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Telehealth Efforts to Reduce Hospital Readmissions of Congestive Heart Failure Patients

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Abstract

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by

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MSA, Central Michigan University, 2004

BBA, Davenport University, 2002

Dissertation Submitted in Partial Fulfillment

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Abstract

Congestive heart failure (CHF) is a chronic condition that affects millions of individuals in the United States. There is no cure for CHF, but medical interventions can help treat the symptoms and improve health outcomes. The purpose of this quantitative study was to determine if telehealth services help to reduce the readmission status of patients diagnosed with CHF. The theoretical framework used in this study was the individual and family self-management theory to help focus on self-management behaviors that contribute to improving the patients' health outcomes. The research questions were focused on addressing CHF patients receiving telehealth services and whether the demographic, medical, and compliance/participation factors influenced or predicted the patients' readmission status. Data was collected for 110 CHF diagnosed patients that received telehealth services. The study revealed that post-telehealth readmission and telehealth discharge goals were correlated ($r = 0.07$, $p < 0.05$), implying that readmission during the program and discharge goals of the program have a direct and positive relationship. A negative correlation was established between patient readmission during the telehealth program and discharge goals status ($r = -0.14$, $p < 0.05$), implying that there is an inverse relationship between the 2 variables in regard to readmission of patients with CHF. Results of the binary logistic regression revealed that none of the predictors of age, gender, or goals status were correlated with readmission. The results can assist positive social change efforts by enhancing telehealth via collaborating with other services, such as homecare to effectively manage patients' CHF conditions and improve the overall quality of care to patients.

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Dedication

I dedicate this dissertation to my family. You have given me the motivation and drive to continue. To my children Benjamin, Brenden, and Brielle, I hope that I have inspired you to go after your dreams until they have reached fruition.

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I would like to acknowledge and thank my Walden University committee members for their time and dedication in relentlessly guiding me through this dissertation journey. Dr. Christopher Miller, Chair; Dr. Egondu Onyejekwe, Committee Member; Dr. Rabeh Hijazi, University Reviewer; Dr. Leslie King, Program Director; Dr. Tammy L. Root, Academic Research Coordinator; and Dr. Magdeline Aagard, Core Faculty, Health Services provided exceptional guidance and mentorship throughout this entire progress. Your efforts are well noted and are greatly appreciated.

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Chapter 1: Introduction to the Study

Congestive heart failure (CHF) affects over 6 million individuals in the United States, and each year, that number increases (American Heart Association, 2018). CHF is the leading cause of morbidity and mortality in the United States, and it is one of the top diagnoses targeted by the Centers for Medicare and Medicaid (CMS; 2017) for payment disincentives to acute care hospitals for patient readmissions. In recent years, hospital organizations have been searching for novel ways to reduce hospital readmissions for a variety of chronic conditions. One promising program is home telehealth. Home telehealth allows patients to actively engage in their care from the comforts of their home. This active engagement in care plays a major role in improving patient outcomes (Ryan & Sawin, 2009). Many quality initiatives across the healthcare continuum have been implemented to improve the quality of life, reduce readmissions, and reduce the mortality rate associated with heart failure (Ryan, Bierle, & Vuckovic, 2019). The individual and family self-management (IFSM) model is a theoretical model used in research to assist in improving self-management behaviors with chronic conditions, such as CHF (Ryan & Sawin, 2009).

Background of the Study

Studies have shown that a significant percentage of CHF readmissions could have been avoided (Bayati et al., 2014). Gu, Ma, Zhou, and Xia (2016) discussed how community-based health services could be beneficial as an intervention in managing patients with CHF. Community-based health services, such as telehealth, are available to assist patients by providing care in the comforts of their home (Liu, Xiang, Lagor, Liu, &

Sullivan, 2016). CHF is one of the top diagnoses targeted by the CMS (2017) for payment disincentives to acute care hospitals for patient readmissions. One of the leading causes of morbidity and mortality is attributed to CHF (Pothineni et al., 2018). It is important for healthcare organizations to implement management strategies in their efforts to reduce the rate of hospital readmissions in patients with CHF. One promising program that assists with the management of patients with chronic health conditions is home telehealth.

