remain stable with follow-up appointments at the same clinic or if they would worsen. The author assessed this through a retrospective chart review and collection of data. Data was collected on the 30-day readmission rate of heart failure patients prior to the opening of the clinic in the fall of 2015 and compared to the 30-day readmission rate of patients who followed up at the clinic after a hospitalization for heart failure. Data was also collected on the EF, GFR, hemoglobin A1c, and BMI pre-clinic and compared to the data post-clinic. The population sampled include 58 males and 42 females with a current age range of 41 to 99. Findings showed that not only were the 30-day hospital readmissions reduced after the initiation of the AdventHealth heart failure clinic; the patients had a lower BMI and increased EF after following up and the heart failure clinic when compared to their BMI and EF before the opening of the clinic. These variables demonstrated that the heart failure clinic helped to improve the patient outcomes. Future studies should be completed to include larger sample sizes and include variables such as race, medication compliance, and diet compliance.

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CHAPTER I

Introduction

Heart failure is a common disease affecting over 5 million people (Centrella-Nigro et al., 2016). It has high morbidity and mortality rates (Bakal, McAlister, Liu, & Ezekowitz, 2014). Heart failure can be acute or chronic and occurs when the heart weakens and cannot pump (systolic heart failure) or stiffens and cannot fill (diastolic heart failure). Both types of heart failure prevent the heart from effectively pumping blood ("What is Heart Failure?", n.d.). When the blood cannot be effectively pumped, it backs up causing congestion and fluid overload ("What is Heart Failure?", n.d.). The weakened heart muscle is also unable to effectively perfuse the tissues of the body (Centrella-Nigro et al., 2016). Heart failure is characterized by an abnormal functioning heart that causes frequent hospital admissions, poor exercise tolerance, reduced quality of life, a shortened life expectancy, and an overall poor prognosis (Wijeysundera et al., 2012). Heart failure is not only a major problem but one that continues to increase in numbers. Over that last 25 years, hospitalizations have increased from approximately 800,000 annually to over 1 million with heart failure as the primary diagnosis (Kim & Han, 2013). That number increases if you add in patients hospitalized with heart failure as a secondary diagnosis (Kim & Han, 2013).

An estimated 5.7 million people in the United States have heart failure and approximately 670,000 people are newly diagnosed with heart failure each year (Centrella-Nigro et al., 2016). Over one million people are admitted to hospitals each year with heart failure; at least one-fourth of these patients will be re-admitted within thirty days of discharge for the same reason (Centrella-Nigro et al., 2016). Regardless of advances in technology and treatment therapies, only about half of patients diagnosed with heart failure survive more than five years after their initial diagnosis (Kovell, Juraschek, & Russell, 2015). The cost is high not only in terms of human health and life. Financially, in 2013 alone, the estimated cost of heart failure was $32 billion and is predicted to cost Americans $70 billion by 2030 (Kovell et al., 2015).

Heart failure is, in fact, the most expensive disease related diagnosis in the United States with five million hospital stays each year at a cost of approximately $8 billion (Sperry, Ruiz, & Najjar, 2014). Due to the Affordable Care Act's Readmission Reduction Program, Medicare now decreases payments to the hospital based on the hospital's readmission performance (Sperry et al., 2014). Heart failure is the most common cause of hospital readmissions with nearly 20% of Medicare patients being readmitted within 30 days with heart failure exacerbations (Sperry et al., 2014). The average 90-day readmission rate of heart failure patients is about 15-30%, and it is estimated that 90% of those readmissions are potentially preventable (McClintock, Mose, & Smith, 2014). These potentially preventable readmissions end up costing about $17 billion in healthcare costs (McClintock, Mose, & Smith, 2014). Even with the decrease in reimbursement and the poor patient outcomes, not much has been done to successfully reduce the readmission rate for heart failure patients. Early follow up visits at heart failure clinics

after a hospitalization for heart failure could be the foundation to reducing the readmission rate of these patients.

Description of the Clinical Problem

Heart failure is the number one cause for hospitalization and has the highest related healthcare costs in the United States (Feltner et al., 2014). A review of Medicare claims from 2007 to 2009 showed that 35% of all 30-day hospital readmissions were for heart failure (Feltner et al., 2014). Heart failure has many causes and comorbidities that can worsen the disease or make it more difficult to treat. A diagnosis of heart failure is made by performing an echocardiogram to estimate the EF, obtaining a chest x-ray, or by blood work to look at biomarkers such as the pro-BNP (Yancey et al., 2013). Once a patient has been diagnosed with heart failure, they must be educated on the lifestyle and medication changes to encourage compliance. Heart failure patients need to follow a low sodium (less than 2000 mg per day), exercise daily, and obtain daily weights (Shawnee Mission Health Heart & Vascular Center, 2015).

There are many different medications used to control heart failure and prevent exacerbations. Beta blockers, such as metoprolol and carvedilol, reduce the morbidity and mortality rate as well as the rate of sudden cardiac death in heart failure patients (Al-Gobari, El Khatib, Pillon, & Gueyffier, 2013). Diuretics are used to remove excess fluid and prevent fluid overload and can also be used in acute exacerbations at higher doses. There are many diuretics to choose from when deciding on a treatment plan with the most common one being furosemide or Lasix (Houston, Kalathiya, Kim, & Zakaria, 2015). Other diuretic classes include thiazide diuretics, with one example being hydrochlorothiazide; aldosterone antagonists, such as spironolactone, which is a

potassium sparing diuretic; and vasopressin antagonists, such as tolvaptan (Houston et al., 2015). Blood pressure control is done with angiotensin-converting enzyme (ACE) inhibitors such as Lisinopril and angiotensin II receptor blockers (ARB) such as losartan (Yancey et al., 2013).

Symptoms of an exacerbation include increased shortness of breath; orthopnea, which is shortness of breath while lying down; dry cough; edema of the legs, ankles, feet, or abdomen; unexplained or increased weakness or fatigue; wheezing; abdominal pain or loss of appetite; and/or sudden weight gain of two to three pounds in one day or greater than five pounds in one week (Shawnee Mission Health Heart & Vascular Center, 2015). Diet modifications, lifestyle changes, and medications are used to prevent acute exacerbations and hopefully prevent hospitalizations, re-admissions, and increase the lifespan of the patient.

The best way to reduce readmissions for heart failure is to prevent heart failure in the first place. Prevention of heart failure begins with reducing the risk factors that cause heart failure and may start with the primary care provider. The primary care provider must know the risk factors for heart failure and routinely screen patients with these risk factors. Patients without heart failure symptoms or an official heart failure diagnosis but currently have comorbidities that put them at risk for heart disease such as diabetes mellitus, obesity, coronary heart disease, hypertension, or chronic kidney disease are said to have stage A heart failure (Kovell et al., 2015). Stage A heart failure is defined as having a predisposition for heart failure but without any structural heart disease or heart failure symptoms (Kovell et al., 2015). There are four stages of heart failure, with stage A being the first. To prevent the progression of stage A heart failure to stages where

structural damage occurs or heart failure symptoms occur (stages B, C, or D), primary care providers need to work with patients on aggressive risk factor control. This includes sodium intake of less than 2000 mg per day, a BMI less than 30 kg/m2, low density lipoprotein less than 100 mg/dL or an even lower goal of less than 70 mg/dL, hemoglobin A1c of less than 7%, systolic blood pressure less than 140 mm Hg, and diastolic blood pressure less than 90 mm Hg (Kovell et al., 2015). This should be the goal for prevention in patients with comorbidities that put them at higher risk for developing heart failure.

Since prevention is not an option for the over five million people in the United States who currently have heart failure, other methods to reduce readmissions must be found. Education needs to be provided to help reduce the number of exacerbations and hospitalizations and needs to be introduced at the initial diagnosis and continued in the primary care setting. Patients need to be educated on the diet to follow, activity recommendations with any restrictions, symptoms to watch for and symptoms to report, and medications. Patients not only need to know what medications they are taking but why they are taking them. Heart failure clinics could provide the perfect setting for this education. During hospitalizations for heart failure, patients are provided education by the nurses. However, questions often arise once the patient has been discharged, and a follow up appointment within a week of discharge could provide the optimal setting for those questions to be answered. These clinics could also provide a platform for further education to ensure the patients understand the changes that must be made to obtain the best possible outcomes, as well as what will happen if these changes are not made.

Significance to Nursing

The establishment of heart failure clinics is one method used to try to reduce the readmission rate of heart failure patients and reduce the healthcare costs associated with these readmissions. Many studies have shown that the key to reducing readmissions is regular follow ups with medical professionals; whether it be home based, clinic based, telemonitoring, or primary care follow ups. Patients who follow up within 7 to 14 days after discharge from a hospital had significantly lower rates of readmissions within 30 days (Jackevicius, et al., 2015). Another important factor in reducing the readmission rate is patient centered education and strategies for reducing their readmissions. The "one size fits all" method currently used in many hospitals doesn't work for most patients. In order to help heart failure patients become more engaged in their health management and self-care, they need to have the education centered around their needs. The standard guidelines for education currently required should still be provided to patients; however, patients felt more empowered to overcome their illness and more well-prepared when their education was tailored around their needs (Ross, Ohlsson, Blomberg, & Gustafsson, 2015). Compliance with medications, diet restrictions, fluid restrictions, exercise and activity requirements, daily weight monitoring, and keeping their follow up appointments is key to reducing readmissions for heart failure. Patient engagement is the key to compliance. If patients aren't engaged in their self-care, they will be less likely to see the need for compliance and have poor outcomes (Ross et al., 2015).

