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Telehealth: Improving Quality of Life in Veterans with Congestive Heart Failure

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Walden University

College of Health Sciences

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Marcia Callender

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2016

Abstract

Telehealth: Improving Quality of Life in Veterans with Congestive Heart Failure

by

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MS, George Mason University, 2000

BSN, Salem State College, 1984

Project Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Nursing Practice

Walden University

August 2016

Abstract

Congestive heart failure (CHF) affects an estimated 5.1 million Americans over the age of 20. The purpose of this quantitative study was to determine whether there is a difference in the Quality of Life (QOL) for Congestive heart failure patients receiving care through telehealth compared to patients receiving face-to-face care (usual care). Guiding this project was the Self-Care Model of Chronic Illness because the primary outcome of the self-care model is illness stability, well-being, and quality of life. Seventy-seven veterans with Heart Failure (HF) from the Washington D.C. Veterans Affairs Medical Center (VAMC) participated in the project. Forty reported they were receiving telehealth and 37 reported that they were receiving face-to-face care. The average participant age was 67 years with a range of 44 to 93 years. Seventy-five of the participants were male and 2 were female. Sixty-four participants were Black and 12 were White. The Minnesota Living with Heart Failure (MLHF) questionnaire average score for the telehealth group was 49.4 ($SD = 28.7$) and the face-to-face care group was 37 ($SD = 27.9$). With equal variance assumed, there was no significant difference between MLHF scores in the telehealth group compared to the usual care group ($t = -1.91, p > .05$). Thus, opportunities for using telehealth without negatively affecting patient outcomes, such as QOL, are plausible. It can be concluded that providing services using home telehealth for HF patients may produce outcomes that are equivalent to those receiving traditional services.

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Section 1: Overview of Evidence-Based Project

Introduction and Background

Congestive Heart Failure (CHF) affects an estimated 5.1 million Americans over the age 20 (American Heart Association (AHA), 2014). According to Go et al. (2014), the AHA estimated that more than 825,000 new CHF cases emerge each year; AHA projects that by 2030, over 8 million people, ages 18 or older, will be diagnosed with CHF. According to Go et al. (2014), at age 40, the lifetime risk of developing CHF for men and women is one in five (20%); however, by age 65, the frequency of CHF approaches 1 in 100 individuals. Despite the shorter life expectancy at age 80, the remaining lifetime risk of developing new diagnosis CHF remains at 20% for men and women. Thus, the risk of developing CHF is great.

Congestive heart failure (CHF) is a complex, debilitating disease that impairs the ability of heart ventricles to fill with and eject blood (U.S. Department of Health and Human Services [DHHS], 2014). This results in the heart's inability to meet the body's needs for blood and oxygen, which may lead to damage of the myocardium (heart muscle). Patients diagnosed with CHF often complain of *dyspnea* (shortness of breath) and *fatigue* (tiredness) at rest or with routine physical effort, such as climbing the stairs. Additional symptoms of CHF include swelling of patients' lower and upper extremities—ankles, feet, legs, and abdomen (DHHS, 2014). The symptoms are caused by fluid buildup due to CHF which results in weight gain, frequent urination, and a cough that worsens at night when lying down (DHHS, 2014).

Common causes of CHF include coronary heart disease, hypertension, and diabetes. The AHA (2014) reported 75% of patients with CHF have a precursor of hypertension—a condition in which blood vessels have persistent high pressure. The higher the pressure in the blood vessels, the harder the heart has to work to pump blood. Untreated hypertension may lead to a heart attack, an enlarged heart, or heart failure (World Health Organization [WHO], 2013). Diabetes—which causes patients' blood glucose to be too high—may damage or weaken the heart and blood vessels if untreated, thereby leading to heart failure. CHF may also lead to other medical abnormalities, such as cardiomyopathy, rheumatic heart disease, heart valve disease, and arrhythmias (DHHS, 2014).

According to Go et al. (2014, p.e244), CHF is a challenge to the health care system. Between 2009 and 2010, AHA estimated that, nationwide, patients with CHF had 1.8 million physician office visits and 668,000 emergency room visits. According to a community-based study of over 1,077 CHF patients in Olmsted County, Minnesota, roughly four out of five (83%) patients were hospitalized at least once with CHF. Also, roughly two out of five (43%) were hospitalized at least four times, which illustrates the effect of CHF on morbidity.

The AHA (2013) projected a 120% cost increase in CHF care in 2030. According to Go et al., 2013, the researchers projected that, between 2014 and 2030, the total direct medical cost of cardiovascular disease (CVD) would rise from \$320 billion to \$818 billion. Researchers also projected that indirect costs for all heart disease would increase

by 52%, from \$203 billion to \$308 billion. Because it consumes many resources, CHF exerts a substantial burden on the health care system.

Because of the increase CHF patient care costs, medical professionals focused on preventing the disease from progressing, increasing the patient life expectancy, and improving the patient's QOL (American Heart Association, 2013). The treatment of CHF patients by medical professionals consists of medication, fluid management, and lifestyle changes such as smoking cessation, weight loss, increasing physical activity, dieting and monitoring the symptoms of the disease. Patient commitment and compliance to treatment is imperative to prevent complications (Go et al., 2013). Patients who fail to comply with the treatment, experience frequent hospitalizations and emergency room visits (Go et al., 2013).

Despite advances in pharmacology and mechanical therapies, the prevalence of CHF affects the ability of patients to maintain their QOL. Hoekstra et al. (2013) stated, CHF impacts QOL in an adverse manner. The WHO QOL Group (1998) defined the QOL as a broad, multidimensional concept that includes subject evaluation of positive and negative aspects of life. Health is one of the important domains of overall QOL in conjunction with other key features such as culture, values, and spirituality (The WHO QOL Group, 1998). Therefore, it can be hypothesized that improving monitoring procedures, providing appropriate treatment based on evidenced-based clinical guidelines, educating patients and helping them pursue their plan of care could lead to improve in the patients' QOL.

Because of the potential for promoting patient safety and enhancing patient-centered care by using a web-based, self-care training model for patients, information technology (IT) constitutes a plausible approach to enhancing the complex monitoring procedures of CHF patients (Suter, Suter, & Johnson, 2011). This model, also called *telehealth*, is a means of communicating medical information from different sites electronically to improve a patient's health status (Suter, Suter, & Johnson, 2011).

A national telehealth survey (Fazzi Associates, 2009) indicated that 90% of home health agencies reported that telehealth improved the overall quality of services provided to patients. Additional survey findings showed that 75% of agencies reported a reduction in unplanned hospitalizations and emergency room visits, thereby reducing health care resources used by the organization (Fazzi Associates, 2009). Consequently, over 40% of agencies reported that home health agencies using telehealth reduced operating cost and the need for home care visits when a patient's condition appeared stable (Suter et al., 2011, p,87).

In 2003, the Veteran's Administration (VA) introduced a program called Care Coordination and Home Telehealth (CCHT). This program systematically employed health informatics, home telehealth, and disease management technologies to help empower veterans with chronic illnesses and remain independent at home. An analysis of 17,025 CCHT participants indicated a 25% reduction in the number of patient care bed-days, 19% reduction in number of hospital admissions, and mean satisfaction score rating of 86% after enrollment into the program (Darkins et al., 2008).

Care facilitated by telehealth medical professionals enabled early detection of key clinical symptoms that indicated CHF-related decompensation, such as dyspnea or weight gain. Early detection of these symptoms afforded advanced implementation of medication and dietary and lifestyle adjustments while reducing patient care costs (Wakefield et al., 2009). Despite the mixed results, De la Torre-Diez et al. (2015) asserted that CHF requires complex management to prevent decompensation and progression of the disease.

If patients are noncompliant with the treatment plan, the risk of hospitalization increases and thus an increase in the use of health care resources. Some risk factors that contribute to patients' noncompliance are poor diet and medication management, inability to recognize the early signs and symptoms of worsening congestive heart failure, and failure to contact the provider promptly (Goldberg, 2005). Thus, providing services that reduce these risks factors are essential to limiting hospital admission among this population.

According to Dansky, Vasey, and Bowles (2008), telehealth is an innovative method used by healthcare providers to improve the management of patients with chronic illness by supplementing the existing network of care while promoting independent living and reducing adverse health events. The advances in telecommunication and information technologies have played a role in transforming the health care system. As a result, evidence-based standards of care need to continue to develop to support telemedicine to rural and remote communities (Nesbitt, 2012).

The Institute of Medicine (2012) further supports that telehealth is important in reducing cost, increasing quality and improving access to care. "We are well past

the point where we need to prove how telehealth applications work. The focus now needs to be on how we can do a better job of harnessing the technology to improve care and to do that as effectively and efficiently as possible, to ensure that telehealth is embedded in the fabric of health care for rural populations” (p.23).

Problem Statement

CHF is a complex, chronic disease that affects an estimated 5.1 million Americans over age 20 (AHA, 2014). Some health care professionals use telehealth as a resource to care for them (Dansky et al., 2009; Suter et al., 2011). Despite using telehealth to enhance CHF patients’ QOL, skepticism about telehealth’s benefits exist among some healthcare professionals treating CHF patients (Taylor, Coates, Brewster, Mountain, Wessels, & Hawley, 2015). The general problem is some healthcare professionals have difficulty controlling escalating health care costs and developing and implementing innovative techniques to ensure safe, cost-effective quality care for CHF patients.

Problem Statement

The purpose of the project was to compare the difference in QOL between heart failure patients receiving care through telehealth and those receiving face-to-face care alone.

Purpose Statement

The purpose of the project was to compare the difference in QOL between heart failure patients receiving care through telehealth and those receiving face-to-face care alone.

Objectives

The objectives of the project were:

1. Evaluate the difference in the QOL for CHF patients receiving care through telehealth compared to patients receiving face-to-face care.
2. Create recommendations for the use of telehealth to improve QOL among patients with CHF.

Project Question

Is there a difference in QOL scores for heart failure patients receiving telehealth as compared to patients receiving face-to-face (usual) care?