Telehealth programs help manage cases such as patients with CHF; however, the effects of managing patients with CHF in a home telehealth setting to prevent readmission need further exploration (Berwick, Nolan, & Whittington, 2016). Gu et al. (2016) also stated that collaborative efforts by primary care teams in managing CHF conditions are limited; however, collaboration plays an important role in the timely delivery of healthcare services. Home telehealth allows the home health clinicians the opportunity to disseminate vital information to key stakeholders in the care coordination of the patient. Punchik et al. (2017) noted a significant decrease in patients being readmitted into the hospital once they were enrolled in a home telehealth service. Home telehealth programs have proven to be successful in managing CHF patients (Punchik et al., 2017).

Research on CHF and transition of care for patients is justified because there is a need to increase the level of safety for CHF patients when they transition home. Research on telehealth efforts to reduce hospital readmission on CHF patients is justified because there is need to increase self-management behaviors when patients are

discharged home from the hospital. The readmission rate of CHF patients is growing each year and is expected to continue to grow in the future (Pothineni et al., 2018). Telehealth programs are used to help manage many healthcare issues such as CHF; however, it is unclear how telehealth programs affect hospital readmission rates.

Problem Statement

Patients with chronic health conditions are frequently readmitted to acute care hospitals. Patients diagnosed with CHF have the highest readmission rate in the United States (Proctor, Marrow-Howell, Li, & Dore, 2016). There are approximately 6.5 million Americans currently diagnosed with CHF (Pothineni et al., 2018). These statistics are steadily growing each year (American Heart Association, 2018). Readmissions of patients recently discharged from the hospital are costly to acute care hospitals (Carey & Stefos, 2016). To combat readmission rates, the CMS (2017) have created programs aimed at lowering hospital payment rates.

Purpose of the Study

The purpose of this study was to determine if telehealth delivered in a home setting will help to reduce the readmission rates of patients diagnosed with CHF. To address the gap, I used a quantitative research method. In an assessment of secondary data previously collected, I analyzed demographic, medical, and compliance/participation factors associated with patients with a CHF diagnosis. This analysis was used to develop an understanding of the compliance factors associated with the readmission of CHF patients enrolled in a home telehealth program.

Research Questions and Hypotheses

RQ1: For CHF patients receiving telehealth services, what demographic, medical, and compliance factors predict readmittance?

$H_0$1: Demographic, medical, and compliance/participation factors are not predictors for readmittance among CHF patients receiving telehealth services.

H_a1: Demographic, medical, and compliance/participation factors are predictors for readmittance among CHF patients receiving telehealth services.

RQ2: Does gender predict demographic, medical, and compliance predictors in the readmission status of CHF patients receiving telehealth services?

$H_0$2: The relationship between demographic, medical, and compliance predictors and readmittance does not differ by gender.

H_a2: The relationship between demographic, medical, and compliance predictors and readmittance does differ by gender.

Theoretical Foundation

The theoretical framework for this study was Ryan and Sawin's (2009) theory of IFSM. This theory focuses on improving the health outcomes of patients who engage in self-management behaviors, which involve patients actively engaging in initiatives to improve their health behaviors (Barlow, Sturt, & Hearnshaw, 2016). Care coordination is often embedded within theoretical frameworks such as IFSM (Ryan & Sawin, 2009). Studies have shown that patients who engage in self-management behaviors improve the

outcomes related to their health (Ryan & Sawin, 2009). Collaborative efforts are embedded within the IFSM theory (Ryan & Sawin, 2009) and play a crucial role in managing CHF patients in home telehealth programs.

The IFSM theory implies that self-management behaviors happen when families and surrounding stakeholders are influenced by risk and underlying factors, such as health status as well as family, environmental, and individual factors (Ryan & Sawin, 2009). This theory assists the patient and their family in actively engaging in the management of their chronic health conditions, such as CHF, leading to the improvement of their overall health and better quality of life as well as decreasing the demand for unwarranted health services and expenditures (Ryan & Sawin, 2009). Self-management behaviors for chronic conditions, such as CHF, include 12 most common tasks: (a) symptoms management, (b) taking medications, (c) recognizing acute episodes, (d) nutrition, (e) exercise, (f) smoking cessation, (g) stress reduction, (h) interaction with health providers, (i) need for information, (j) adapting to work, (k) managing relations, and (l) managing emotions (Ryan & Sawin, 2009). Researchers have utilized the IFSM theory to understand the risk and health outcomes of self-regulated behaviors of managing common tasks of chronic conditions. The need to understand these risks will enable the patient to be more engaged with his/her health and provide educational support for interventions in minimizing the risk of hospital readmissions (Barlow, Sturt, & Hearnshaw, 2016).