Theoretical Framework

The Uncertainty in Illness Theory and Uncertainty in Illness Scales by Merle Mishel were developed to measure the perceived uncertainty felt by chronically and

acutely ill patients, family members of these patients, and caregivers of the patients. This theory and associated scales can be used to assess if the uncertainty in the illness is perceived as a threat or as an opportunity. If it is viewed as a threat, patients try to decrease the uncertainty by learning as much as they can about the illness. If the illness is viewed as an opportunity, it becomes a normal part of the everyday life and the patient tries to maintain the uncertainty (Alligood, 2014). Much of the literature reviewed based the patient interventions on techniques to lessen the uncertainty faced by patients with heart failure. This was done in many studies with patient centered education and strategies to increase patient engagement and interest in self-care. The more engaged and involved patients are with their own health, the better the outcomes may be.

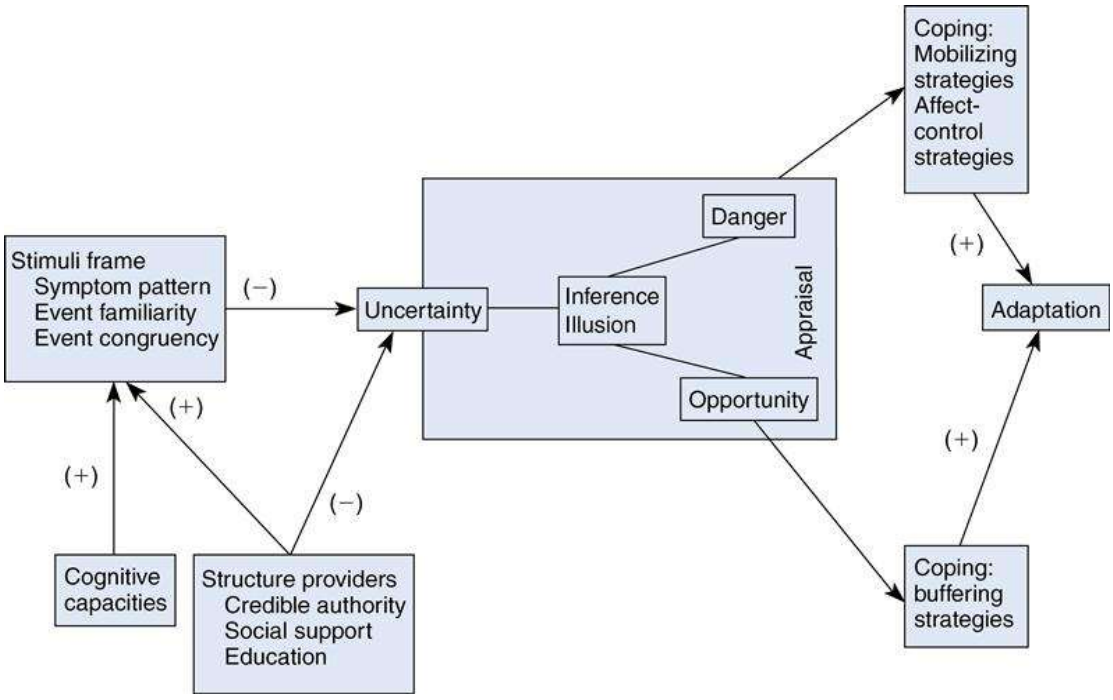

Figure 1. Mishel's Uncertainty in Illness Theoretical Framework (Alligood, 2014).

The figure above shows Mishel's Uncertainty in Illness Theoretical Framework. The Stimuli frame represents the disease or illness. This causes uncertainty.

Subsequently, the patient decides if they will view this as a positive (opportunity) or a negative (danger), and they adapt their lives based on the inference they make. The cognitive capacities and structure providers are interventions that aim to decrease uncertainty. These interventions to lessen the uncertainty felt by heart failure patients could be some of the interventions from the articles discussed in the literature review found in Chapter 2. The major interventions being patient-centered education and patient-centered care.

Purpose and Objectives

The purpose of this scholarly project was to determine if follow up visits at the AdventHealth Heart Failure Clinic in Shawnee Mission, Kansas were effective in reducing the 30-day readmission rate of heart failure patients. When patients are discharged from the hospital for a heart failure related admission, they are educated on the need to follow up with their primary care provider within seven to ten days after discharge. Occasionally these appointments are made prior to discharge; however, patient follow through is not guaranteed or monitored. The AdventHealth Heart Failure Clinic ensures that patients admitted for heart failure or with a heart failure related diagnosis are scheduled for an appointment within one week of discharge at the nurse practitioner led heart failure clinic. These appointments are monitored for follow through and patients are provided the individualized education needed. This study was designed to ascertain whether these appointments were effective in reducing the number of heart failure related readmissions and improving patient outcomes.

Project Questions

The project questions this study will attempt to answer are as follows:

1. Did patients who received care at a heart failure clinic have reduced 30-day readmission rates versus those who did not receive care at a heart failure clinic?
2. Did patient's EF, hemoglobin A1c, glomerular filtration rate (GFR), and body mass index (BMI) remain stable or improve as a result of heart failure clinic visits?

Definition of Key Terms

The definitions of key terms and variables include heart failure, primary care provider, cardiologist, nurse practitioner, heart failure clinic, compliance, ejection fraction (EF), pro-BNP, clinical practice guidelines, exacerbation, and readmission.

Primary Care Provider – a healthcare provider (such as a general practitioner, pediatrician, or nurse) who provides health care, with whom a patient has initial contact and by whom the patient may be referred to a specialist (Merriam-Webster dictionary, n.d.).

Cardiologist – a physician who specializes in the study of the heart (Yancy, et al., 2013).

Nurse Practitioner – advanced practiced registered nurse (APRN) "a registered nurse who through advanced training is qualified to assume some of the duties and responsibilities formerly assumed only by a physician" (Merriam-Webster dictionary, n.d.).

Heart Failure Clinic – a clinic that specializes in the treatment of patients with heart failure and management of their medications and other needs (Lu, et al., 2017).

Compliance – Adhering to a treatment plan (McClintock et al., 2014.).

Ejection Fraction (EF) – a measure of the percentage of blood ejected during systole in relation to the total end-diastolic volume (Srichai, Danias, & Lima, 2019).

Pro-BNP – (B-type natriuretic peptide) useful to support clinical judgment for the diagnosis or exclusion of heart failure (Yancey, et al., 2013).

Clinical Practice Guideline – "statements that include recommendations intended to optimize patient care" ("Clinical Practice Guideline Manual", 2017).

Exacerbation – a worsening of a disease or its symptoms (Merriam-Webster dictionary, n.d.).

Readmission – to be admitted again for the same reason (Sperry, et al., 2014).

Logic Model

The logic model for this scholarly project was created to show the relationships between the inputs, outputs, and outcomes as well as the assumptions and external factors involved in this study. This logic model, as shown in Figure 2, identifies the short-term, intermediate, and long-term outcomes for the project and acknowledges the assumptions and external factors influencing the project.

The inputs of the logic model for this study were this DNP student, nurse practitioners, physicians, the AdventHealth heart failure clinic, time, and the research performed. The output activities included consent for participation, review of charts to

determine the readmission rates before the opening of the heart failure clinic as well as review of the charts to determine the readmission rate after the heart failure clinic opened. Participation was needed from the heart failure clinic, nurse practitioners, and this DNP student.

The short-term outcomes of this study were an increased knowledge of the heart failure clinical practice guidelines and a better understanding of heart failure and what is needed to prevent readmissions. The intermediate outcomes of this study were an increase in the referrals to heart failure clinics and an increase in the medication and lifestyle compliance with heart failure patients. The long-term outcomes of this study were a decrease in heart failure related readmissions and a decrease in the morbidity and mortality of heart failure patients.

The assumptions were that consent would be given for the review of charts by the clinic, the charts reviewed would provide an accurate sampling reflecting the overall patient population, and the heart failure clinic would be found to reduce the readmission rate of heart failure patients. The external factors would be patient compliance with their medications and necessary lifestyle changes as well as their understanding of heart failure and how to control it and prevent future readmissions.

Project: Heart Failure Clinic Logic Model

Goal: To determine the effectiveness of heart failure clinics in reducing the readmission rates of heart failure patients.