Significance of Practice

Congestive heart failure patients have a diminished QOL because of diet restrictions, the side effects associated with multiple medications, and other symptoms such as shortness of breath. The result is limited socialization. Telehealth has been shown to increase patient adherence to care, improve access to care, increase provider's capability to network with patients, and ensure that patients remain in a safe environment (Farberow, Hatton, Leenknecht, Goldberg, Hornung, & Reyes, 2008).

Telehealth is a method used to monitor, educate, and counsel patients. It collects physiological information, such as weight and vital signs. It allows patients to have access to their personal data, resulting improved self-management, reduced home visits, and reduced home care costs (Paget et al., 2010). The goal of telehealth is to empower patients by preventing recurrent unplanned admissions, thus allowing them to remain independent while improving their QOL (Goldberg, 2015). In contrast, face-to-face care

may limit the patients' ability to monitoring physical information daily. There may be barriers to obtaining care face to face. For example, patients are required to schedule an appointment in the CHF clinic and to travel to the health-care facility, which may be stressful for some patients.

Successful home telehealth monitoring depends on the patient's compliance with the treatment. For instance, the patient must know when to contact the clinician and have a general understanding of the signs and symptoms *not* measured by the telehealth device (i.e., edema, shortness of breath [SOB]). As clinicians, patients, insurers, and society become more dependent on these systems, standards must be clear and concise to ensure patient safety is maintained. Telehealth provides CHF patients and their providers with real-time physiological feedback that can improve health. It also empowers patients to manage their physical conditions, which leads to better QOL (Farberow et al., 2008).

Evidence-Based Significance of the Project

The literature was mixed on the evidence that telehealth improves the QOL of congestive heart failure patients. According to Gorst, Armitage, Brownsell, and Hawley (2014), telehealth is an all-inclusive concept that includes the transfer and exchange of health information through electronic devices. It enable patients to manage their healthcare better by having physical control, such as, monitoring daily weight It builds patient self-knowledge and it gives them a better understanding of their disease (Gorst et al., 2014). Additionally, telehealth facilitates a quick response to any health problem.

There are barriers to telehealth, such as technical issues, patient's belief that it is not necessary, and patient's preference for face-to-face care. Also, patients may have

difficulty understanding how to use the technology, especially the elderly. Finally, patients who receive the face-to-face contact with the health care provider are free and unrestrained to discuss their concerns with their doctor (Gorst et al., 2014).

Implications for Social Change in Practice

The integration of advanced technologies has profound implications for the development of health care services (Rheuban, 2006). It helps providers focus on disease prevention, wellness, chronic disease management, quality, and patient safety. It offers organizations the chance to increase access to care and to reduce specialty shortages (Rheuban, 2006).

The implications for social change are dependent on the part of health care professionals in telehealth and their ability to improve the patient's QOL. By bolstering self-efficacy in patients, these professionals can assist those with chronic diseases who have experienced failures with disease management. Health care professionals can help patients set measurable, meaningful, and achievable goals by providing positive reinforcement and affirmation, which, in turn, promote empowerment (Rheuban, 2006).

Health reform legislation, such as the Patient Protection and Affordable Care Act (PPACA) supports health care professionals using telehealth to enhance patients' QOL, clinical management, and health (DHHS, 2010). The implementation of the PPACA offered health care professionals a framework in which to advance innovative patient care with enhanced patient-centered benefits and quality measures. (DHHS, 2010).

Definition of Terms

The following terms include telemonitoring, telemedicine, New York Heart Failure Association (NYHF) classification, and ejection fraction.

Telemonitoring. Telemonitoring is a communications technology used to monitor and transmit items related to patient health status between geographically separated individuals (Maric, Ignaszewski, & Lear, 2009).

Telemedicine. Telemedicine is an exchange of medical information from one site to another through electronic communication for the purpose of improving the status of patient's health as defined by the American Telemedicine Association. (Suter, Suter, and Johnson, 2011).

New York Heart Failure (NYHF) Association Classification. The NYHF classification is the functional capacity as an estimate of what the patient's heart will allow the individual to do (AHA, 1994).

Left Ventricular Ejection Fraction (LVEF). Left ventricular ejection fraction is the percentage of blood that is ejected out of the heart with each beat. At rest, the normal ejection fraction is between 55% and 70%. (AHA, 2014).

Heart Failure with Reduced Ejection Fraction. Heart failure with reduced ejection fraction is the clinical diagnosis of heart failure and $EF \leq 40\%$ (Yancy et al., 2013).

Heart Failure with Preserved Ejection Fraction. Heart failure with preserved Ejection fraction is the clinical signs and symptoms of heart failure (Yancy et al., 2013).

Usual Care Group. Usual care group are patients used as a control arm while

receiving uniformed, albeit individualized patient care in an exploratory clinical research trial setting (Freedland, Mohr, Davidson, & Schwartz, 2011; Thompson & Schoenfeld, 2007).

Assumptions

The assumptions, which are based on the patient's perception of their QOL, are as follows: (a) The intervention of CCHT will improve patient self-care management strategies in HF. This has the potential to improve QOL as measured by the Minnesota Living with Heart Failure Questionnaire (MLHFQ). (b) The usual care group (i.e., control group) will not receive the level of support experienced by the CCHT group and therefore may have lower perceived QOL as measured by the MLHFQ.

Limitations

There were four limitations affecting the scope of the project. First, only outpatient CHF patients receiving care at the VA medical center were enrolled in this project. Second, although efforts to solicit female veterans in this project were made, the predominant sample target population was male veterans. Third, because the problem was explored at only two clinics, selection bias was a limitation of the study. Fourth, based on the sample size calculation, the results of the project may not produce the statistical significance required to achieve the project goal or objectives.

Summary

Because of an aging population, the implications for social change has abounded with a growing global CHF epidemic (Suter et al., 2011). To address this growing epidemic, health care professionals explored various innovative initiatives to address

chronic maladies such as HF. Exploring innovative initiatives on chronic health maladies included health care professionals using telehealth to improve patient-centered disease management, health outcomes, and QOL (Suter et al., 2011).

Section 2: Review of the Literature and Theoretical Framework

Introduction

The literature review conducted to utilize articles organized around the central focus of the concept, quality of life. The goal ensured each source contributed to the evidenced-based nursing practice (Terry 2012). The literature search was conducted using MEDLINE, CINAHL, Google Scholar, Cochrane Collection and PubMed. The search consisted of the concepts telehealth, CHF and QOL, with a date range from 2003 to 2013, producing a total of 91 articles. The search was then refined using the following keywords: telemedicine, telehealth, CHF and improving the QOL.

The literature search included studies that comprise of adult CHF patients with a primary diagnosis of heart failure; a left ventricular ejection fraction < 40% and >40%, and New York Heart Association (NYHA) Class II-IV. Articles excluded studies that focused on pediatric CHF, cognitive impairment, pregnancy, renal dialysis, the terminally ill, heart transplant, and valvular heart disease patients. The search was limited to 13 articles. The preferred research articles were arranged into three categories: (a) home telemonitoring, (b) self-care and (c) the MLHFQ and QOL.

Home Telemonitoring

Giordano, Zanelli & Scalvini (2011) reported that few studies evaluated the effects of home-based telemonitoring on patient's QOL. However, they agreed that a

multidisciplinary approach is often needed to manage patients with complex diseases, such as heart failure. The complexity of CHF challenges patients emotionally, psychologically and physically. Subsequently, compliance is imperative in managing and maintaining the disease. Bennett, Hays, Embree & Arnould (2000) stated that CHF patients experience suffering and reduced QOL due to symptoms such as dyspnea, fatigue, or decreased functional ability. To manage these symptoms and improve QOL effectively, many health organizations are implementing home-telemonitoring.

The literature demonstrated that home telemonitoring is beneficial to CHF patients because it helps patients manage their disease (Antonicelli et al., 2008; Giordano et al., 2011; Mohammadzadeh et al., 2013). However, patients' compliance with the treatment plan was critical. Bennett et al. (2000) indicated that patients who were noncompliant with medication, and with sodium and other dietary restrictions, were at increased risk of hospitalization.

Antonicelli et al. (2008) used telemonitoring to study the effects of home telemonitoring in elderly patients with CHF, mortality and rate of hospitalization, compliance with treatment, quality of life, and costs of CHF management, by comparing the group receiving usual care. In this study, twenty-eight patients who received home telemonitoring had a (26) 91% compliance rate with treatment compared to (10) 46% compliance for twenty-nine non-telemonitoring patients who were statistically significant ($p < 0.03$). Also, the patients' perception of their health resulted in a significant improvement ($p = 0.046$) in their QOL compared to control group (Antonicelli et al., 2008, p.303).

Antonicelli et al. (2008) and Giordano et al. (2011) emphasized the importance of educating patients and caregivers about the disease, telemonitoring technology, treatment plan, and medication management to improve compliance with the treatment plan. Detecting early signs and symptoms of decompensation resulted in immediate changes in the administration of treatment. Hence, telehealth led to patients' better tolerance of medication and greater compliance with the therapeutic regimen (Antonicelli et al. 2008).

Self-Care

It is essential that CHF patients feel confident about managing their disease such as taking medications as prescribed and participating in physical activity (Lockhart, Foreman, Mase & Heisler, 2014). In Riegel's study, self-care was defined as a naturalistic decision-making process involving the choice of behaviors that maintain physiologic stability (maintenance) and the response to symptoms when they occur (management) (Riegel, Carlson, Moser, Sebern, Hicks, & Roland, 2004).

The self-care model derived from behavioral science and supported links between cognition about self-efficacy, health behaviors, and health status (Dansky et al., 2008). Dansky and colleagues used the model as a framework for interpreting the relationship between telehealth and self-care management because it is imperative that patients obtain the ability to maintain and manage their CHF, which is the key to self-care management.

They hypothesized telehealth would facilitate self-confidence that is a critical antecedent of effective self-care. For example, Dansky et al. (2008) discovered that patients who received home care enhanced by telehealth technology reported greater confidence regarding the management of HF than patients who did not receive telehealth.