Nature of the Study

The nature of this study was quantitative analysis. Quantitative research is consistent with understanding the details of a problem to help examine the relationship between known variables (Frankfort-Nachmias & Nachmias, 2008). I investigated the research questions by using a binary logistic regression to predict which patients were readmitted (i.e., the dependent variable). Independent variables (i.e., predictors) included the demographic variables of age, sex, and race/ethnicity. Medical variables included hypertension and diabetes diagnoses. Finally, variables related to compliance and participation in the telehealth were also used as predictors, which included the percentage of daily data uploads completed as well as whether the uploads included the pertinent data for weight, blood pressure, heart rate, and pulse oximetry reading, if applicable.

Results of the binary logistic regression analysis included omnibus model statistics as well as the significance of predictor variables and their associated odds ratios. In this study, the odds ratios indicated the increase or decrease in odds of readmission. The results also indicated, in the form of a percentage of correct classification, how successfully patients can be classified as readmission *yes* or *no*. I report two models in this study: (a) a model with all independent variables and (b) a model with only significant predictors, which was created by systematically removing nonsignificant variables (by largest *p* value) until only significant predictors remained. The full model more fully accounts for all variables, while the significant-only model has greater statistical power.

Throughout the binary logistic regression process, I assessed predictors for multicollinearity (i.e., variance inflation factor) and examined influence statistics (e.g., Cook's distance) in case of highly influential outliers. If problems arose, commonly used methods of exclusion or data transformation were implemented as appropriate. Keeping the focus on the patient's role in managing care was consistent with Ryan and Sawin's (2009) theory of IFSM. This quantitative analysis helped reveal the effectiveness of using telehealth services in preventing readmission among CHF patients.

Definitions

In this section, I provide definitions of key terms found within this research study and commonly used terms in healthcare.

Care coordination: Deliberately organizing patient care activities and sharing information among all the participants concerned with a patient's care to achieve safer and more effective care (AHRQ, 2018).

Centers for Medicare & Medicaid Services (CMS): A part of the U.S. Department of Health and Human Services. CMS oversees many federal healthcare programs (CMS,2017).

Collaboration: Healthcare involves the participation of patients, family, and a diverse team of often highly specialized, healthcare professionals. Involvement of all these team members in a cooperative and coordinated way is essential to providing exceptional care (AHRQ, 2018).

Compliance: The process of following rules, regulations, and laws that relate to healthcare practices (AHRQ, 2018).

Congestive heart failure (CHF): A condition in which the heart cannot pump enough blood to meet the body's needs. CHF does not mean that the heart has stopped or is about to stop working. Rather, it means that the heart is not able to pump blood the way it should. It can affect one or both sides of the heart (CDC, 2019).

Home-based primary care: A health service provided to patients in their home. The program is for patients who need a team-based approach to care and home support for ongoing or chronic diseases. Also used for patient who have difficulty keeping or making appointments due to the severity of their disease (Totten, White-Chu, Wasson et al., 2016).

Individual and family self-management (IFSM): A research theory focused on engaging individuals and families in self-management (SM) behaviors to improve their health outcomes (Ryan & Sawin, 2009).

Morbidity: The state of being diseased or unhealthy within a population (AHA, 2018).

Mortality: The term used for the number of people who died within a population (AHA, 2018).

Readmission: An admission to a hospital within 30 days of discharge from the same or another hospital (CMS, 2017).

Self-management (SM): The ability of the individual with the assistance of family, community, and healthcare professionals to actively manage symptoms; treatments; lifestyle changes; and the psychosocial, cultural, and spiritual consequences of health conditions (Ryan & Sawin, 2009).

Telehealth: The use of electronic information and telecommunications technologies via phone or computer to aid in remote clinical healthcare (WHO, 2010).

Assumptions

This study was based on several assumptions. The first assumption was that patients enrolled in the telehealth program received education on using their device prior to usage and that patients were well informed on all telehealth services available. I also assumed that patients were monitored on their daily usage and immediately notified if noncompliance was present with the required usage of the device. Another assumption was that patients self-reported accurate information into the system. Finally, I assumed that the patients were following the provided telehealth protocol, such as compliance with taking medication, diet, exercise, and managing their established goals.