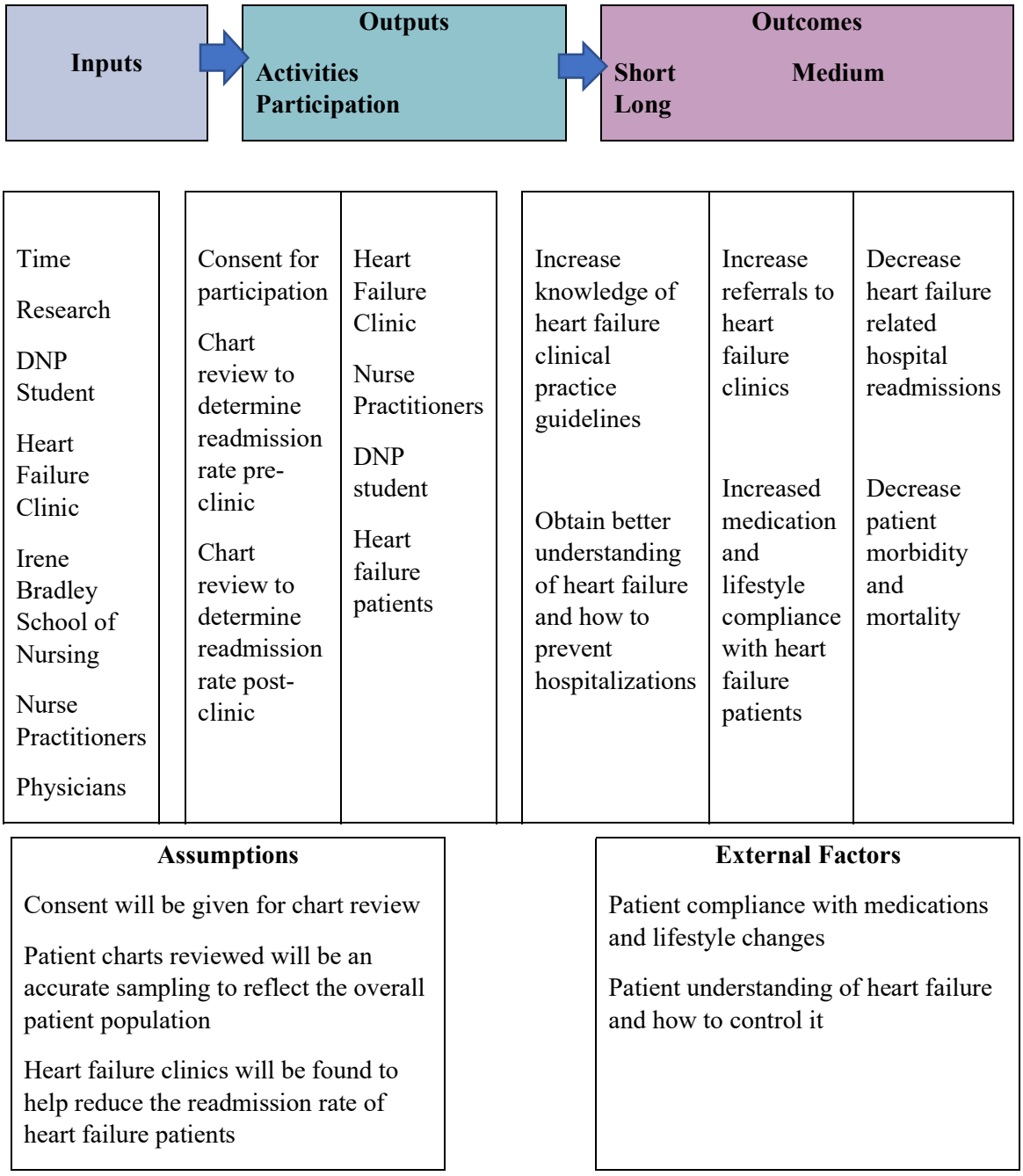

Figure 2. Logic Model – Effectiveness of Heart Failure Clinics on Reducing Hospital Readmissions

Summary

Heart failure is the main illness-related cause of hospitalization and over five million Americans have this diagnosis (McClintock et al., 2014). Education needs to start at the initial diagnosis and continue in primary care or heart failure clinic settings. Patients should have a discussion with their health care provider about what their education needs are and what they need to learn to be successful and compliant in maintaining their health. Finally, patients need to be educated on what is necessary to manage their health including monitoring their daily weights and blood pressures. Heart failure clinics provide an excellent location for patients to be given this individualized education. These interventions all combined should help decrease the readmission rates of heart failure patients and improve overall patient outcomes.

CHAPTER II

Review of the Literature

This review of the literature provides an overview of the research to date on what can be done to reduce the readmissions for heart failure patients and on the role of patient involvement in heart failure clinics as a major factor in reducing the rate of readmissions. It further reviews the interventions that have been associated with decreased morbidity, mortality, and hospitalizations in heart failure patients. The purpose of this literature review is to use the research to determine the underlying cause of readmissions in heart failure patients, find common themes in the literature on how to reduce readmissions, and determine if patient involvement in heart failure clinics is beneficial in reducing the readmission rate of heart failure patients.

A systematic search of the literature was performed using the electronic databases SUMMONS and ProQuest Nursing & Allied Health Source. The key terms used to gather data for this review of the literature were "Heart failure clinics" AND "Readmissions." Reducing the readmission rate in heart failure patients was the primary concept reviewed in this synthesis. The concepts of heart failure clinics, education, compliance, and other interventions to reduce the readmission rate of heart failure patients were reviewed to identify what is known concerning each concept and how they apply to the primary concept. Common themes were found and areas where more

research is needed were identified. Many of the research studies found on reducing the readmission rates in heart failure patients were quantitative in nature and used statistics to determine if the quality improvement initiative was beneficial in reducing the readmission rate in heart failure patients. The two qualitative studies found were conducted in Sweden however both provided excellent interventions that are applicable in the United States.

Definition of Heart Failure

Heart failure as defined by the 2013 ACCF/AHA Heart Failure Guidelines as "a complex clinical syndrome that results from any structural or functional impairment of ventricular filling or ejection of blood" (Yancy, et al., 2013, p. e246). The weakened heart muscle is also unable to effectively perfuse the tissues of the body (Centrella-Nigro et al., 2016). The common symptoms of heart failure are fluid retention, edema, dyspnea, and/or fatigue (Yancy, et al., 2013). Heart failure is characterized by an abnormal functioning heart that causes frequent hospital admissions, poor exercise tolerance, reduced quality of life, a shortened life expectancy, and an overall poor prognosis (Wijeysundera et al., 2012).

A thorough history and physical is needed to determine possible causes of heart failure or diseases that may accelerate or worsen existing heart failure (Yancy, et al., 2013). Laboratory orders for a complete blood count (CBC), urinalysis, serum electrolytes, blood urea nitrogen (BUN), serum creatinine, fasting lipid profile, hemoglobin A1c, and pro-B-type natriuretic peptide (pro-BNP) should be obtained (Yancy, et al., 2013). The diagnostic imaging needed for each patient to diagnose heart failure are a chest x-ray to determine

approximate heart size and if there is any pulmonary congestion present, and echocardiogram to determine EF, ventricular function, wall thickness, and valve function (Yancy, et al., 2013). While the diagnosis of heart failure is mainly a clinical diagnosis based on a thorough history and physical combined with patient symptoms, these diagnostic tests and labs help to classify the stage of heart failure (Yancy, et al., 2013).

Patient Centered Care

Patient centered care was a common theme in the studies on reducing the readmission rate of heart failure patients. Current practice in hospitals is to educate patients based on what is known regarding best practice for the prevention of heart failure exacerbations. The education is the same for every patient on every admission. Ross et al. (2015) explains how patient centered education was used to increase patient engagement as well as increase their involvement in the self-care practices necessary for maintaining health and preventing readmissions. The study asked the patient to write down their questions at the beginning of their diagnosis of heart failure so the education could be tailored to their individual perceived needs. By doing this, the patients stated they felt more empowered. If patients are not engaged in their self-care, they will be less likely to see the need for compliance and have poor outcomes (Ross et al., 2015). Although current best practices for patient education needs to be provided, patients were found to feel more empowered to overcome their illness and better prepared to fight the disease when their education was tailored to meet the patients' own perceived needs. (Ross et al., 2015).

A review of data collected by Sperry, Ruiz, and Najjar (2014) took patient cognition, finances, quality of life, and the presence of depression into consideration to

reduce the readmission rate of heart failure patients. They found that by screening for deficiencies in each of these areas, patient education can be more focused on the interventions specifically needed by the patient to improve health outcomes and decrease readmissions (Sperry et al., 2014). Increased hospital admissions correlate with a greater functional decline in the patient which can make them less capable of caring for themselves, less compliant with keeping follow up appointments and monitoring daily weights, and unable to comply with everything needed to manage their heart failure (Sperry et al., 2014). These patients would need assistance in purchasing their medications, planning and carrying out low budget meal ideas that follow the heart failure low sodium diet guidelines, and would need personalized education that fits their cognitive level. Without this added assistance, the patients are at a greater risk for readmission which then leads to further decline (Sperry et al., 2014).

The use of depression screens during the initial hospitalization and diagnosis of heart failure was one patient centered intervention used to decrease readmission rates in heart failure patients (Lea, 2014). The many symptoms of heart failure, increased weakness, and feelings of uncertainty caused by the diagnosis put the patient at a high risk for developing depression (Sperry et al., 2014). Depression is associated with increased mortality and poor overall outcomes. Readmission rates of those with major depression are four times higher than those with no depression or mild depression (Lea, 2014).

Early Follow-up Care

Early follow-up care after a hospitalization was found to be a key component in reducing the rate of readmissions in heart failure patients (McClintock et al., 2014).