Patients using the telemonitoring devices, even without online support and information, led to an increase in their confidence in managing CHF (Dansky et al., 2008).

Telehealth is a significant innovation; however, patients must feel confident and comfortable using the technology. Self-efficacy is defined as the confidence one has in performing a particular routine according to Ciere, Cartwright & Newman (2012). If a CHF patient's self-efficacy is strong, they will adhere to the medical treatment, dietary restrictions, and exercise and stress reduction. Conversely, HF patients with weak self-efficacy will not adhere to the management plan (Ciere et al., 2012).

Ciere and colleagues (2012) proved that telehealth was associated with a significant increase in patient's knowledge of CHF compared to a control group ($p < 0.001$, $p = 0.040$). It was evident by patients stating the purpose and side effects of their medications. Patients enrolled in the telehealth group reported 91% compliance with the prescribed treatment at 12 months, compared to 46% of patients in the control group ($p < 0.03$). The study showed significant improvement in CHF patient's self-care behavior at 3-months and telehealth improved patient's self-efficacy according to Ciere et al. (2012).

The outcomes of the study were positive in the relationship to telehealth, patient confidence and self-management behaviors. Overall, the patients' confidence was a positive predictor of self-management (Dansky et al., p. 31). Therefore, the studies support the use of the self-care model and infer that telehealth, self-management, and confidence improve patient QOL.

MLHF Questionnaire

Garin and colleagues (2014) methodically evaluated health-related QOL instruments used in patients with heart failure. There were seven tools used to measure the patient's QOL including: the Chronic Heart Failure Assessment Tool; the Cardiac Health Profile Congestive Heart Failure; the Chronic Heart Failure Questionnaire (CHFQ); the Kansas City Cardiomyopathy Questionnaire (KCCQ); the Left Ventricular Disease Questionnaire (LVDQ); the MLHFQ; and the QOL in Severe Heart Failure Questionnaire.

The study assessed each of these tools using a standardized tool for evaluating patient-reported outcomes (EMPRO). The scores ranged from 0 to 100. The investigators found that the most highly rated instruments based on the overall EMPRO score were the KCCQ (64.4) and the MLHFQ (60.7), followed by the CHFQ (59.2) (Garin et al., 2014). The advantage of the MLHF questionnaire is ease of administration. Also, it was the most widely used instrument for evaluating Health-Related QOL (HRQOL) in CHF patients internationally.

The impact of CHF on the patient's QOL has been assessed using the MLHF questionnaire (Lupon et al., 2013; O'Loughlin et al., 2008; Sisk et al., 2006). They used the tool to identify patients at risk for physical and psychosocial changes that affect patients' outcomes, such as QOL. O'Loughlin et al. (2008) conducted a retrospective analysis of patients with NYHF Class IV, who enrolled in a hospital-based disease management program. The study found that Health-Related QOL (HRQOL) was a predictor of HF outcomes, including readmission and mortality.

The physical and emotional domains were the significant independent predictor of the patient's long-term mortality and morbidity. Also, patient's perception of their condition was a useful measure of disease severity and a predictor of HF outcomes, such as QOL (O'Loughlin et al., 2008, p. 59). However, the score was not useful in predicting outcomes in elderly patients greater than 80 years old.

Additionally, Lupon et al. (2013) conducted a longitudinal study in a population of patients with heart failure, evaluated the temporal changes and prognostic value of QOL of HF using the same questionnaire. In a study of 1,151 HF patients, they reported that median baseline QOL score was 29 but found that QOL scores worsened over the course of the study. Baseline scores were significantly associated with survival. In a cohort study of 660 patients, Hoekstra and colleagues assessed QOL of HF patients after a hospital admission. The patients with the worst QOL scores were noted to have more advanced HF with Class III and IV symptoms, worse renal function and higher BNP levels, which could also impact survival (Hoekstra et al., 2013).

Theoretical Framework

The most appropriate middle-range theory is the Self-Care Model of Chronic Illness because it is essential to managing chronic illness, such as heart failure. Clinically, the Self-Care Model may be used to structure an assessment for HF patients to identify any areas of struggles and to implement a plan of care. In research, the theory provided the researchers with the structure to help translate evidence into practice. However, the primary outcome of the self-care model is illness stability, well-being, and

QOL. Self-care monitoring is the link between self-care maintenance and self-care management (Riegel, Jaarsma, & Stromberg, 2012).

The fundamental concepts of the theory are self-care maintenance, self-care monitoring, and self-care management. First, self-care maintenance was defined as behaviors chronically ill patients use to improve the wellbeing, preserve health or to maintain physical and emotional stability. For chronically ill patients, these behaviors frequently mirror the recommendations made by the providers, such as lifestyle changes or medication management (Riegel et al., 2012; Rockwell et al., 2001).

Second, self-care monitoring refers to the process of observing oneself for changing signs and symptoms. In chronic illness, systematic and routine monitoring produces the best outcomes. For example, CHF patients are required to monitor their weight daily and to report the results to their providers. Hence, the goal of self-care monitoring is to ensure patients feel confident about reporting any change in their health to the provider. Therefore, patients enrolled in a telehealth program are required contact their healthcare provider to discuss changes in their symptoms (Riegel et al., 2012).

Third, self-care management is defined as the response to changes in patient's signs and symptoms physically or emotionally that require an evaluation and intervention if needed. It will require a health care provider to determine the effectiveness of the treatment and to evaluate whether the approach should be repeated in the future. For instance, a CHF patient that complaints of shortness of breath and weight gain may require an additional dose of their diuretic to remove the extra fluid (Riegel et al., 2012; Rockwell et al., 2001). Finally, self-care is limited to patients who are unable make

decisions about their health care, such as, a patient that has poor memory who may not be able to perform self-care (Riegel et al., 2012).

Summary

The complexity of CHF challenges patients emotionally, psychologically and physically. The literature review demonstrated that compliance is critical to the management of chronic illness. Dansky et al. (2008) study revealed that patients who received home care enhanced by telehealth technology reported greater confidence regarding the management of HF than patients who did not receive telehealth. The MLHF questionnaire was used by the researchers such as: Lupon et al. (2013); O'Loughlin et al (2008); Sisk et al. (2006) to identify patients at risk for physical and psychosocial changes that affects patients' outcomes, such as QOL. Finally, self-care monitoring is the link between self-care maintenance and self-care management.

Section 3: Collection and Analysis of Evidence

Project Design/Method

The project design and method of data collection was appropriate to the problem statement, question, setting and the population of interest. A structured interview was selected because it was easy to discuss the project and administer the questionnaire (Terry, 2012).

Population and sampling

A Doctor of Nursing Practice (DNP) project was conducted at the Washington, DC, VA Medical Center (VAMC) to determine if there was a difference in QOL for veterans, 18 years and older, with a primary diagnosis of CHF, receiving home telehealth compared to veterans receiving traditional face to face care only.

Inclusion/Exclusion

The patients were screened for enrollment based on the following inclusion and exclusion criteria: veterans, age 18 and older, English-speaking, primary diagnosis of CHF, New York Heart Failure (NYHF) Classification score I-IV, left ventricular ejection fraction (LVEF) of 10–60%, no diagnosis of dementia, end-stage renal disease, end-stage heart failure, debilitating psychiatric disorder, or terminal cancer. Sample size for the project was estimated using the G* Power 3 Statistical Analysis Program (Faul, Erdfelder, Lang, & Buchner, 2007). With a power of 0.80, medium effect size, and alpha set at 0.05, 36 subjects per group were needed to detect a difference.

Data Collection

Following IRB approval by the Walden University Institutional Review Board (IRB) [# 06-04-15-0357746], the Washington, DC, VA Medical Center Human Studies Subcommittee IRB [ID#01735], and the Research and Development Committee of Washington DC VAMC, I obtained a waiver to acquire the list of CHF patients enrolled in the CCHT program. Once enrollment was confirmed, the patient clinic appointments were verified and placed on the calendar.

As patients seen by their provider in the CHF clinic, I met with the preceptor (PI) to identify patients who may be eligible to participate in the project. I then met with the candidates and discussed the project. If the candidates agreed to participate, I then discussed the study's purpose, benefits, and approximate time of completion; I also explained the measures that would be taken to ensure confidentiality in general and especially with the use of their personal information.

They were then given a series of forms to sign and date: an IRB approved VA Research Consent form (VA Form 10-1068) (Appendix A), Authorization for Use and Release of Individual Identifiable Health Information for Veterans Health Administration (VHA) Research (HIPAA) form (VA Form 10-0493) (Appendix B), MLHF questionnaire (Appendix C), and a research participant information brochure.

The following steps were used to administer the questionnaire:

1. The student assisted the participants with the first question to ensure they understood how to complete the survey.

2. The student reviewed the questionnaire for completeness. If the participants did not complete any portion of the questionnaire, the student discussed why they have difficulty answering the question and read the question as written to them. If the participant requested clarification, the student would re-read the question as written. The participants responded to the question based on their understanding of it
3. If the participants did not want to respond to some or the entire question, the student emphasized that they can mark zero response to indicate that it does not apply.

In order to maintain each participant's anonymity, an ID number replaced the patient's name to the questionnaire. Participants were given ample time and private space to complete the questionnaire.

The participant's consent and Health Insurance Portability and Accountability Act (HIPAA) forms was placed in the patient's research folder, which was maintained by the Primary Investigator (PI), and a copy was given to the patient. The data and investigator roster placed in a secure file in the share drive (S-drive) on the PI's computer. After receiving informed consent, I obtain patient's baseline characteristics including age, gender, race, NYHA Classification score, LVEF, the onset of HF, and date of enrollment in CCHT.

Instrument

The MLHF questionnaire was selected for the project as it is a reliable and valid tool that measures patient perceptions of physical, emotional, social and mental

dimensions of QOL using a 5-point Likert scale across 21-items. Along with calculating an overall score, the MLHF also has three subscales. The questionnaire has 21 items that were divided into physical, emotional and other factor items. The total score for the 21 items ranges from 0 to 105. A lower MLHF questionnaire score indicated less effect of heart failure on patient's QOL. Therefore, lower scores represent a better self-reported QOL (Rector & Cohn, 1992).