Scope and Delimitations

The scope of this study concerned archived data derived from a clinical data warehouse of patients diagnosed with CHF. The clinical data warehouse is stored in an electronic medical record system for patients enrolled in healthcare the study site. The time frame of archived data was determined by the availability of accessible data. The data retrieved did not exceed a 5-year time frame. The data for this study were scrubbed, and patient information was de-identified to meet Health Insurance Portability and Accountability Act (HIPAA) standards. Variables for this study included (a) telehealth enrollment status and (b) readmission status. I met with key members of the Institutional Review Board (IRB) committee at the study site, and they were confident the data could

be retrieved and released. Similar data has previously been released to secondary resources.

Limitations

The primary limitation of this study was the possibility of a small sample size due to the percentage of patients diagnosed with CHF who are enrolled in the program. Limitations also included the availability of data submitted by the patient and the patient's compliance in providing timely and accurate information. Patients are in the program for a limited time, which may not have allowed an adequate time frame for SM of a percentage of the population studied.

Significance of the Study

The results of this study provide insight into understanding telehealth efforts in reducing hospital readmissions for patients diagnosed with CHF. This study is important because of the lack of information that exists relating to the SM of CHF patients' care in preventing hospital readmissions. Evaluating SM behaviors of patients with CHF can assist in efforts to improve the outcomes that could possibly impact their quality of life. The findings of this study could prove useful in quality improvement initiatives to enhance standards of care and educational opportunities for CHF patients.

Significance to Theory

The results of this study have the potential to enhance the understanding of how SM behaviors, like telehealth efforts, can reduce the rate of hospital readmissions among CHF patients. I projected that my testing of SM theory would assist the management of telehealth programs. The theory of IFSM used in this study relies strongly on

collaborative efforts and care coordination between the patient and the caregiver (Ryan & Sawin, 2009).

Significance to Practice

There remains a lack of research among the population of patients with CHF enrolled in telehealth programs using SM tools to monitor compliance (Greenlalgh, A'Court, & Shaw, 2017). Outcomes related to effectively self-managing chronic conditions such as CHF warrant further exploration. The findings of this study could affect outcomes in improving CHF patients' overall health using the ISFM theory.

Significance to Social Change

Increased efforts and initiatives have been undertaken to ensure that all patients receive the best experience and quality care in their health journey. Patient-centered care, the involvement of patients' families, and a focus on the process of their care have been the key components of these initiatives. SM plays an important role in delivering the highest quality care possible to patients. CHF is the top diagnosis for hospital readmissions and has proven to be costly in healthcare-related expenses for all stakeholders involved in the process (CDC, 2019). My belief is that SM and telehealth efforts will assist patients in effectively managing their CHF conditions and improve quality of care while lowering unwarranted hospital costs.

Summary and Transition

Chronic health conditions such as CHF are the top cause of death in the United States (CDC, 2019). CHF accounts for more than 836,000 deaths in the United States (CDC, 2019). Greenlalgh et al. (2017) noted that a major burden of CHF is reduced

ability to work. The initial diagnosis of CHF also generates a decreased sense of self-worth in the patient process of recovery (Greenhalgh et al., 2017). Improving outcomes of patients enrolled in home telehealth programs by incorporating the patients and their families into the process of their care could conceivably improve the SM behaviors of patients with chronic conditions such as CHF and lower the rate of preventable readmissions. Increasing the use of telehealth programs and providing diagnosis-specific education and guidance could improve critical elements related to CHF diagnosis and readmission rates.

Chapter 2: Literature Review

In Chapter 2, I thoroughly review literature studies and peer-reviewed sources of telehealth efforts to reduce hospital readmissions of CHF patients. After explaining the literature strategy, in which the multiple publication years used for the study as well as primary and peer-reviewed sources used are highlighted, the theoretical foundations that supported this study are provided. Subsequently, the conceptual framework section encompasses the model that supports the need for telehealth efforts in reducing patient hospital readmissions. In this section, I also look at the acts that help patients and insurance policies in place. The final part of this chapter contains an in-depth review of the literature on the topic.

Literature Search Strategy

I used the following databases and websites to locate research that was previously conducted on this topic: ProQuest, CINAHL, Ebsco, PubMed, American Heart Association, CDC, SAGE, MEDLINE, CMS, U.S. Library of Medicine, *Journal of Family Medicine*, and the World Health Organization (WHO). My literature search concentrated on the patient's diagnosis with CHF and key efforts of telehealth programs in minimizing hospital readmissions. Key search terms used included *telehealth, hospital readmission, congestive heart failure, self-management strategies, care coordination,* and *individual and family self-management theory*. The literature review was conducted from articles published in the years 2014 through 2019. I chose this time frame because recent research shows the application of telehealth technology in the healthcare system by medical professionals. Furthermore, many government programs enacted laws and acts

that protect doctors, nurses, social workers, healthcare providers, and the majority of the population seeking medical attention through insurance policies. Journals, websites, books, and other peer-reviewed literature studies conducted by various scholars, authors, and researchers were also reviewed to collect information required for this study. Through my search of the aforementioned databases, journals, and websites, a complete review on the use of telehealth in the healthcare system was achieved.