When patients are discharged home from a hospitalization, they are to follow up with their primary care provider within 7-14 days with the emphasis being on seven days. The American College of Cardiology and the National Institute for Healthcare Improvement launched the quality improvement initiative, The Hospital to Home, in March 2011 (McClintock et al., 2014). This initiative introduced "See You in 7" which focused on early follow up care (McClintock et al., 2014). This early follow up care is to lower the risk for readmission (McClintock et al., 2014). The study done by Jackevicius et al. (2015) showed that among the 277 total patients studied, 23.3% of the control group patients were readmitted to the hospital within 90 days and only 7.6% of the clinic patients were readmitted to the hospital within 90 days. The most important finding was that early follow-up care was received by the heart failure patients, whether it be at a heart failure clinic or at a health care provider's office (Feltner et al., 2014). Andersson, Eriksson, and Nordgren (2013) did a qualitative study that combined the themes of patient centered care and regular follow ups with a health care professional. They found that personalizing the early follow up care to the individual patients caused better patient satisfaction as well as better patient outcomes. Stewart et al. (2012) found 67% of the home-based care patients compared to 69% of the clinic-based care patients had greater than or equal to one unplanned hospitalization. The main difference between home-based care and heart failure clinic-based care was home-based had lower associated costs. Both interventions had reduced readmission rates however, home-based interventions reduced health care costs by about one-third (Stewart et al., 2012).

Heart Failure Clinics and Readmission Rates

The establishment of heart failure clinics is one method used to try to reduce the readmission rate of heart failure patients. Pharmacist-managed medication titration clinics were looked at in the study by Martinez, Saef, Paszczuk, and Bhatt-Chugani (2013) to see if these clinics reduce the readmission rate. The outcome of this study was that patients were more likely to achieve optimal doses of their angiotensin-receptor blockers (ARBs), angiotensin-converting enzyme inhibitors (ACEIs), and beta blockers. However, there was no statistically significant correlation between participation in these clinics and decreased readmissions (Martinez, Saef, Paszczuk, & Bhatt-Chugani, 2013).

Patient involvement in heart failure clinics is thought to help reduce the rate of readmissions in heart failure patients, and many studies have been carried out on this assumption. Results, however, vary. One study done in Ontario, Canada, found involvement in heart failure clinics did seem to decrease the readmission rate, yet critics of the study believe there is a need to standardize the care provided in these clinics for the results to be valid (Wijeysundera et al., 2012). When looking at the research, it is impossible to compare the results confidently due to the difference in how the clinics are set up and the interventions they provide. The study by Jeckevicius et al. (2015) specifically looked at the involvement in heart failure clinics and reduction of readmissions and found that the clinics in their study were associated with a significant reduction in the 90-day readmission rate for heart failure patients. They also found follow up care at a heart failure clinic within 7-14 days of discharge from a hospital significantly reduced the 30-day readmission rate for heart failure patients (Jackevicius et al., 2015). This shows a positive relationship between early follow-up care and

involvement in a heart failure clinic in reducing the patient's risk for readmission. This study, however, was an observational study and may have had a biased selection of participants (Jackevicius et al., 2015).

The study by Kutzleb et al. (2015) looked at the effects on rehospitalization from the use of a nurse practitioner-led heart failure clinic that targeted the causes of rehospitalization in heart failure patients. These were listed as "lifestyle, medication and diet noncompliance, and lack of self-care disease management" (Kutzleb et al., 2015, p. 302). Not only did the 30-day readmission rate decrease, but there was found to be an increase in patient engagement, self-management, and compliance (Kutzleb et al., 2015). Lu et al. (2017) showed a significant increase in heart failure related medication compliance with involvement in specialized multidisciplinary heart failure clinics. These clinic appointments were with physician assistants, pharmacists, and case managers. At 90 days post discharge, clinic patients were 86% compliant with twice daily Beta blockers versus 66% compliant in the control groups. Patients in the clinic group also had a significantly higher rate of medication compliance with aldosterone antagonists, ACE inhibitors, angiotensin II receptor blockers, and digoxin (Lu et al., 2017).

Martinez et al. (2013) performed a study to determine if a pharmacist-managed heart failure medication titration clinic decreased the readmission rate of patients with heart failure. Current heart failure management guidelines recommend the use of angiotensin-receptor blockers (ARBs), angiotensin-converting enzyme inhibitors (ACEIs), and beta blockers in all heart failure patients (Martinez et al., 2013). These medications need to be titrated in patients to achieve the optimal dose or the highest tolerated dose for each patient. Many times, patients are initiated on the standard starting

dose and never titrated above that dose. With a pharmacist-managed clinic, the percentage of patients who reached the optimal dose of each medication was increased (Martinez et al., 2013). This study suggested very promising data; however, it was a small-scale trial that was not blind and was therefore not generalizable. The study was performed at Veterans Affairs (VA) medical centers and the majority of the participants were white males (Martinez et al., 2013).

Clinical Practice Guideline

The heart failure clinical practice guideline was taken from the University of Michigan Guidelines for Clinical Care. The guideline is titled "Heart Failure – Systolic Dysfunction" and was last updated in 2013. Minor revisions were made in December of 2016 (University of Michigan Health System, 2016). The following recommendations of the heart failure clinical practice guideline are to be used when treating heart failure patients to help achieve the best patient outcomes and prevent readmissions. While this is the standard of care, there may be instances where there are contraindications to the treatments. Contraindications will be documented in the electronic medical records by the physicians to maintain compliance. The recommendations are compiled into the bundle below. This bundle has three "steps." The recommendations are shown in these three "steps" Table 1 below. Following these three steps together provides a new standard for the treatment of all patients with heart failure.

Recommendations:

Table 1: Recommendations with Steps

Recommendations
Diagnosis of Heart Failure
1. All patients admitted for heart failure need to have an echocardiogram to determine their ejection fraction (EF) to diagnose the cause of their heart failure (systolic or diastolic dysfunction).
2. Upon admission, a serum BNP should be obtained to help determine if the dyspnea is heart failure related.
Pharmacological Therapy
3. Placed on an ACE inhibitor, ARB, or ARNI (unless contraindicated).
4. Placed on a Beta blocker (unless contraindicated).
5. Placed on a diuretic to maintain fluid balance (either with a loop diuretic or an aldosterone antagonist, occasionally both; unless contraindicated).
6. Digoxin for patients in Atrial Fibrillation who need rate control, or patients who remain symptomatic despite treatment with ACE inhibitors, diuretics, and beta blockers (unless contraindicated).
Device Therapy
7. Implantable defibrillators should be considered to prevent sudden cardiac death in patients with an EF of less than 35%, and bi-ventricular pacemakers considered for patients needing defibrillators who have symptomatic heart failure and a bundle branch block.

The practice change recommendations in the clinical practice guideline are not a "one size fits all" package that can be used for all heart failure patients. There are specific requirements that come with many of the recommendations as well as contraindications patients may have. While there are specific criteria that should be considered when trying to apply this bundle to individual heart failure patients, it provides an overall standard of how providers should manage and treat heart failure patients. Having a standard of care will help ensure that all patients are getting the best care possible. With the implementation of this CPG for the treatment and management of

heart failure, the life expectancy of heart failure patients should be increased to more than five years from the first onset of symptoms as well as decrease the number of hospitalizations each year for heart failure exacerbations (University of Michigan Health System, 2013).

Summary

The survey of the literature shows that patient centered care and education, as well as early follow up care after a hospitalization, are important in reducing the readmission rate of heart failure patients. Finding out what the patient wants to know regarding their diagnosis, medications, and self-care needs helps to improve patient engagement and empowerment. This, in turn, helps improve patient outcomes and decreases readmissions. Early follow up care creates a continuity of care after a hospitalization and allows early intervention if the patient needs help with medication titration, diuresis, electrolyte replacement, or further education to aid the patient in their ability to manage their disease.

Many studies have been completed on the need to reduce the readmissions of heart failure, but few studies have conclusively determined the interventions necessary to accomplish it. The studies have small sample sizes or produce results that are not statistically significant to support their hypotheses. More qualitative studies need to be completed to learn from patients with heart failure where the needs are in terms of education and follow up care. More studies need to be performed to determine how to improve patient compliance with diet and medications, as well as keeping their follow up appointments. The impact of this literature review on this scholarly project was to clarify the focus of this study which seeks to identify quality improvement measures needed to

help reduce the 30-day readmission rate. Initially, involvement in a heart failure clinic shortly after discharge from a hospital was the main idea researched to improve the readmission rate. However, after completing the research and review of literature, the intervention must be more complex than simply involvement in a heart failure clinic. Standardizing the interventions included in the heart failure clinics, as well as the multidisciplinary teams included in these clinics, is one of the first steps needed to make a difference in the readmission rates of heart failure patients.

Gaps in the literature are seen in the shortage of quality studies with large enough sample sizes to show a statistically significant correlation between the outcome and intervention. Many of the studies showed positive correlation between involvement in a heart failure clinic and decreased readmissions, however the sample sizes were small and therefore the data was not statistically significant enough to establish a relation between them.