MLHF scale items have 8 physical dimension (Items 2, 3, 4, 5, 6, 7, 12 and 13), 5 emotional dimension (Items 17, 18, 19, 20 and 21), as well as 8 other factors (Items 1, 8, 9, 10, 11, 14, 15 and 16). The summary of the responses includes the physical dimension (min = 0, max = 40), emotional dimension (min = 0, max = 25), and other dimension (min = 0, max = 40). The summation of these subgroups may help describe the physical and psychological effects of heart failure on QOL (Pietri et al., 2004). Therefore, the essential feature of the MLHF questionnaire was that the patient, rather than the provider, rates the impact of HF on their QOL. Finally, a licensing agreement was obtained from the University of Minnesota Office for Technology Commercialization to use the MLHF questionnaire (Appendix D).

Protection of Human Subjects

Maintaining patient privacy and confidentiality was crucial. Privacy can be considered a person's ability to control the access to others' information about himself or herself. Confidentiality was the protection of information. I did not disclose records that identify individuals.

Data Analysis

Reliability. The reliability and validity of the MLHFQ was tested in a primary efficacy measure in a multicenter, randomized, double-blind, placebo-controlled study of Pimobendan, which was an investigational agent with inotropic and vasodilator activities. (Rector & Cohn, 1992). The study consisted of 198 ambulatory patients with primary New York Heart Association (NYHA) Class III heart failure from 20 referral centers. Interim correlations identified subgroups of questions representing physical and emotional dimensions. The dimensions of the MLHF questionnaire identified the correlations by examining the patient responses to each issue (Rector & Cohn, 1992).

The dimensions of the survey were formed by selecting questions that most strongly correlated ($r > 0.50$) with a factor. Cronbach's alpha was used as a second measure of reliability because it was based on inter-item changes between assessments. If the variability during the baseline self-assessment were unbiased, the difference between the baseline scores should be zero. The questions were highly related to the degree of dyspnea and fatigue and labeled as physical dimensions such as walking and climbing stairs. The items represented an emotional dimension was feelings of depression or worry. The MLHF score was obtained by adding the responses to the individual items, the lower the score, the better the perceived QOL (Rector & Cohn, 1992).

In this study, the medium (25th and 75th percentile) scores at baseline were 47 for a total score, 21 for physical dimension, and 9 for an emotional aspect. The baseline scores were highly correlated ($r = 0.93$) with the physical ($r = 0.89$) and emotional dimension ($r = 0.88$), indicating that all three scores had good reliability. Cronbach's

alphas were .94, .94 and .90 ($n = 197$). The data demonstrated that the MLHFQ was reliable when self-administered and revealed beneficial effects on the daily life of the patient to Pimobendan compared with placebo (Rector & Cohn, 1992). The scores suggest that the MLHF questionnaire was a reliable and valid patient self-assessment of the therapeutic benefit from Pimobendan (Rector & Cohn, 1992).

Validity. The validity of the questionnaire was evaluated by examining the responses to various interventions and their relationships with other measures of the therapeutic response. The physical dimension of the MLHF questionnaire made up about 45% of the baseline score and constituted a substantial part of the improvement attributable to Pimobendan. The correspondence of the changes in the scores of the groups improved, worsened or did not change their degree of fatigue and dyspnea as rated by the patient-supported validity score (Rector & Cohn, 1992).

Conversely, a higher dose of Pimobendan help established the validity of the MLHF questionnaire as a measure of efficacy (Rector & Cohn, 1992). Garin and Colleagues (2014) posited that the MLHF questionnaire denotes the highest reliability scores and good ability to both measure its objectives (validity) and to detect change over time (p. 356). The MLHF score was an extremely reliable measure, as demonstrated by the correlation (r) between baseline assessments and also by measuring internal consistency the researchers used Cronbach's Alpha to validate the internal consistency reliability of the MLHF score for each study question.

An examination of the MLHF score for each study question indicated an estimated Cronbach's alpha reliability coefficient of 0.86. Consequently, the total MLHF

(21) reliability score was alpha 0.959 score, thereby, indicating a consistent and perfect positive relationship among the study questions and MLHF Reliability scores (Rector & Cohn, 1992).

Analytical Techniques

Data were analyzed using SPSS 21.0 (IBM, Inc., Chicago, IL) software with statistical significance set at .05. Descriptive statistics was used to describe the sample. All baseline characteristics (age, gender, race, marital status, LVEF, NYHA Classification score, Care Coordinator Home Telehealth (CCHT) group, usual care (HF clinic) group, and Minnesota Living with Heart Failure Scores) was documented as percentages, mean and standard deviations. Independent t-tests were used to compare the means of the continuous variables of the CCHT and heart failure groups to determine if there is a difference between the groups, as well as with the MLHF means and total scores.

Project Evaluation Plan

Logic Model was used to incorporate theory into the planning process, which represents the program elements, proposed outcomes, and the theoretical constructs. The first step was the input. The co-investigator communicated the importance of the study to key stakeholders that was instrumental in ensuring the project was successful. I met with clinic's nurse managers to discuss the study and to enlist their help in allowing me to meet with the Veterans before or after their scheduled appointments to discuss the study and possible enrollment (Zaccagnini & White, 2011).

All materials obtained for the project included copies of the MLHF questionnaire, consent, data collection and HIPAA request forms. Also, a licensed copy of SPSS Statistical Software applied for and obtained for the study. The principle investigator and student followed-up with the Washington, DC, VAMC, the Walden University IRB, and the Research and Development Committees at Washington DC, VAMC to obtain approval to implement the project. I identified constraints that prevented the study from progressing promptly, such as enrollment challenges, medical record reviews, canceled or no show appointments. A timeline was created to track the progress of the study (Appendix E).

The second step was the output. Before the implementation of the study, the proposal was presented at the April 2015 Evidence-based Practice Monthly Meeting, and a poster created for the poster display at the 2015 Nurse's Week's event. After IRB approval have had been obtained, data collection and enrollment were initiated in June 2015. The third step was outcomes that include identifying short and long-term goals. The short-term goals consisted of creating an Excel spreadsheet, SPSS data file, and a password protected file in the "S" drive, to begin data collection and to analyze the data.

The long-term goals included showing that telehealth improved the veterans' QOL, to improve and promote patient education program, improve veteran's management and maintenance of heart failure, increase enrollment in the telehealth, to continue heart failure monitoring with one-to-one education via telehealth (Zaccagnini & White, 2011). The outcome of the study was to show that telehealth improved the patients' QOL thereby, empowering patients to manage their healthcare (Figure 1).

Summary

A DNP project conducted at the Washington DC, VAMC to explore the difference in the QOL for heart failure patients receiving care through telehealth compared to patients receiving face to face alone. Despite the challenges, the enrollment, data collection, and analysis was implemented. The logic model was used to guide and to evaluate the progress of the project.

Section 4: Findings, Discussion, and Implications

Introduction

The purpose of the project was to compare the difference in the QOL between CHF patients receiving care through telehealth and those receiving face-to-face care alone. Descriptive and inferential statistics were used to analyze the data. The results showed no difference in the QOL of patients receiving telehealth compared to patients receiving face-to-face care alone.

Participants

Seventy-seven CHF patients were recruited; 40 (51.9%) were in the CCHT group and 37 (48.1%) were in the usual care group (Figure 2). The participant's ages ranged from 44 to 93 years old with an average age of 67 years ($SD = 9.7$). Thirty-eight of the participants were over the age of 65. The average age of participants enrolled in the CCHT group was 66 ($SD = 10$) years as compared with the average age of the usual care group being 67 ($SD = 9.8$) years. The participants were majority men 75 (97%), with 40 (100%) of the CCHT group being males and no males in the usual care group. There were no females in the CCHT group and two (100%) females in the usual care group.

The participants were primarily Black 64 (83%) with 12 (16%) reporting to be White patients. By group, there were 34 (85%) Black and six (15%) White participants in the CCHT group. Thirty (81%) were Black with six White participants (16%) in the usual care group. There were slightly more single participants 44 (57%) compared to 33 (43%) married overall. In the CCHT group, 19 (53%) were married, and 21 (47%) were single. In the usual care group, 14 (38%) were married and 23 (62%) single (Table 1).

Table 1

Demographics of Participants

Demographics	N (%)	M (SD)	CCHT N (%)	Usual Care (N (%))
Age (in years)	77	66.7 (9.9)	66 (10)	67 (9.8)
Gender				
Male	75 (97)		40 (100)	35 (95)
Female	2 (3)		0	2(5)
Race				
African-American	64 (83)		34 (85)	30 (81)
White	12 (16)		6 (15)	6 (16)
Marital status				
Married	33 (43)		19 (53)	14 (38)
Single	44(57)		21 (47)	23 (62)

The mean Left Ventricular Ejection Fraction (LVEF) of the participants was 30% ($SD = 0.111$) with a range of 10% to 58%. There were no significant differences in LVEF between the CCHT ($M = 31$, $SD = 0.12$) and usual care ($M = 30$, $SD = 0.10$) groups ($t = -0.47$, $p > 0.05$). When the EF was used as the grouping variable, 65 (84%) participants had an $EF \leq 40\%$, 33 (51%) within the CCHT group, 32 (49%) participants in usual care group. Comparatively, only 12 (16%) of the participants had an $LVEF \geq 40\%$; seven (58%) in the CCHT group and five (42%) usual care group. Again, there was no difference between the groups in these baseline characteristics (Table 2).