Theoretical Foundation

In this study, I adopted the IFSM theory as the theoretical framework. This theory engages individuals suffering from chronic diseases, like CHF, together with their families, in various purposeful health-related behaviors as part of their daily routine (Ryan & Sawin, 2009). IFSM theory is usually not limited to biological family (Ryan & Sawin, 2009). Furthermore, IFSM theory encourages individual and their families to manage the complicated health management instructions in ways that reflect their personal or family personalities, morals, values, and beliefs (Ryan & Sawin, 2009). In IFSM theory, the patient and his/her family take control of health management while collaborating with healthcare professionals, which means that during the period after hospitalization, there is always an engagement in decision-making between individual families and medical professionals to ensure control of the patient's condition (Ryan & Sawin, 2009). Hence, IFSM theory allows for the development of skills that the patients need while transitioning in their surroundings, which reduces readmissions.

Fawcett, Watson, Neuman, Walker, and Fitzpatrick (2016) argued that IFSM theory is a pervasive and complex SM process that deals with context, process, and

outcomes. Their research indicated that there are several contextual factors that influence the ability of the individual and family to ensure that proper SM is accorded to the patients, including conditions that may be structural, physical, or environmental, such as access to healthcare services; the ability to transition from one healthcare service provider to the next; the availability of social capital; access to transport; and involvement in work, school, and other cultural activities. IFSM theory also shows that these individual or family factors indirectly or directly impact the significant outcomes of patient SM, especially after hospitalization (Ryan & Sawin, 2009). Therefore, this theory highlights the need for individual or family assistance during SM in patients with chronic diseases to help avoid readmission.

IFSM theory also describes the ability of individuals and families to easily take part in given health behaviors, especially when explanatory information is provided (Ryan & Sawin, 2009). According to Barlow et al. (2016), individuals readily embrace health beliefs as long as they are consistent with behavior. Their research found that if individuals or families develop the ability to self-regulate, they will believe that they can change their health. The method also asserts that with support from their families or others close to them, patients are positively influenced to take part in preventive health behaviors (Barlow et al., 2016). Furthermore, IFSM theory argues that abundance of knowledge and positive beliefs greatly affect behavior and outcomes and leads to the achievement of goals by individuals, families, and health providers (Ryan & Sawin, 2009). Therefore, the ability of individuals or family to self-regulate both physical and emotionally positively impacts SM, leading to reduced hospital readmissions.

IFSM theory also argues that individuals who engage in SM behaviors, like goal setting, planning, self-monitoring, reflective thinking, and proper dieting, highly improve their health results (Ryan & Sawin, 2009). In their study, Schilling, Grey, & Knafl (2015) stressed that several outcomes or results may be achieved from engagement in SM behaviors by patients of chronic illnesses. These behaviors may be in particular conditions, transitions, or even risk. These researchers also pointed to costs as one of the outcomes of implementing IFSM theory; well self-managed behaviors of both individuals and families reduce costs related to therapy and other symptoms (Schilling et al., 2015). Additionally, IFSM theory indicates that health status usually experiences several outcomes in self-managed patients after hospitalization (e.g., individuals may feel much stronger and healthier after SM and the quality of life in chronic health patients also greatly improves; Ryan & Sawin, 2009). Hence, in this study, I used ISFM to more deeply understand the need for telehealth for the SM of individual and family health. Table 1 shows the definitions of the major concepts of IFSM. Table 2 displays assumptions of the IFSM theory. Figure 1 models the concepts of IFSM theory.