CHAPTER III

Methods

This quantitative study was designed to determine if follow up appointments at heart failure clinics effectively decrease the 30-day hospital readmission rate for heart failure patients. A study was conducted to determine if follow up appointments at the AdventHealth heart failure clinic following hospitalizations was an effective way to reduce 30-day hospital readmissions. This chapter covers the methodology, selection and protection of subjects, instrumentation, data collection, and analysis of data for this study.

Project Design

This study's project design was a retrospective chart review of heart failure clinic patients at the AdventHealth Heart Failure Clinic. Data was collected on the 30-day readmission rate of heart failure patients prior to the opening of the clinic in the fall of 2015 and compared to the 30-day readmission rate of patients who followed up at the clinic after a hospitalization for heart failure. A total of 429 patient charts were reviewed to find 100 charts that met the inclusion criteria for the study. A list of total patients in the AdventHealth heart failure clinic was given to the researcher by AdventHealth. This list was randomized in a Microsoft Excel spreadsheet by using the randomization formula and assigning each patient financial identification number (FIN) a random number. These random numbers were then sorted in ascending order and the corresponding patient

charts were reviewed starting with the first FIN and reviewing charts in order. No patient identifying information was collected or used in this study.

Sample/Target Population

The target population for this study was patients at the AdventHealth Heart Failure Clinic in Shawnee Mission, Kansas. Only subjects who were a part of the AdventHealth System with an established diagnosis of heart failure and a previous hospitalization for heart failure were considered in this study. A retrospective chart review of randomly selected subjects was conducted for data collection. A goal of 100 charts were reviewed for the collection of data.

Inclusion and Exclusion Criteria

The inclusion criteria for this project was adult patients ages 18-100 that had been hospitalized for heart failure at AdventHealth Shawnee Mission, had a heart failure diagnosis since September 2014 or before, and had been a patient of the heart failure clinic for at least twelve months. Exclusion criteria for this project included: pediatric patients, subjects who did not follow up at the AdventHealth heart failure clinic following hospitalization for heart failure, subjects who had been diagnosed with heart failure after September 2014, subjects who did not follow up at the clinic for a minimum of 12 months, death, and/or dialysis.

Protection of Human Subjects

The Institutional Review Board (IRB) of Pittsburg State University and the Irene Ransom Bradley School of Nursing approved this study based on their requirements before data collection was initiated. This study met the requirements for exempted IRB status because there was no harm to human subjects. For the protection of the

participants, no identifiable demographic information was needed or used in this study. There were no risks identified for the human participants.

Procedures

Mutual Agreement with Cooperating Agency. Approval was obtained from AdventHealth Shawnee Mission to do a retrospective chart review on patients that were seen at the heart failure clinic following a hospitalization for heart failure. The chart audit looked at 30-day readmission rates for heart failure before the opening of the clinic and the 30-day readmission rates after follow-up visits at the clinic. Approval letters were obtained from Amber Delphia, Clinical Education Specialist and Student Liaison for AdventHealth Shawnee Mission and Andrea Stafos, former chair for the Council for Research and Evidence Based Practice and AdventHealth Shawnee Mission, both via email.

Timeline

Data collection began January 6, 2020 and was completed March 13, 2020. After data was collected, it was evaluated, and results were completed on March 20, 2020.

Resources Needed

The technology needed for this project included the technology needed to access charts of the subjects and evaluate the data. The human resources needed were the author and person completing the chart reviews.

Market analysis

This study hopefully showed the effectiveness of a heart failure clinic at reducing 30-day hospital readmissions as well as an improved or stable EF, GFR, hemoglobin A1c,

and BMI. If this study showed the heart failure clinic was successful at reducing 30-day readmissions for heart failure, it could significantly decrease overall healthcare costs associated with heart failure as well as decrease mortality rates. This study could also provide evidence to support the updating of current clinical practice for hospitalized heart failure patients to include follow up appointments at heart failure clinics as well as support the need for an increase in the number of heart failure clinics. The results of this study were presented to the head of the AdventHealth Heart Failure Clinic. These results hopefully supported the work that has been put into establishing the clinic.

Outcome Data

The outcome data collected was the number of 30-day hospital admissions for heart failure and patient compliance with follow up visits at the heart failure clinic. This data was used to determine if follow up visits at the heart failure clinic were effective at reducing the 30-day readmission rate for heart failure patients.

Tools/Instruments

Data collected was evaluated using the paired samples t-test. The means of each group was calculated and compared. The subject groups were divided up into pre and post groups. Group 1 (pre-clinic) was composed of data collected before the heart failure clinic was established and Group 2 (post-clinic) will be composed of data collected after establishing care at the heart failure clinic. (See Appendix 1)

Methods of Analysis

Data was analyzed using the paired samples t-test and the Wilcoxon Signed Ranks Test. The readmission rate means of the two sample groups were compared to determine if there was a statistical significance that correlated follow up visits at the heart failure

clinic to a decrease in 30-day hospital readmission rates. Data collected regarding hemoglobin A1c, EF, GFR, and BMI was also be compared to determine if the heart failure clinic had prevented any worsening of these values. Data regarding pro-BNP levels were also collected however, during the collection of this data it was found that no follow up pro-BNP levels were collected after the initial one drawn upon admission for a heart failure exacerbation. This data was excluded from the study due to the inconsistency of when and how often this lab was drawn.

Strengths and Weakness of the Study

The strengths of the study were using the same patients as the pre-clinic and post-clinic groups as well as the randomization of the charts that were reviewed. Weaknesses of the study included human error, the possibility the patients were diagnosed with heart failure at a different hospital prior to being diagnosed at AdventHealth, and the inconsistency of the frequency that data was collected as well as the type of data collected. To strengthen future studies like this, standards could be created for heart failure clinics for frequency of collection of pro-BNP, A1c, EF, GFR, and BMI.

CHAPTER IV

Results

Purpose

The purpose of this study was to determine if follow up visits at the AdventHealth heart failure clinic in Shawnee Mission, Kansas were effective in reducing the 30-day readmission rate of heart failure patients. A retrospective chart review was done to collect pre-clinic and post-clinic data on 100 patients which met the inclusion criteria of the study. The project questions evaluated include:

1. Will patients who received care at a heart failure clinic have reduced 30-day readmission rates versus those who did not receive care at a heart failure clinic?
2. Will patient's EF, hemoglobin A1c, GFR, and BMI remain stable or improve as a result of heart failure clinic visits?

Description of Population

The demographic characteristics of the population sampled include 58 males and 42 females (Table 2) with a current age range of 41 to 99 (Table 3). Patients followed up at the AdventHealth heart failure clinic from 1 to 5 years with 34 percent following up for 5 years (Table 4). Upon approval from the Pittsburg State University research committee, AdventHealth Shawnee Mission, and IRB; data were collected between January 1, 2020,

and March 13, 2020. Inclusion criteria was adult patients ages 18-100 that had been hospitalized for heart failure at AdventHealth Shawnee Mission, had a heart failure diagnosis since September 2014 or before, and had been a patient of the heart failure clinic for at least twelve months. Pediatric patients, patients who did not follow up at the AdventHealth heart failure clinic following hospitalization for heart failure, patients who had been diagnosed with heart failure after September 2014, patients who did not follow up at the clinic for a minimum of 12 months, patients who died prior to completing 12 months at the heart failure clinic, and patients on dialysis were not included in the data collected. The demographic data was divided into age of diagnosis, current age, years at the heart failure clinic, gender, number of 30-day hospital readmissions pre and post-clinic, GFR pre and post-clinic, EF pre and post-clinic, A1c pre and post-clinic, and BMI pre and post-clinic. This chapter will review the data tables and statistical findings of the data collected. Data analysis was performed using SPSS and the comparison between the pre and post measures were conducted using the paired samples t-test and the Wilcoxon Signed Ranks Test.

Table 2. Gender

	Frequency	Percent
Male	58	58.0
Female	42	42.0
Total	100	100.0

Table 3. Population Ages at Diagnosis and Current Age

Age Groups in Years	Age at diagnosis		Current Age	
	Freq.	Percent	Freq.	Percent
40 and less	2	2.0	0	0.0
41-45	1	1.0	2	2.0
46-50	3	3.0	0	0.0
51-55	5	5.0	2	2.0
56-60	13	13.0	5	5.0
61-65	13	13.0	7	7.0
66-70	13	13.0	10	10.0
71-75	15	15.0	13	13.0
76-80	14	14.0	14	14.0
81-85	11	11.0	15	15.0
86-90	9	9.0	12	12.0
91 and up	1	1.0	20	20.0

Table 4. Years at Clinic

	Frequency	Percent
1	4	4.0
2	18	18.0
3	17	17.0
4	27	27.0
5	34	34.0
Total	100	100.0

Analysis of Project Questions

Data were collected to determine if appointments at a heart failure clinic (specifically the AdventHealth heart failure clinic) following hospitalization for heart failure, reduces the 30-day readmission rate for heart failure. The data collected determined if the patient's EF, hemoglobin A1c, GFR, and BMI remained stable or improve as a result of those heart failure clinic visits or if they declined.