Table 2

Left Ventricular Ejection Fraction

LVEF	N (%)	M (SD)	CCHT N (%)	Usual Care N (%)
Total EF (M/SD)	77	31(.11)	31% (.12)	30% (.10)
EF <40%	65(84%)		33 (51%)	32 (49%)
EF >40%	12(16%)		7 (58%)	5 (42%)

The New York Heart Failure Classification score covered a full range with the majority of the participants having some or marked limitation in their physical activity. Eight participants (10.4%) were categorized as NYHA Class I compared to 43 participants (55.6 %) categorized as NYHF Class II. Twenty participants (26%) categorized as NYHF Class III, and two (7.8%) participants categorized as NYHF Class IV. In the CCHT group, three (7.5%) participants were categorized as NYHF Class I, 23 (57.5%) were categorized as NYHF Class II, 12 participants (30%) Class III, and two (5%) categorized Class IV. In the heart failure group, patients were categorized as follows: five (13.5%) were NYHF Class I, 20 participants (54%) were categorized NYHF Class II. eight participants (21.6%) were categorized NYHF Class III, and four participants (10.8%) were categorized as NYHF Class IV (Table 3).

Table 3

NYHA Classification scores

NYHA	Total N (%)	CCHT N (%)	Usual Care N (%)
Class I: No Limitations of Physical activity	8 (10)	3(8)	5 (13.5)
Class II: Slight limitation of physical activity	43(56)	23 (57)	20(54)
Class III: Marked limitation of physical activity	20 (26)	12(30)	8 (22)
Class IV: Unable to carry on physical activity without discomfort	6 (8)	2 (5)	4 (11)

Inferential Statistics

An independent-sample test was used to determine if there was a difference in MLHF scores between participants enrolled in CCHT and those enrolled in the usual care groups. The average MLHF score for the CCHT group was 49.4 ($SD = 28.7$) and the average score for the usual care group was 37 ($SD = 27.9$). With equal variance assumed, there was no significant difference between MLHF scores of CCHT and the usual care group ($t = -1.91, p > 0.05$).

To further understand if other differences exist, the subscale scores for physical, emotional and other factor (were estimated for differences. The MLHF mean scores for the HF group were: physical 17 (12); emotional 7 (8); and other factor 12 (10). For the

CCHT group, the scores were 21 (22); emotional 10 (8); and other factor 19 (10). With equal variances assumed, there was no significant difference between the physical ($t = 1.41, p > 0.05$) and emotional scores ($t = 1.70, p > 0.05$) between the groups. Conversely, there was a difference in the other factor score between the groups. The CCHT group tended to have higher other factor scores as compared to the HF (usual care) group ($t = -2.9, p < 0.05$) (Table 4).

Table 4

Minnesota Living with Heart Failure (MLHF) Results

MLHF	N	Total M (SD)	CCHT M (SD)	HF group (M (SD)	t, p
Total score	77	43 (29)	49 (28)	37(28)	t = -1.91, p > 0.05
Physical Factor	77	19 (12)	21 (12)	17 (12)	t = -1.41, p > 0.05
Emotional Factor	77	9 (8)	10(8)	7 (8)	t = -1.70, p > 0.05
Other Factor	77	16 (10)	19(10)	12(10)	t = -2.90, p < 0.05

Discussion of Findings

The project demonstrated that there was no significant difference between MLHF scores of CCHT and the usual care group, no significant difference between the physical or emotional scores; however, there was a difference in the other factor score between the groups. Polisena, Tran, Cimon, Hutton, McGill, Palmer & Scott (2010) conducted a systematic review of the literature regarding home telemonitoring and QOL. Seven of the thirteen studies reported no difference in QOL between the telehealth and usual care groups as compared to five studies that reported a higher QOL for the telehealth group. The authors concludes that the study results “mainly indicated that home telehealth interventions were favorable compared with usual care” (Polisena, et al., 2010, p. 74).

The project findings, except for the other score, were consistent with the literature, suggesting that further opportunities for using telehealth are plausible without negatively affecting patient outcomes, such as QOL. Thus, it can be concluded that providing services using home telehealth for heart failure patients may produce equivalent outcomes to those receiving transitional services (Whitten & Mickus, 2007).

According to Pietri et al. (2004), the MLHF total score should be taken as the best measure of how heart failure and treatments impact an individual's QOL. The MLHF total score ranged from 0 (*no effect*) to 105 (*worst*) (Pietri et al., 2004; O'Loughlin et al., 2010; Behlouli, Feldman, Ducharme, Frenette, Giannetti et al., 2009). To determine the cut-off scores for the MLHF questionnaire, Behlouli et al. (2009) used the neutral network (NN) approach to help discriminate between HF patients having good, moderate or poor QOL.

Behlouli et al. (2009) estimated that the MLHF questionnaire scores less than 24 would be representative of a good QOL that indicated that heart failure had less effect on a patient's QOL. A score between 24 and 45 would be representative of a moderate QOL and a score greater than 45 would be representative of poor QOL (Behlouli et al., 2009). However, Pietri et al. (2004) stated that a lower MLHF score indicates a less effect of heart failure on a patient's QOL. In the project, the average score was 43, which indicate that participants perceive that their CHF had a moderate effect on their QOL. These results are consistent with another study which showed that HF patients rated their QOL to be moderate (Seto, Leonard, Cafazzo et al., 2011).

The patients' perception of their heart failure is a useful measure of the disease severity and predictor of HF outcomes (O'Loughlin et al., p.65). A comparison of the groups revealed that the CCHT group had a higher mean score that indicated patients perceive their HF had a poor effect on their QOL compared to the patients in the usual care group (Table 4). According to O'Loughlin et al. (2010), a poor Health-Related QOL (HRQoL) is related to higher frequency of hospital readmission and death in a non-structured care of HF patients. However, the results of these findings may be due to variability in the sample population. In Riegel et al. (2002) study found that Living with Heart Failure Questionnaire differentiated only between subjects receiving a high-intensity intervention compared to those patients in control group. Therefore, the interventions provided may not be sufficiently intense to influence HRQoL in a general HF population (Riegel et al., p. 216).

Additionally, there may be factors that affect a person's perception of QOL that are individualized and cannot be express in a standard tool such as, patients who are experiencing emotional or physical symptoms (Dunderdale, Thompson, Miles, Beer, & Furze, 2005). Patients who followed a home telemonitoring program may have been encouraged to play a more active role in managing their heart failure. As a result, they may have been followed more closely by providers or nurses compared to the patients in the usual care group (Polisena et al., 2010). Conversely, an important implication of these findings is that the efficacy of telemonitoring program is most favorable for heart failure compared to other chronic conditions (Inglis, Clark, & Cleland, 2011; Wooton, 2012).

The MLHFQ assessed the patient's perception of the effects of heart failure on the physical, psychological and socioeconomically (other factors) aspect of their life (Dunderdale et al., 2005). Every day, heart failure patients experience difficulties that affect their QOL resulting in self-restrictions and reducing their physical activity. The assessment of the QOL of patients with heart failure is important in the evaluation of their practical situation and the stages of the disease (Papadopoulou, 2009). The patient's self-assessment of their physical and psychological dimensions of QOL scores showed no definitive differences between the CCHT groups compare to the total and usual (HF clinic) care groups. Hence, the CCHT and usual care group scores were in the middle range and similar. However, there was a difference in the socioeconomically (other factors) dimension of QOL between the means of CCHT and usual care group scores.

The results aligned positively with another study, which show that the physical and emotional dimensions of QOL were at the middle of the score range (Seto et al. 2011). The significance of these findings indicates patients perceived that their QOL was good. Therefore, patients' perception of their QOL may be attributed to health care providers providing encouragement, and information, and inquiring about their well-being may be enough to improve their QOL and other outcomes (Blum & Gottlieb, 2014).

In contrast, the MLHF other factor scores assess patients response to impairments that impact their QOL such as, recreational past-times, side effects from medications or treatments, and sexual activity. These results suggest that patients perceive HF impaired their ability to live as they desire, such as engaging in hobbies or sports, experiencing side effects to treatment and sexual activity problems (Pietri et al., 2004).

Two studies demonstrate these findings. First, Kraai, Vermeulen, Hillega and Jaarsma (2015) conducted a study that explored the prevalence and perceived harshness of impairments due to heart failure and the relation between harshness and HR-QOL in patients with heart failure. The study showed that patients with NYHF Classification score one reported having difficulty engaging with recreational pastimes such as hobbies or sports and experiencing side effects to treatment. In terms of CHF therapy, the researchers concluded side effects of therapy might jeopardize adherence to treatment plan and could even lead to hospitalization (Kraai et al., 2015).

Second, Zambroski, Moser, Bhat & Ziegler (2005) study examined the impact of symptom prevalence and symptom burden on health-related QOL in patients with heart failure. The authors found that nearly half (46%) of patients had problems with sexual interest or sexual activity. For that reason, helping heart failure patients adjust sexually has been associated with better QOL. Providing a comprehensive assessment of patient's sexual concerns and follow-up counseling should be directed toward decreasing the overall prevalence of problems with sex and reducing the burden associated with the symptom (Zambroski et al. 2005).

With the advancement in scientific technology and prevalence of chronic diseases as the Veteran population ages (Lu, Chi, & Chen, 2013), the adoption of telehealth may be a plausible strategy. Telehealth is utilized to assist patients with effectively managing their heart failure, as well as increasing their self-compliance with medication management, diet, and exercise programs. Therefore, the need for strategies to maintain

and improve patient's QOL is imperative (Schwarz, Mion, Hudock & Litman, 2008; Hoekstra et. al., 2013).

Moreover, supportive home telehealth care makes it is possible to manage effectively the ubiquitous numbers of people living with chronic diseases, increase work efficiency, and handle clinical shortages (Lu et al., 2013). As demonstrated in this project, the use of telehealth may allow HF patients to maintain their maximum achievable QOL. An additional benefit to the QOL outcome would be a reduction in the cost to the healthcare organization (Jennett et al., 2003).

Self-care and QOL. The primary objective of the self-care model is illness stability, wellbeing, and QOL. It is important that patients prevent exacerbation and progression of the disease and reduces the risk of hospitalization and death by being actively engage in self-care behavior to maintain clinical stability (self-care maintenance) and manage symptoms when they occur (self-management) (Riegel et al., 2009). For that reason, enhancing self-care is a significant role in improving patient's outcomes such as QOL, health status, individual and family outcomes (Grady, 2008).