Table 1

Individual and Family Self-Management Theory: Definition of Major Concepts

Context: Risk and Protective Factors: Condition specific factors that challenge or protect individuals and families engagement in SM.	
Condition Specific	Physiological, structural, or functional characteristics of the condition, its treatment, or prevention of the condition that impact the amount, type, and critical nature of behaviors needed to manage the condition during times of stability or transition (e.g., complexity of condition or treatment, trajectory, physiological stability, or physiological transitions).
Physical & Social Environment	Physical or social factors including factors such as access to health care, transition in health care provider or setting, transportation, neighborhoods, schools, work, culture, and social capital that enhance or present barriers to individual and family SM.
Individual & family factors	Characteristics of the individual and family that enhance or diminish SM; for example, individual cognitive status, perspectives, information processing, developmental stages, individual and family capabilities and cohesion, literacy, resourcefulness.
Processes and their enhancement: based on the dynamic interaction among the following: a) condition-specific knowledge and beliefs, b) acquisition and use of self-regulation skills and abilities, and c) social facilitation and negotiation.	
Knowledge & Beliefs	Factual information and perceptions about a health condition or health behavior. Including self-efficacy, outcome expectancy, and goal congruence Self-efficacy is a behavior specific concept and refers to the degree of confidence one has in his/her ability to successfully engage in a behavior under normal and stressful situations. Outcome expectancy is a belief that engagement in a particular behavior will result in desired outcomes. Goal congruence is a person's ability to resolve the confusion and anxiety occurring from apparent contradictory and competing demands associated with health goals
Self–regulation	Self-regulation is an iterative process people engage in to achieve a change in health behaviors. Self-regulation includes a number of skills and abilities including: 1. Goal setting 2. Self-monitoring and reflective thinking 3. Decision making 4. Planning and action 5. Self-evaluation 6. Management of responses
Social facilitation	Social facilitation occurs within relationships and enhances an individual's capacity to change: includes social influence, support, and negotiated collaboration. Social influence is a message or dialogue in which respected persons in positions of perceived authority with expert knowledge advises and encourages individuals and families to engage in specific health behaviors. These respected persons may be health care providers, family, friends, neighbors, work colleagues, and members of community groups or printed or electronic medium such as magazines, television, or the internet. Social support consists of emotional, instrumental, or informational support provided to a person or family with the explicit goal of assisting or facilitating their engagement in health behaviors. Negotiated Collaboration occurs when "your, mine, and our" perspectives are respected and influential. Professional expertise and standards, individual meaning, and mutual family roles and responsibilities influence goals and recommended treatments.
Outcomes: includes proximal or short-term outcomes that lead to attainment of distal outcomes	
Proximal Outcomes	Individual and family self-management behaviors: including engagement in activities/treatment regimens, symptom management, or use of recommended pharmacological therapies. Engagement in health behaviors may or may not impact cost of health care services.
Distal Outcomes	1. Health status as an indicator of the disease trajectory (indicating prevention, attenuation, stabilization, worsening of the condition) 2. Quality of life/perceived well-being, 3. Cost including both direct and indirect costs

Table 2

Assumptions of the Individual and Family Self-Management Theory

- Persons engage in behaviors for personally meaningful reasons that may or may not be directly related to optimizing their health status.
- Many factors influence behavior; including, personal preferences, culture, social norms, and family rules and boundaries.
- Numerous contextual factors affect an individual's and family's ability and desire to engage in SM.
- Individual and family perceptions of resources affect engagement in SM behaviors.
- SM involves dynamic iterative processes requiring time, repetition, and reflection.
- Social facilitation can direct, encourage, and support engagement in SM behaviors and achievement of outcomes.
- Person/family-centered interventions are most effective in fostering engagement in SM behaviors and achievement of proximal and distal outcomes.
- The concepts adherence, alliance, and compliance are perceived contrary to SM as they dismisses the notion that the primary responsibility and control lie with the individual or family.
- Individuals actively engaged in self-managing conditions by collaborating with persons in the health care system in order to achieve personal health goals.
- Individuals and families engaging in health promotion behaviors may or may not collaborate with persons in the health care system