Research Question One. Did patients who received care at a heart failure clinic have reduced 30-day readmission rates versus those who did not receive care at a heart failure clinic? The number of 30-day hospital readmissions was counted from the year of diagnosis to the opening of the heart failure clinic and then from the opening of the heart failure clinic through March 13, 2020 and entered into the data collection tool for each subject included in the study (Table 5). Tables 6 and 7 show the statistics calculated.

Table 5. Number of 30-day Readmissions

Number of 30-day Readmissions

	Pre-clinic		Post-clinic	
	Frequency	Percent	Frequency	Percent
0	61	61.0	62	62.0
1	14	14.0	26	26.0
2	11	11.0	8	8.0
3	7	7.0	1	1.0
4	4	4.0		
5	1	1.0		
6			2	2.0
7			1	1.0
8	1	1.0		
15	1	1.0		

	Mean	Std. Deviation
Number of 30-day Readmissions Pre-clinic	1.01	2.002
Number of 30-day Readmissions Post-clinic	.64	1.219

Table 6. Paired Samples Statistics 30-day Readmissions

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Number of 30-day Readmissions Pre-clinic	1.01	100	2.002	0.200
	Number of 30-day Readmissions Post-clinic	0.64	100	1.219	0.122

Table 7. Paired Samples Test 30-day Readmissions

		Mean Difference	Std. Deviation	T	df	Sig. (2-tailed)
Pair 1	Number of 30-day Readmissions Pre-clinic - Number of 30-day Readmissions Post-clinic	0.370	1.790	2.067	99	0.041

There was a statistically significant difference between 30-day hospital readmissions when comparing pre-clinic readmissions and post-clinic readmissions ($t = 2.06$, $p = .041$). The difference found was 0.37 times less 30-day hospital readmissions post-clinic.

Research Question Two. Did the patient's EF, GFR, hemoglobin A1c, and BMI remain stable or improve as a result of heart failure clinic visits? The EF, GFR, A1c, and BMI were collected at diagnosis or as close to diagnosis as was available (pre-clinic) as well as the most recent numbers available (post-clinic). Data collected were entered into tables and are shown in Tables 8 to 19 with the statistics below. The statistics were calculated using the paired samples t-test and Wilcoxon statistics.

Table 8. Ejection Fraction (EF)

	EF Pre-clinic		EF Post-clinic	
Ranges of EF	Frequency	Percent	Frequency	Percent
10-15	3	3.0		
16-20	2	2.0	6	6.0
21-25	4	4.0	11	11.0
26-30	8	8.0	7	7.0
31-35	3	3.0	10	10.0
36-40	11	11.0	6	6.0
41-45	15	15.0	12	12.0
46-50	10	10.0	7	7.0
51-55	12	12.0	8	8.0
56-60	24	24.0	16	16.0
61-65	8	8.0	13	13.0
66 and higher			4	4.0

The EF values collected ranged from 10 to greater than 66. These values were changed into ranges and the frequency of each range was calculated. A Wilcoxon statistic was used to calculate if the EF post-clinic was equal to the EF pre-clinic values. These values are provided in Table 8 and Table 9. There was not a statistically significance difference between the pre- and post-clinic values for EF (Wilcoxon = -1.38, p = .181).

Table 9. EF Wilcoxon Statistics

	Ranks	N	Mean Rank	Sum of Ranks
EF Post Clinic - EF Pre Clinic	Negative Ranks	36[a]	44.22	1592.00
	Positive Ranks	37[b]	29.97	1109.00
	Ties	27[c]		
	Total	100		

a. EF Post Clinic < EF Pre Clinic
b. EF Post Clinic > EF Pre Clinic
c. EF Post Clinic = EF Pre Clinic

Table 10. Wilcoxon Test Statistics

	EF Post Clinic - EF Pre Clinic
Wilcoxon Statistic	-1.338[b]
Asymp. Sig. (2-tailed)	.181

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Table 11. GFR Pre and Post-clinic

	GFR Pre-clinic		GFR Post-clinic	
GFR Range	Frequency	Percent	Frequency	Percent
20 or less	3	3.0	10	10.0
21-30	5	5.0	8	8.0
31-40	5	5.0	17	17.0
41-50	16	16.0	19	19.0
51-60	22	22.0	12	12.0
61-70	13	13.0	10	10.0
71-80	7	7.0	10	10.0
81-90	13	13.0	9	9.0
91-100	8	8.0		
101-110	5	5.0	4	4.0
111 and greater	3	3.0		
Missing Data			1	1.0

Table 12. GFR Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	GFR Pre Clinic	64.4414	99	24.20361	2.43255
	GFR Post Clinic	51.8636	99	23.84784	2.39680

Table 13. Paired Samples Test

		Mean difference	Std. Deviation	t	df	Sig. (2-tailed)
Pair 1	GFR Pre Clinic - GFR Post Clinic	12.57778	25.69821	4.870	98	.000

There was a statistical difference that showed the GFR post-clinic was 12.58 less than the GFR pre-clinic (t = 4.87, p = .000). The mean pre-clinic GFR was 64.76 and the mean GFR post-clinic was 51.86.

Table 14. Hemoglobin A1c Pre- and Post-clinic

	A1c Pre-clinic		A1c Post-clinic	
A1c Range	Frequency	Percent	Frequency	Percent
4.0-4.9	5	5.0	7	7.0
5.0-5.9	38	38.0	38	38.0
6.0-6.9	22	22.0	26	26.0
7.0-7.9	14	14.0	7	7.0
8.0-8.9	3	3.0	8	8.0
9.0-9.9	5	5.0	3	3.0
10.0-10.9				
11.0-11.9				
12.0-12.9	2	2.0		
13.0 and greater	2	2.0	2	2.0
Missing Data	9	9.0	9	9.0

Table 15. Hemoglobin A1c Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	A1c Pre-clinic	6.6604	91	1.84233	.19313
	A1c Post-clinic	6.4516	91	1.66576	.17462

Table 16. Paired Samples Test

		Mean Difference	Std. Deviation	t	df	Sig. (2-tailed)
Pair 1	A1c Pre-clinic - A1c Post-clinic	.20879	1.83791	1.084	90	.281

There was no statistical difference between the A1c pre-clinic and A1c post-clinic. The mean pre-clinic A1c was 6.7 and the mean post-clinic A1c was 6.5.

Table 17. BMI Pre and Post-clinic

	BMI Pre-clinic		BMI Post-clinic	
BMI Range	Freq.	%	Freq	%
20 or less	2	2.0	6	6.0
21-25	21	21.0	36	36.0
26-30	30	30.0	23	23.0
31-35	20	20.0	14	14.0
36-40	17	17.0	13	13.0
41-45	6	6.0	5	5.0
46 and greater	4	4.0	2	2.0

Table 18. BMI Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	BMI Pre-clinic	31.4527	100	7.37664	.73766
	BMI Post-clinic	29.5221	100	7.53198	.75320

Table 19. BMI Paired Samples Test

		Mean Difference	Std. Deviation	t	df	Sig. (2-tailed)
Pair 1	BMI Pre-clinic - BMI Post-clinic	1.93060	4.99364	3.866	99	.000

The BMI post-clinic was 1.93060 less than the BMI pre-clinic. This difference was statistically significant (t = 3.866, p = .000). The mean pre-clinic BMI was 31.5 and the mean post-clinic BMI was 29.5.

CHAPTER V

Discussion

Purpose

The specific purpose of this project was to evaluate the efficiency of the AdventHealth heart failure clinic in Shawnee Mission, Kansas at reducing the 30-day hospital readmission rate of heart failure patients. It was also to determine if a patient's BMI, EF, GFR, and A1c would improve or remain stable with follow-up appointments at the same clinic or if they would worsen. Improvement or stability in a patient's EF, GFR, A1c, and BMI would indicate the patients' overall health is improving or stable. This study was to determine if heart failure clinics can be an effective way for hospitals to reduce the 30-day readmissions of heart failure patients and improve reimbursements from Medicare.

Relationship of Outcomes to Research

Two research questions were examined in this project. The first question was "does the AdventHealth heart failure clinic lower the 30-day readmission rate for heart failure patients who follow up there after hospitalizations for heart failure?" This question was answered by completing a retrospective chart review and comparing the number of 30-day readmissions before the opening of the AdventHealth heart failure clinic in September 2015 with the number of 30-day readmissions after following up at

the clinic. The study proved there was a statistically significant difference between 30-day hospital readmissions when comparing pre-clinic readmissions and post-clinic readmissions. The statistics showed post-clinic patients were readmitted within 30-days of a previous hospitalization for heart failure 0.37 times less than pre-clinic patients. The clinic was effective at reducing the 30-day readmission rate of heart failure patients.

The second question was "did patient's EF, GFR, hemoglobin A1c, and BMI remain stable or improve as a result of heart failure clinic visits?" This question had 4 different parts to it. First, did the EF improve or remain stable? The way an EF was reported in the charting was not consistent. At times it was reported as a single number and other times it was reported as a range. In order to be as consistent and concise as possible, the data was placed into 12 ranges. All ranges reported were placed in the range with the highest EF reported, for example a reported EF of 45-50 was placed in the 46-50 range for data reporting. This was done to provide consistency. Since the data being reported was in a range, a paired samples t-test was not able to be conducted and therefore a Wilcoxon Statistics test was run and showed that post-clinic EFs were the same or better than the pre-clinic EFs. Of the 100 charts reviewed, 37 of the post-clinic EFs were better than the pre-clinic EFs and 27 of the post-clinic EFs were the same as the pre-clinic EFs. This left 36 post-clinic EFs less than (or worse) pre-clinic EFs.