Patients' emotional and physical stability impacts their QOL. Jaarsma, Halfen, Tan et al. (2000) asserted that patients will have fewer symptoms and better functional capabilities if they take better care of themselves and adhere to the heart failure treatment. Also, heart failure patients have the remarkable capacity to adapt to their illness and they report better QOL than other patients (Jaarsma et al., 2000). Effective self-care support requires a collaborative approach between the patient and healthcare professionals to meets patient's need for information and promote their active

participation in their care (Rogers et al., 2000; Wagner et al., 2001; Glasgow et al., 2002; Riley, Gabe & Cowie, 2012).

It further suggests that the patient and telemonitoring nurse use telemonitoring technology as a tool to facilitate self-care. The ability to understand the signs and symptoms of heart failure, identify a change from the normal and develop self-care skills to detect worsening symptoms are important antecedents to self-management (Riley et al., 2012). The researchers suggested that healthcare professionals may facilitate the use of telemonitoring by stressing to patients its potential to promote self-care and support them living in their home without the need for constant, on-going face to face professional surveillance (Riley et al., 2012).

Recommendations

The following recommendations that may enhance the QOL of heart failure patients include: providing provider education; providing patient and caregiver education, assessing resources to promote telehealth within the organization, and implementing a community telehealth HF support group.

First, health care providers are essential to promoting QOL in patients with heart failure. Providing education to physicians and other health care providers, such as uncertified CHF nurses about the benefits of telehealth, is essential to ensure that patients are provided with the tools needed to effectively manage their heart failure and improve their QOL. Alwan, Bravinder, Burnside, Code et al. (2015), stated that physicians and health care providers should engage as partners in patient care, beyond the formal

interactions within the health care system (hospital visits) as this is vital to improving patient health and outcomes.

Educating health care providers about telehealth can increase patient's knowledge regarding the management of HF and self-efficacy. In a study, LaFramboise, Toder, Zimmerman and Agrawal (2003) address the question of whether telemonitoring as part of the standard home care for patients with heart failure has an effect on patient's self-efficacy for managing their disease and on their wellbeing. They randomized 90 CHF patients to receive a telehealth intervention and home care, home care only, and telephone alone. The project findings revealed that patients using telehealth as an intervention resulted in increased self-efficacy while all groups had equal improvement in health-related QOL (LaFramboise et al., 2003). As a result, educating medical providers play an essential role in recommending enrollment and active participation in telehealth for their HF patients and to help maintain their QOL.

Second, educating patients and caregivers about heart failure and telehealth are essential to improving their QOL. According to Boyne, Vrijhoef, Spreeuwenbert et al. (2014) stated the combination of personal education by a nurse during face-to-face contact and education using telemonitoring was found to improve patients' knowledge and self-care abilities. Colandrea and Gustavson (2012) suggested that educating patients to identify problematic symptoms early and access the system for help can often avoid costly readmissions. The study showed that standardized CHF education, referrals to CCHT and Home-Based Primary Care (HBPC), early social work intervention, and

follow-up visits to the CHF clinic have decreased readmission rates (Colandrea & Gustavson, 2012).

Therefore, patient education played an integral part in the management of CHF. Hence, providing and educating HF patients and caregivers would promote, support and foster change in behaviors through increased understanding the disease. Also, education will improve compliance with treatment and recognition of clinical indicators. The inclusion of these factors was shown to result in subjectively increased report QOL.

While and Kiek (2014) suggested that the nurse-led education program needs to focus on knowledge and understanding of CHF which include medication knowledge and self-care behavior such as, daily weight and regular monitoring of blood pressure. In addition, patients need to be educated on early recognition of symptom exacerbation and warning signs of fluid overload. Taking into consideration the variance in patients educational needs and abilities, adaptability in identifying methods for delivering the information to patients to ensure the utmost effectiveness, is of the utmost importance (While & Kiek, 2014).

If patients feel better about managing their CHF, they will have a higher QOL. Bosworth, Steinhauser, Orr, Lindquist, Grambow and Oddone (2004) focus group study identified five domains of concern: symptoms, role loss. Affective response, coping and social support. The researchers concluded that coping strategies such as knowledge, medication compliance and supporting others all contributed positively to QOL (Bosworth et al., 2004).

Third, assessing resources to promote telehealth within the organization. The VHA Service Support Center's patient quality improvement electronic database and VHA Report and Measure Portal (RAMP) were used to track the medical centers progress toward achieving all quality measures. Each department has expected quarterly measures and benchmarks to meet in order to remain compliant with the organization's strategic plan (U.S. Department of Veterans Affairs, 2016).

For this project, the primary clinical care measure is virtual care and the telehealth program. To that end, many data points are tracked and reported pertaining to the study measure. The data points varied from blood pressures to weights, pulse, glucose levels, oxygen levels and temperature, depending upon the medical provider orders and the individual patient's comorbid conditions.

Additionally, the balance scorecard is vital to the organization because it provides leaders with a "snapshot" of key indicators for the organization. The medical center uses dashboards which are a natural subset of balance scorecards to improve the health care performance and efficiency in the organization (Kelley, 2011) Therefore, the measures are tracked and plans are implemented to ensure the standards are met. Also, it used to ensure healthcare providers are compliant with JCAHO standards which ensure patients receive the safe and excellent quality care.

Telehealth can be evaluated by monitoring HF outcomes using an organizations quality matrix, such as the VHA's Strategic Analytics for Improvement and Learning Value Model (SAIL). The SAIL is a national system which allows for summarizing the hospitals' performance system. SAIL assesses 25 Quality performance measures, such as

death rate, complications, and patient satisfaction, as well as overall efficiency at individual VA Medical Centers (U.S. Department of Veterans Affairs, 2016).

The Joint Commission's ORYX measures cover four composites which are tracked in the SAIL program. These measures include but are not limited to, acute myocardial infarction, heart failure, pneumonia and surgical care improvement project. The medical center, which is the focus of this study, monitors disease specific readmission rates for CHF and focuses on the reduction of hospital readmissions to improve patient outcomes, quality of care, and the reduction of cost expended.

Consequently, the medical center monitors the number of patients who had been hospitalized and had a least one acute care HF readmission to the hospital within 30 days following discharge. As well as, all cause readmissions which are unplanned to the hospital. These readmissions are not necessarily related to a previous visit, and not all readmissions are preventable (U.S. Department of Veterans Affairs, 2016). Also, the numbers of HF patients who have died within 30 days of hospital admission are monitored using VHA Strategic Analytics for Improvement and Learning Value Model.

Fourth, the implementation of a telehealth heart failure support group, is imperative for promoting lifestyle modifications and improving patients' QOL. These groups should emphasize smoking cessation, HF treatment and symptom management, daily weight monitoring, dietary sodium and blood pressure management and control, restricting alcohol use, and regular exercise program.

A study conducted by Daley, Matthews, and Williams (2006), focused on a heart failure support group that was organized and run by Heart Failure Nurse Specialists

(HFNS) in the United Kingdom in 2003. Although, the telehealth was not used as the foundation for the group, researchers found that a community-based HFNS could function as a useful tool by providing support throughout the patients' illness and maintaining continuity of care. However, the use of standard formal assessment of the patients' problems, coping strategies, values and care preferences was critical to the process (Daley et al., 2006).

Clinical Significance

There is a growing interest in using telehealth in the delivery of health care, improving access and reducing disparities (Graves, Ford & Mooney, 2013). Health care providers who have an understanding the HF patients' perception of the QOL ensure they received quality care. Health care providers engage patients to invest in adherence and empower patients to handle effectively and efficiently the complexity of the disease (Lucas et al., 2015).

The project demonstrated that using telehealth is a plausible solution to addressing the needs of patients with heart failure (Schwarz, Mion, Hudock & Litman, 2008; Hoekstra et. al.2013). In addition to the benefits associated with telehealth technology, it allowed patients to remain independent, increase self-confident, improve access to care, and other outcomes (Paget et al., 2010; Goldberg, 2015). Therefore, patient will be able to maintain their QOL. Telehealth is a tool providers should use as an adjunct in the management of patients with heart failure because patients using telehealth had the same QOL compare to patients receiving face to face (usual) care.

Implications

Policy. Heart failure is a complex disease that impacts all aspects of patient's life and society (DHHS, 2014). The implications of telehealth impact four areas that include, policy, practice, research, and social issues. White and Brown (2011) defined policy as the choices a society, organization or group make regarding its goals and priority, and how that organization or groups allocate resources to those priorities (p.131).

Telehealth promotes innovation in healthcare (Ciere et al., 2012) and it has led to a number of new delivery models such as, telemental health, teleradiology, telepathology and remote patient monitoring. It is essential to connecting patients to their health care providers because more patients with chronic diseases are choosing to stay at home instead of entering an assisted living, skilled nursing or hospice facilities (Laxman. Krishnan & Dhillon, 2015) in order to maintain their QOL. Although, there are many barriers to implementing telehealth, a major obstacle to adopting telemedicine technology is the lack of universal reimbursement from private payers (Whitten & Buis, 2007).

According to the Natoli (2014), the absence of consistent, comprehensive reimbursement policies is a serious hindrance to total integration of telehealth into health care practice. Currently, 39 states provide some Medicaid reimbursement for telehealth services. Fifteen states have enacted laws required reimbursement for telehealth services if the same service would be repaid when provided in person, such as Maryland and Virginia. If a definitive policy is not available, some insurers and Medicaid agencies will reimburse for telehealth services as long as the services are justified to the agency's

satisfaction. Although telehealth payment policies are evolving at a steady rate, limited reimbursement contracts are a major barrier to the expansion of telehealth (Natoli, 2014).

Practice. In practice, nurses are strong advocates of teaching patients and their families about disease processes, medication management, and monitoring health problems. Telemonitoring used telehealth to monitor patient's information remotely such as weight, blood pressure, or glucose level. The information was captured via medical devices in the patient's home and then transmitted to a provider system via the Internet. Nurses and physicians used the data to recommend changes in a patient's treatment plan, tell patients to seek medical treatment, or alert providers of potential complications (Dixon, Hook, and McGowan (2009)).