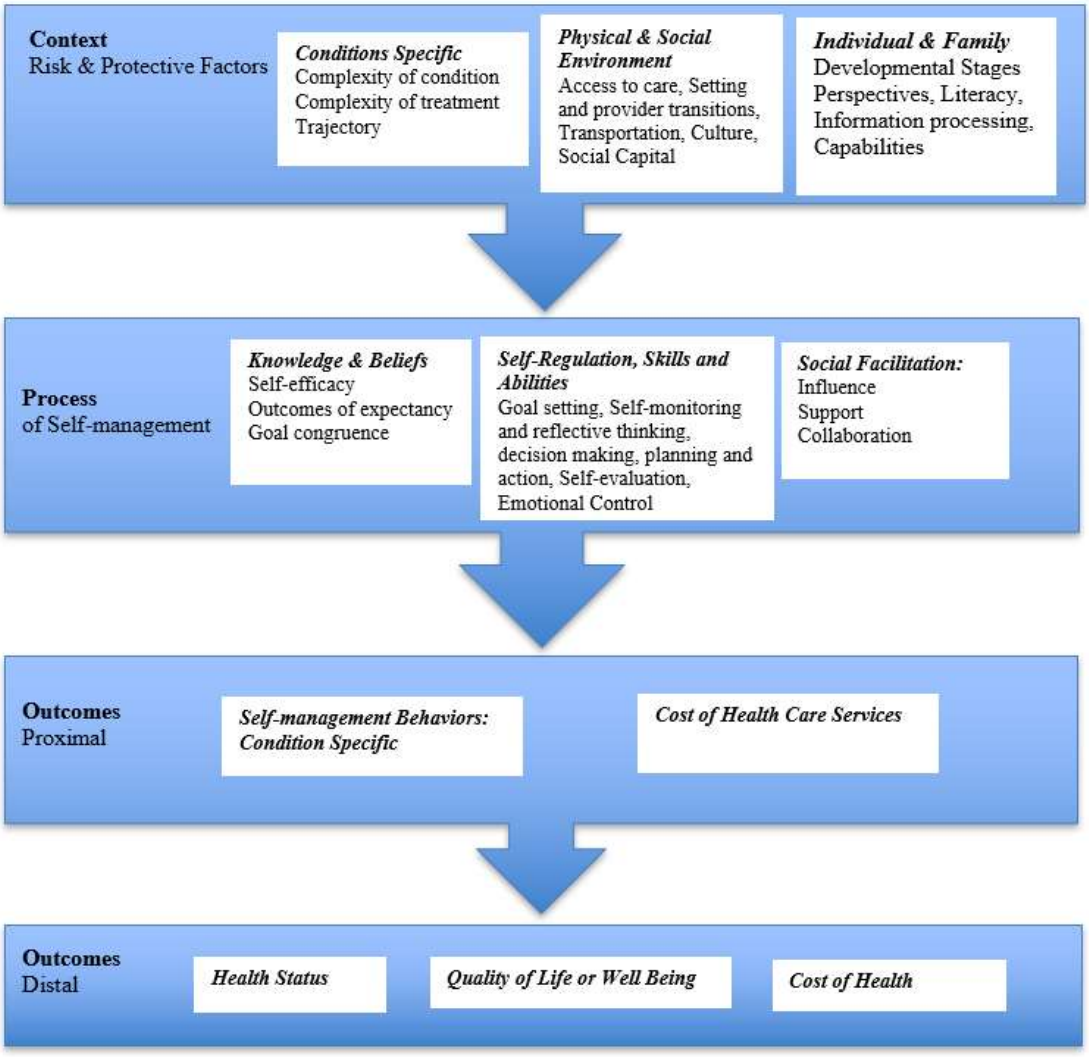

Figure 1. Model of individual and family self-management theory (Ryan & Sawin, 2009).

Literature Review

Patient satisfaction has become one of the biggest concerns of healthcare in recent years (Cleary, 2014). Levels of patient satisfaction can be analyzed using the quality of healthcare effectiveness data and information from the outcomes in medical customer assessments of medical professional organizations (Kruse, Krowski, Rodriguez, Tran, Vela & Brooks (2017). Cleary (2014) argued that, like the conventional modalities in the medical profession, telehealth also highly depends on patient satisfaction information to

understand how patients were treated and if the medication received met their expectations. If the results of the data collected show that patients are unsatisfied with medical services provided remotely, it will also make the service expensive and lead to its termination at the end of the day (Cleary, 2014). The increasing popularity of telehealth shows the significance of ensuring quality indicators of patient satisfaction no matter agility during development because the different healthcare organizations continue to manufacture other technology that can meet patients' needs (Cleary, 2014). Hence, continuously listening to the voices of the clients will ease healthcare service delivery by telehealth, reducing the number of chronic health patients readmitted to hospitals.

According to the WHO (2010),

> Telehealth is the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies. For the exchange of accurate information diagnosis, treatment and prevention of diseases and injuries, research and evaluation. And for the continuing education of health care providers, in all the interests of advancing the health of individuals and their communities. (p. 47)

Due to the increasing development of technologies in healthcare, the WHO has continued to emphasize telehealth because it can extend access to health services from various providers to remote areas with the help of experts, which overcomes transport and proximity barriers. Hence, low-income patients, those with small children, and those restricted from accessing hospitals due to mobility can continue with treatment, reducing readmissions.