The second variable examined in the second question was did the GFR improve or remain stable? A paired samples t-test was ~~also~~ used to determine if the GFR was improved or stable. There was a statistical significance that showed the GFR post-clinic was 12.58 less than the GFR pre-clinic. The mean pre-clinic GFR was 64.76 and the mean GFR post-clinic was 51.86. These results showed a worsening of the GFR with

post-clinic samples. There are many different things that can lower a patient's GFR. This could be seen as the heart failure clinic not helping to overall improve the patient outcomes; however, it also could be explained as GFR and overall kidney function worsening over time as well as something commonly seen in patients with comorbidities.

The third variable examined in the second question was did the hemoglobin A1c improve or remain stable? A paired samples t-test was used to determine if the A1c was improved or stable. There was no statistical significance difference between the A1c pre-clinic and A1c post-clinic. The mean pre-clinic A1c was 6.7 and the mean post-clinic A1c was 6.5. These values were similar however, there was no statistical significance to show the clinic was effective at improving a patient's A1c. There were 9 charts reviewed pre-clinic and post-clinic that were missing data. This was not enough to skew the results.

The fourth variable examined in the second question was did the BMI improve or remain stable? A paired samples t-test was used to determine if the BMI was improved or stable. There was statistical significance difference to show the BMI post-clinic was 1.93 less than the BMI pre-clinic. The mean pre-clinic BMI was 31.5 and the mean post-clinic BMI was 29.5. The BMI was collected to determine if patients were able to maintain their weight or even lose weight due to following a low sodium diet.

Observations

General observations noted during the collection of data were the differences in reporting of EF from each physician reading the echocardiogram. Another difference noted was the frequency of obtaining a patient's BMI, A1c, EF, and GFR. The GFR was obtained at each visit, however the BMI was only obtained during hospitalizations. The

A1c and EF were only obtained when the physician determined it was necessary. There were 9 subjects who never had their A1c checked from the time of their diagnosis to current day.

Evaluation of Theoretical Framework

The findings support the Uncertainty in Illness Theory, specifically that patients will do their best to obtain as much information to minimize the uncertainty they have with a chronic illness. This was shown in that patients who followed up at the heart failure clinic had fewer 30-day readmissions for heart failure. These heart failure clinic appointments were used to closely monitor and follow up with patients to lessen the uncertainty faced by these patients with heart failure. Clinic appointments would help provide strategies to increase patient engagement and interest in self-care. The more engaged and involved patients are with their own health, the better the outcomes may be.

Evaluation of Logic Model

The logic model for this scholarly project (Figure 2) was created to show the relationships between the inputs, outputs, and outcomes as well as the assumptions and external factors involved in this study. Regarding the short-term outcomes of this study, this researcher was able to obtain an increased knowledge of the heart failure clinical practice guidelines and a better understanding of heart failure and what is needed to prevent readmissions. Regarding the intermediate outcomes of this study, it was found that the current number of patients seen in the clinic is over 1400. The clinical notes in the individual patient charts written by the nurse practitioner who provided the care showed an increase in the medication compliance with the heart failure clinic patients based on patients verbalizing their compliance when asked. Regarding the long-term

outcomes of this study, the 30-day readmissions for heart failure were statistically significantly decreased when compared to the 30-day readmissions before the clinic opened.

Limitations

There were some limitations found in the completion of this study. While there was no sampling bias due to the randomization of the population to be sampled, some patients could have been excluded due to their initial diagnosis of heart failure being done at a different hospital. Many patients fail to self-report much of their health history and a failure of their self-reporting a previous diagnosis could mean some patients were unintentionally excluded. Another limitation of the study was the inconsistency of how and when different physicians order diagnostic and laboratory tests. One last limitation was the inconsistency in how and when a patient's pro-BNP was ordered. The pro-BNP was one way used to determine if a patient was in an exacerbation of heart failure. During the data collection it was found that the BNP was only collected upon initial admission for a heart failure exacerbation. No follow up BNPs were collected to determine how the patient's fluid overload status was improving. Therefore, this variable was removed from the study.

Implications for Future Projects and Research

Heart failure clinics are an excellent way to help heart failure patients receive closer monitoring and reduce 30-day readmissions for heart failure. The efficiency of these clinics on their ability to reduce 30-day readmissions is something that has not been studied in detail. This study pointed out some limitations and improvements that could

be made in future studies and pointed out a need for further studies like this. This study also showed that heart failure clinics are beneficial in reducing the 30-day readmission rate for heart failure patients and should be utilized more frequently to maximize reimbursements from Medicare.

Future studies should be completed with larger sample sizes and include variables such as race, medication compliance, diet compliance, and qualitative data like overall understanding of heart failure and patient view on the benefits of the clinic. This would provide data on what heart failure clinics could add to how they treat patients to make them more successful at improving patients' lives in decreasing their morbidity and mortality.

Implications for Practice

The results of this study showed that the AdventHealth heart failure clinic was effective at reducing the 30-day readmission rate for heart failure patients. The implications for practice are that these clinics should be made more available and utilized with every heart failure patient after every hospital admission for heart failure. This study also pointed out areas of current practice that could be changed and streamlined so all physicians provided the same care for each patient each time, for example when providers order diagnostic tests and laboratory tests.

Conclusion

Many studies have been completed on the need to reduce the readmissions of heart failure, but few studies have determined interventions to accomplish it. Current studies have small sample sizes or produce results that are not statistically significant to support their hypotheses. This study had a large enough sample size that was able to

produce statistically significant data. The data collected showed the AdventHealth heart failure clinic was a successful way to reduce the 30-day readmission rate of heart failure patients.

Not only were the 30-day hospital readmissions reduced after the initiation of the AdventHealth heart failure clinic, the patients had a lower BMI and increased EF after following up and the heart failure clinic when comparted to their BMI and EF before the opening of the clinic. These variables demonstrated that the heart failure clinic helped to improve the patient outcomes. From 2007 to 2009, a review of Medicare claims showed that 35% of all 30-day hospital readmissions were for heart failure (Feltner et al., 2014). With the use of heart failure clinics like the AdventHealth heart failure clinic, 35% of 30-day readmissions could potentially be prevented and that would mean a potential savings of millions of dollars in healthcare expenses.

REFERENCES

Al-Gobari, M., Khatib, C., Pillon, F., & Gueyffier, F. (2013). Beta-blockers for the prevention of sudden cardiac death in heart failure patients: a meta-analysis of randomized controlled trials. *BMC Cardiovascular Disorders*, *13*, 52.

Alligood, M.R. (2014) Nursing theorists and their work. 8th edn. St. Louis, MO, United States: Elsevier Health Sciences.

Andersson, L., Erikson, H., & Nordgren, L. (2013). Differences between heart failure clinics and primary health care. *British Journal of Community Nursing*, *18*(6), 288–292. doi:10.12968/bjcn.2013.18.6.288

Bakal, J. A., McAlister, F. A., Liu, W., & Ezekowitz, J. A. (2014). Heart failure re-admission: Measuring the ever shortening gap between repeat heart failure hospitalizations. PLoS One, 9(9), e106494. doi:http://dx.doi.org/10.1371/journal.pone.0106494

Centrella-Nigro, A., Bognar, L., Burke, K., Faber, K., Flynn, V., LaForgia, M., & Wiklinski, B. (2016, May-June). The readmitted patient with heart failure. *MedSurg Nursing*, *25*(3), 163+.

Clinical Practice Guideline Manual. (2017). *Aafp.org*. Retrieved 30 November 2017, from http://www.aafp.org/patient-care/clinical-recommendations/cpg-manual.html

Feltner, C., Jones, C. D., Cené, C. W., Zheng, Z., Sueta, C. A., Coker-Schwimmer, E. L., & ... Jonas, D. E. (2014). Transitional care interventions to prevent readmissions for persons with heart failure: a systematic review and meta-analysis. *Annals Of Internal Medicine*, *160*(11), 774-784. doi:10.7326/M14-0083

Houston, B. A., Kalathiya, R. J., Kim, D. A., & Zakaria, S. (2015). Volume overload in heart failure: An evidence-based review of strategies for treatment and prevention. *Mayo Clinic Proceedings, 90*(9), 1247-1261.

How to help prevent heart disease - at any age. (2016, March). Retrieved November 28, 2017, from http://www.heart.org/HEARTORG/HealthyLiving/How-to-Help-Prevent-Heart-Disease---At-Any-Age_UCM_442925_Article.jsp#mainContent

Jackevicius, C. A., de Leon, N. K., Lu, L., Chang, D. S., Warner, A. L., & Mody, F. V. (2015). Impact of a Multidisciplinary Heart Failure Post-hospitalization Program on Heart Failure Readmission Rates. *Annals Of Pharmacotherapy*, *49*(11), 1189-1196. doi:10.1177/1060028015599637

Kim, S., & Han, H. (2013). Evidence-based strategies to reduce readmission in patients with heart failure. *The Journal for Nurse Practitioners*, *9*(4), 224-232.