Some systems use algorithms so that a patient can receive a computer generated or telephonic prompts for next steps in their care. A valuable asset to telehealth is health education, which involves the distribution or enabling access to educational materials such as curricula, lectures, and computer-based training programs to health care technology. The technology improves healthcare providers' ability to treat and manage complex diseases such as heart failure, and as demonstrated in this project, provides equal QOL when compared with usual care. In this environment, telehealth support and enhance the care providers provide to patients by fostering collaboration and exchanging of health information (Dixon et al. 2009). Therefore, it is important to develop and implement evidence-based practice strategies that focus on improving patients' QOL.

Research. Telehealth research continues to progress in the United States. An initiative to place information technology to work in health care was implemented by the

Agency for Healthcare Research and Quality (AHRQ) health information technology (health IT) as part of the Nation's strategy (AHRQ, 2008). The goal of Health IT was to improve the quality of care and make it more available to patients by developing secure and private electronic health records and making health information available electronically (AHRQ, 2008).

The AHRQ agency conducted several studies implementing telehealth that use of electronic data and telecommunications technologies to maintain clinical health care, health-related education, public health, and health administration from a distance. The agency found that Telehealth improved patient safety and quality of care. Despite the benefits of telehealth, implementing telehealth is not easy and it requires clear guidelines for reimbursement to sustain it. (AHRQ, 2008). As a team, health care providers used telehealth as a method of improving the organization's mission, goals, and objectives, and promote a culture of safety.

Social Change. The implications of social changes is telehealth offers health care professional socio-economic benefits by increasing access to care, improve the quality of care, and enhancing patients' QOL. Jennett, Hall, Ohinmaa, Anderson, Thomas, Young, Lorenzetti and Scott (2003) suggested that there were socio-economic benefits associated with computer-based applications in geriatric telehealth through enhanced health care, education, such as checking medications for interactions. The computer-based education has been shown to increase patient self-efficacy on medication use and reduce adverse effects related to medication administration (Jennett et al., 2003).

Improving access to care is crucial for patients. Jennett et al. (2003), found that a patient's ability to access services in the local community via telehealth may indicate a significant benefit in the patient's QOL. In the context of indigenous population, it is essential that health care information is delivered to patients in a culturally appropriate way (Jennett et al., 2003) to meet their needs. Because of the ability to allow patients to live independently with a sense of security, telehealth promoted by health care professional as a technique of enhances the patient QOL and the life of patients with mobility problems (Jennett, p.314). As the population ages, telehealth will continue to be a valuable asset to helping patients maintain their independence in society.

Project Strengths and Limitations

Strengths. The literature review benefits from extensive searches of multiple databases which focused on the concept of the project. The method used supported the project question, goals, and objectives. The implementation and comprehensive description of the interventions was an essential part of the project. The Self-Care Model of Chronic Illness (Riegel et al., 2012) showed the link between self-care maintenance, monitoring and management in the care of patients with heart failure, and its impact on their QOL.

The MLHFQ (MLHF) was an important component of the project because the questionnaire is a disease-specific tool used to measure the effect of heart failure on patient's QOL (Chu, Lee, Yoo, Kim, KO, OH et al. (2014); Blum & Gottlieb (2014). The MLHF questionnaire has been used extensively in the literature, and its reliability and validity has been well documented (Rector et al., 1987; Riegel et al., 2002). Finally, the

results of the project revealed that the patient's perception of their QOL was same whether they were in the telehealth or usual care group.

Limitations. The following limitations identified during the analysis of the study included, a limited number of female veterans and missed opportunities to enroll patients in the project due to conflicting schedules. Additionally, other confounding variables such as co-morbidities, cost, readmission rates, hospitalizations rates, and patient education, which all have an effect on QOL, were not included in the project. Also, only two clinics at the Veterans Affairs Medical Center were selected for the project, thus, the results of the project are not generalizable to a larger setting.

Analysis of Self

As scholar. The skills and knowledge I have gained in the DNP program enhanced my expertise, as an advanced practice nurse to assume positions of greater responsibility within the VA or my community. As a result, it enhanced my abilities to develop and implement new healthcare policies, review and revise policies that impact the cost, regulations, access to health care, patient safety, and quality of care. Also, I will continue to be an active participant on committees at all levels of the organization to ensure patients received the quality safe effective health care.

Finally, I will continue to serve as an advocate for peers, subordinates, and leaders within and outside the organization. According to IOM (2010), health care providers should work together to break down the walls of hierarchical silos and to be accountable to each other for improving quality and reducing preventable adverse events. All providers should display the capacity to adapt to the continually evolving dynamics of the

health care system (IOM, p.223). My goal is to remain flexible and to be a champion for ensuring patients receive safe quality patient care.

As practitioner. I have obtained the essential skills to function effectively by completing thorough assessment of patient's psychosocial, behavioral, cultural and economic status in healthcare. This assessment involved using a holistic approach to help patients and families make decisions improve their QOL by making lifestyle changes through self-care (Terry, p.9).

Promoting the use of telehealth is a valuable asset to the health care system. According to IOM (2010), the Health Information Technology (HIT) is expected to increase the efficiency and effectiveness of clinician interaction with patients. Electronic Health Record (EHRs) and other HIT should lower the cost of service delivered to patients and improve the quality of care as measured by outcomes or achievement of other endpoints, such as increase adherence to optimal guidelines (IOM., 2010). As a DNP graduate, I will continue to promote the use of telehealth in health care organizations to meet the needs of patients.

As project developer. The knowledge and skills I have gained enable me to develop a plan, cost-analysis, and timeline for projects for the Veterans Administration. According to Zaccagnini and White (2011), a project is a "sequence of tasks with a beginning and an end that is bounded by time and resources, and that produces a unique product or service" (p. 404). Therefore, the knowledge I gained developing the proposal will serve as a guide to creating future proposals that would persuade the stakeholders that a project was needed to improve the organization' mission and improve outcomes.

Summary

Heart failure impacts the patient's life, policy, practice, research and social issues. The strengths and limitations of the study were analyzed, as well as, a self-analysis. The purpose of the project was compared the difference in the QOL between CHF patients receiving care through telehealth and those receiving face-to-face alone. The independent sample t-test did not show a difference in the QOL of patients receiving telehealth compared to patients receiving face-to-face care. However, more research is needed to assess the impact of telehealth on the QOL of HF patients. The self-care framework implied that the patient's decision to be active in their self-care is the catalyst for patients to manage heart failure and to improve their QOL effectively.

Section 5: Dissemination Plan

Executive Summary

CHF is a chronic disease affecting an estimated 5.1 million Americans over age 20 (AHA, 2014). Robbins and Djoussé (2015) posited that an estimated 825,000 new heart failure (HF) cases emerge each year with a projected CHF diagnosis of an additional eight million individuals over 18 years old by 2030. The AHA (2013) projects that the total cost of CHF care will increase almost 120% by 2030. Because of rising health care cost, researchers proposed that Information Technology (IT) may serve as a solution to enhance CHF patient care (Chen, Cheng, & Mehta, 2013; Kamei, 2013). Consequently, telehealth is a process of using technology to improve patient care (Suter, Suter, & Johnson, 2011).

The complexity of heart failure challenges patients emotional, psychologically and physically. The literature review demonstrated that compliance is critical to the management of chronic illness. Telehealth is a significant innovation, and it was associated with significant increase in patient's knowledge (Ciere et al., 2012). The purpose of the study is to explore the difference in the QOL for heart failure patients receiving care through telehealth compared to patients receiving face-to face care alone. The Minnesota Living with Heart Failure (MLHF) questionnaire was selected for the project as it is a reliable and valid tool that measures patient perceptions of physical, emotional, social and mental dimensions of QOL.

The results showed that there was no difference in the QOL for heart patients in the CCHT group compared to the usual care (face-to- face) group. The findings

generated several recommendations that may enhance the QOL of heart failure patients which include, providing provider education; providing patient and caregiver education, assessing resources to promote telehealth within the organization, and implementing a community telehealth HF support group. The goal of telehealth is to empower patients by preventing recurrent unplanned admissions, thus allowing them to remain independent while improving their QOL (Goldberg, 2005).

Finally, Dudley-Brown (2012) asserted that dissemination is an essential component of translating evidence to ensure the acceptance change and innovation. To support social change, the dissemination of the project findings will occur through a variety of methods, such as posters, presentations, and manuscripts to educate and train both health care professionals and patients.

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Appendices

Appendix A. VA Research Consent Form-VA Form 10-1086 (IRB approved)

See attachment

Appendix B. Authorization for Use and Release of Individual Identifiable Health
Information for VHA Research (VA Form 10-0493)

See Attachment

Appendix C. Minnesota Living with Heart Failure Questionnaire

The following questions ask how much your heart failure (heart condition) affected your life during the past month (4 weeks). After each question, circle the 0, 1, 2, 3, 4 or 5 to show how much your life was affected. If a question does not apply to you, circle the 0 after that question.

Did your heart failure prevent you from living as you wanted during the past month (4 weeks) by -						Very	Very
	No	Little				Much	
1. causing swelling in your ankles or legs?	0	1	2	3	4	5	
2. making you sit or lie down to rest during the day?	0	1	2	3	4	5	
3. making your walking about or climbing stairs difficult?	0	1	2	3	4	5	
4. making your working around the house or yard difficult?	0	1	2	3	4	5	
5. making your going places away from home difficult?	0	1	2	3	4	5	
6. making your sleeping well at night difficult?	0	1	2	3	4	5	
7. making your relating to or doing things with your friends or family difficult?	0	1	2	3	4	5	
8. making your working to earn a living difficult?	0	1	2	3	4	5	
9. making your recreational pastimes, sports or hobbies difficult?	0	1	2	3	4	5	
10. making your sexual activities difficult?	0	1	2	3	4	5	
11. making you eat less of the foods you like?	0	1	2	3	4	5	
12. making you short of breath?	0	1	2	3	4	5	
13. making you tired, fatigued, or low on energy?	0	1	2	3	4	5	
14. making you stay in a hospital?	0	1	2	3	4	5	
15. costing you money for medical care?	0	1	2	3	4	5	
16. giving you side effects from treatments?	0	1	2	3	4	5	
17. making you feel you are a burden to your family or friends?	0	1	2	3	4	5	
18. making you feel a loss of self-control in your life?	0	1	2	3	4	5	
19. making you worry?	0	1	2	3	4	5	
20. making it difficult for you to concentrate or remember things?	0	1	2	3	4	5	
21. making you feel depressed?	0	1	2	3	4	5	

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Appendix D. University of Minnesota Office of Technology Commercialization MLHF

Questionnaire Licensing Agreement

Full License Agreement

Following is the full and final license agreement text.

Please read the terms and conditions of this license agreement (“Agreement”) carefully. By clicking “Accept” on the “Review and Accept Agreement” page during the licensing process, you are agreeing to the following terms and conditions on behalf of the Licensee identified below, and you represent and warrant that you are authorized to do so.

The Minnesota Living with Heart Failure® Questionnaire can be used with the following educational project:

The questionnaire will be used in a project to assess QOL in HF patients enrolled on telehealth program.

License Fee:

License Fee is \$0.00 USD, payable upon checkout.

Licensee: Marcia Callender

Company – VAMC DC

Contact Email – marcia.callender2@va.gov

Contact Phone – 202-745-8000 ext.57259

And residing or doing business at –

50 Irving St., NW

Washington, DC 20422 US

TERMS AND CONDITIONS – The following terms and conditions govern this Agreement by and between the Regents of the University of Minnesota, a constitutional corporation under the laws of the State of Minnesota, (“University”) and the Licensee.

Definitions – For purposes of this agreement, the following terms have the following meanings.

“Accompanying Documentation” means the following:

The Overview Document (123 KB .PDF)

Appendix E. Timeline for Telehealth Study

	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov
Proposal reviewed by Chair and Committee	X									
Proposal approved by URR		X								
Proposal oral conference & doctoral study approved			X							
Initiate IRB at Walden University & Washington DC VAMC			X							
IRB approved @Washington DC VAMC				X						
R & D approval pending				X						
IRB Reconsideration/Approval					X					
List of HF patients CCHT					X					
Participant enrollment agreement/consent sign					X	X	X			
Data Collection					X	X	X			
Data Analysis								X	X	
Finalize study										X
Dissemination										X

The following schedule was established to achieve the goals and objectives of the project within a designated timeline, which include the following:

In February 2015, the proposal was submitted to Chairperson, Dr. M. Murphy, PhD, MS, MBA, RN for review. After the review, the proposal, DNP Project Minimum Standards Rubric, and DNP Project Checklist was submitted to the committee members for review.

In March 2015, the proposal was sent to URR and Dr. Jonas Nguh approved it.

In April 2015, the DNP student presented the proposal at the teleconference with the Committee Chairperson, Dr. Marilyn Murphy and Committee Member and Dr. Tiankai Wang. After the conference, the committee approved the doctoral study proposal. All required IRB forms were submitted to the Washington DCVAMC and Walden University IRB committee for approval.

In May 2015, the Washington DC VAMC approved the IRB application, and it was sent to Research and Development for approval. After R&D Committee had approved it, it was returned to IRB and reapproved. All updated forms were submitted to IRB committees.

In June 2015, Walden University approved the study, and the IRB approval number was 06-04-15-0357746. Washington DC VAMC consented to the study and it was given an IRB#01735. On 30 June 2015, the researcher prepared to start data collection.

In July and August 2015, the researcher continued data collection.

In September to October 2015, complete data analysis and final study. In November 2015, the study was prepared and presented at the 7th Evidence-based Practice Conference, Martinsburg, WV.

Figure 1: Logic Model for Implementing Telehealth Project

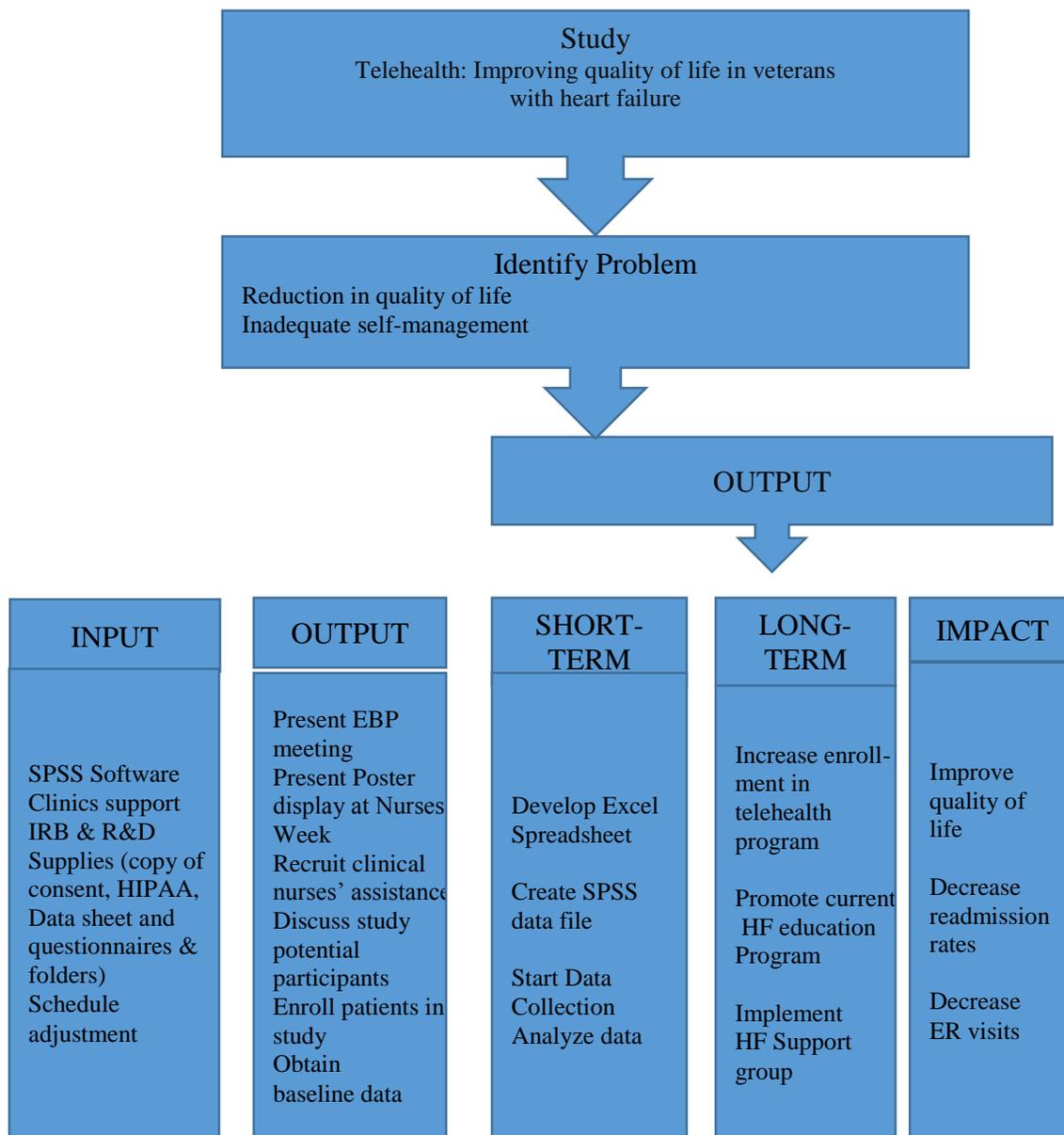


Figure 1

Figure 2: Enrollment of Study Participants

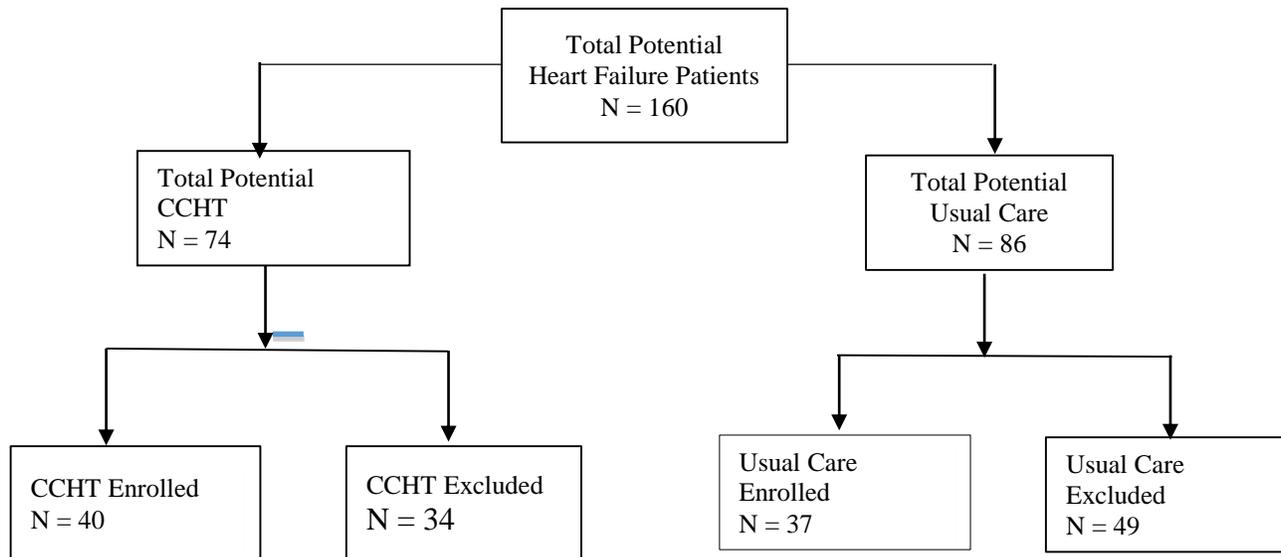


Figure 1