Kovell, L. C., Juraschek, S. P., & Russell, S. D. (2015). Stage A heart failure is not adequately recognized in US adults: Analysis of the national health and nutrition examination surveys, 2007-2010. PLoS One, 10(7) doi:http://dx.doi.org/10.1371/journal. pone.0132228.

Kutzleb, J., Rigolosi, R., Fruhschien, A., Reilly, M., Shaftic, A. M., Duran, D., & Flynn, D. (2015). Nurse practitioner care model: Meeting the health care challenges with a collaborative team. Nursing Economics, 33(6), 297-305.

Lea, P. (2014). The Effect of Educational Intervention on Nurses' Attitudes and Beliefs about Depression in Heart Failure Patients. *Depression Research and Treatment*, *2014*, 257658. http://doi.org/10.1155/2014/257658

Lu, L., Jackevicius, C., de Leon, N., Warner, A., Chang, D., & Mody, F. (2017). Impact of a multidisciplinary heart failure postdischarge management clinic on medication adherence. *Clinical Therapeutics, 39*(6), 1200-1209.

Martinez, A. S., Saef, J., Paszczuk, A., & Bhatt-Chugani, H. (2013). Implementation of a pharmacist-managed heart failure medication titration clinic. *American Journal of Health-System Pharmacy*, *70*(12), 1070–1076. doi:10.2146/ajhp120267

McClintock, S., Mose, R., & Smith, L. F. (2014). Strategies for reducing the hospital readmission rates of heart failure patients. *The Journal for Nurse Practitioners, 10*(6), 430-433. doi:http://dx.doi.org/10.1016/j.nurpra.2014.04.005

Merriam-Webster Dictionary. (n.d). Retrieved from https://www.merriam-webster.com/medical/ ejection%20fraction

Ross, A., Ohlsson, U., Blomberg, K., & Gustafsson, M. (2015). Evaluation of an intervention to individualise patient education at a nurse-led heart failure clinic: A mixed-method study. *Journal of Clinical Nursing*, *24*(11-12), 1594–1602. doi:10.1111/jocn.12760

Shawnee Mission Health Heart & Vascular Center. (2015). *Congestive heart failure survival skills*. [Pamphlet]. N.P., n.p.

Sperry, B. W., Ruiz, G., & Najjar, S. S. (2015). Hospital readmission in heart failure, a novel analysis of a longstanding problem. *Heart Failure Reviews, 20*(3), 251-258. doi:http://dx.doi.org/10.1007/s10741-014-9459-2

Srichai, M., Danias, P, & Lima, J. (2019). Tests to evaluate left ventricular systolic function. *UpToDate.* Retrieved October 3, 2019, from https://www-uptodate-

com.library.pittstate.edu/contents/tests-to-evaluate-left-ventricular-systolic-function

Stewart, S., Carrington, M. J., Marwick, T. H., Davidson, P. M., Macdonald, P., Horowitz, J. D., … Scuffham, P. A. (2012). Impact of home versus clinic-based management of chronic heart failure. *Journal of the American College of Cardiology*, *60*(14), 1239–1248. doi:10.1016/j.jacc.2012.06.025

University of Michigan Health System. Heart failure - systolic dysfunction. (2013). Ann Arbor (MI): University of Michigan Health System. Retrieved June 30, 2017, from: http://www.med.umich.edu/1info/FHP/practiceguides/heart/HF.pdf

Wijeysundera, H. C., Trubiani, G., Abrahamyan, L., Mitsakakis, N., Witteman, W., Paulden, M., … Krahn, M. (2012). Specialized multi-disciplinary heart failure clinics in Ontario, Canada: An environmental scan. *BMC Health Services Research*, *12*(1), 236. doi:10.1186/1472-6963-12-236

What causes heart failure? Retrieved October 19, 2016, from http://www.heartfailurematters.org/ en_ GB/Understanding-heart-failure/What-causes-heart-failure.

What is heart failure? Retrieved October 19, 2016, from http://www.heartfailurematters.org/ en_ GB/Understanding-heart-failure/What-is-heart-failure.

Wijeysundera, H. C., Trubiani, G., Abrahamyan, L., Mitsakakis, N., Witteman, W., Paulden, M., … Krahn, M. (2012). Specialized multi-disciplinary heart failure clinics in Ontario, Canada: An environmental scan. *BMC Health Services Research*, *12*(1), 236. doi:10.1186/1472-6963-12-236.

Yancy, C. W., Jessup, M., Bozkurt, B., Butler, J., Casey, D. E., Drazner, M. H., … Wilkoff, B. L. (2013). 2013 ACCF/AHA guideline for the management of heart failure: A report of the American college of Cardiology foundation/American heart association task force on practice guidelines. *Circulation*, *128*(16), e240–e327.

APPENDIX

Appendix 1

Instrument for Data Collection

Patient Number (1-100)

Age at diagnosis

Current Age

Years at clinic

Gender (M/F)

Number of 30-Day Readmissions Pre-clinic

Number of 30-Day Readmissions Post-clinic

Ejection Fraction Pre-clinic

Ejection Fraction Post-clinic

GFR Pre-clinic

GFR Post-clinic

BMI Pre-clinic

BMI Post-clinic

Hemoglobin A1c Pre-clinic

Hemoglobin A1c Post-clinic

BNP Pre-clinic

BNP Post-clinic

Appendix 2

Pittsburg State University Application for Approval of Investigations Involving the Use of Human Subjects

Pittsburg State University
Application for Approval of Investigations
Involving the Use of Human Subjects

This application must be completed by the Investigator and sent to the Office of Graduate and Continuing Studies by the first Tuesday of the month during the fall and spring academic semesters to be considered for full review on the second Tuesday of the month.

Expedited and exempt reviews can be turned in any time. For questions about the review process contact Brian Peery in Russ Hall, #112, Ext. 4175.

1. Investigator(s) Name(s): Sarah Stoughton

2. Department: BSN-DNP

3. Local Address: 21190 E. 125 Rd. Fulton, KS 66738

4. Phone: 913-424-5087

5. E-mail Address: smstoughton@gmail.com

6. Project Title: Effectiveness of Heart Failure Clinics on Reducing Hospital Readmissions

7. Expected Completion Date: 03/31/2020

8. Expected Starting Date 11/01/2019

9. Is this project (check all that apply): Use review criteria in Form CR-1 to determine which category of review applies.

☐ Application for Full Review ☐ Protocol Change ☐ Thesis/Special Investigation
☐ Being submitted for external support ☐ Continued Review ☐ Application for Expedited Review
☐ Being conducted in a foreign country ☐ Faculty Research ☑ Application for Exempt Review
☐ Publishable research ☐ A Class Project

10. If notification of human subject approval is required give date required: _____

Name of agency: _____

11. If you are a student, complete the following:

Faculty Sponsor: Dr. Jennifer Harris

Department: Irene Ransom Bradley School of Nursing

Phone: 620-235-4447

**** If submitted externally, a complete copy of the proposal must be submitted to the IRB.****

Appendix 3

Approval from AdventHealth Shawnee Mission

From: Delphia, Amber L <AMBER.DELPHIA@AdventHealth.com>
Sent: Monday, December 30, 2019 4:08 PM
To: Stoughton, Sarah <SARAH.STOUGHTON@AdventHealth.com>; Stark, Susan <SUSAN.STARK@AdventHealth.com>
Cc: Stafos, Andrea <ANDREA.STAFOS@AdventHealth.com>; Frost, Kristen <KRISTEN.FROST@AdventHealth.com>
Subject: Student Paperwork Complete

Sarah,

Good afternoon! I have received all of your student required paperwork, so you are cleared as a student to begin your project. Please assure that you are cleared through the CREB committee before starting. I will also need dates that you will begin your project and an end date for student computer access. Please send it to me and I will request.

Thank you,

Amber Delphia, MSN, RN

AdventHealth Shawnee Mission
Clinical Education Specialist | Professional Development
913-676-2102
amber.delphia@AdventHealth.com
Office Hours: Monday-Wednesday

Appendix 3

From: Stafos, Andrea <ANDREA.STAFOS@AdventHealth.com>
Sent: Friday, March 20, 2020 10:00:12 AM
To: Stoughton, Sarah <SARAH.STOUGHTON@AdventHealth.com>
Cc: Frost, Kristen <KRISTEN.FROST@AdventHealth.com>; Clark, Pamela (Home Health) <PAMELA.CLARK@AdventHealth.com>
Subject: RE: Approval letter for DNP scholarly project over heart failure clinic

Sarah Stoughton,

Thank you for attending the Council for Research and Evidence-Based Practice on December 4, 2019 to share your proposal for your Heart Failure Readmission DNP project. You were given permission at that time to proceed with your project and we look forward to hearing the outcomes.

Regards,
Andrea Stafos
Former Chair, Council for Research and Evidence-Based Practice

Andrea Stafos, DNP, APRN, BC-ADM
AdventHealth Shawnee Mission
Manager and Diabetes Clinical Specialist | Nutrition and Diabetes Education Center
O: 913-676-2573 F: 913-789-3903 P: 816-771-0047
andrea.stafos@AdventHealth.com