With healthcare reforms maturing, administrators, policy creators, and healthcare providers are trying to ensure they achieve the primary objective of providing improved health services to patients at low costs (CMS, 2017). Therefore, reduced hospital readmissions have continued to be significant as the standard gauge for quality in healthcare delivery. According to the Health Information Technology for Economic and Clinical Health Act (2009), there is a continued look into incentives for meaningful ways to use electronic information and health data to prevent 30-day readmissions of patients to hospitals. The period immediately after hospitalization of patients with chronic illnesses is the most dangerous because some individuals suffer adverse situations after being discharged (Kash, Baek, Davis, Champagne, & Langabeer, 2015).

Although addressing medical and clinical errors, patient behaviors, and education gaps during the transition may reduce such situations, modernizing and harnessing telehealth services can also efficiently address several complex issues that lead to readmission of patients. Leveraging telehealth into healthcare facilities is a benefit to all stakeholders in the process of care coordination. Understanding ways to incorporate telehealth into the different healthcare systems sufficiently reduces the readmission of patients to hospitals.

The WHO (2010) argued that telehealth in the healthcare system creates a university with nonexistent borders, increasing educational learning, growth, and independence among professionals. Enabling remote training of some healthcare experts in these local areas across the country is a way of quickly reaching the patients. The use of telehealth systems by healthcare providers also gives local nurses or doctors a chance

to access experts from participating medical facilities across the world (WHO, 2010). Furthermore, these partnerships highly benefit patients in these medical facilities because their providers can find fast solutions to patient issues. For instance, all medical personnel taking part in treating patients through the telehealth systems provide reports accessible online (Berwick, Nolan, & Whittington, 2016); these allow for medical consultations and education within themselves. The use of telehealth systems also provides insight into how doctors handle neglected diseases among patients across the world (Punchik et al., 2017). Ultimately, telehealth systems improve skills among medical professionals, leading to better service delivery and reducing readmissions.

Using telehealth is one of the most significant ways for patients to connect virtually with healthcare service providers after hospitalization. This multifunctional technological intervention may be of great help to patients, as it provides complex patient-centered models that reduce readmissions, such as patient-centered virtual visits, daily biometric surveillance, and increased data access. Kimberly, Shamuel, Catherine, Elinor, Wei, & Gerald (2018) argued that adopting telehealth drastically changes the mode of service delivery in healthcare. Additionally, it builds a healthy patient-provider relationship that is mostly independent of the modality of the service. A well-developed and integrated telehealth intervention gives the most significant potential for healthcare to provide posthospitalization care to patients, thereby reducing readmissions. However, this new technology of telehealth if applied by healthcare, will highly increase accessibility reducing readmissions of patients.

According to a study by Feltner et al. (2014), using telehealth as a transitional care intervention by healthcare providers reduced readmission of chronic health patients as well as increasing the mortality benefit. They argue that using consistent home-visiting programs, especially using technology that gives information in real time, improved service delivery and reduced all causes of readmissions to the hospital (Feltner et al., 2014). Structured telephone support interventions provide support to patients as well as increase the flexibility of the navigator doctors while attending to individual patients. On the other hand, the scholars applied a Markov model that was developed to quickly evaluate the cost-effectiveness of the telehealth tech equipment supplied to recently discharged patients. The model showed that telehealth is the most cost-effective tool that can be adopted by healthcare systems in effectively delivering services. Hence, with the nature of illnesses facing different chronic health patients, using telehealth by clinics and hospitals becomes cost-effective, reducing readmissions.

The evolution of technology has crucially advanced healthcare services. Louis, Turner, Gretton, Baksh, and Cleland (2015) researched "telemonitoring for management of heart failure". Their study suggests that telemonitoring applied alone or as a part of multidisciplinary care program like telehealth increasingly reduces patients' hospital bed-days. This study also found that increased use of social media apps aided patient compliance and acceptance of this new technology, as apps provided an easy means for distributing guidelines as well as medication instructions (Louis et al., 2015).

Additionally, the study revealed that telemonitoring of patients facilitates early detection of change in patients' signs and symptoms. This technology reduces the length

of hospital stay by heart patients, as it enables treatment to be delivered quickly. Ultimately, increased care and attention will be given to heart patients, minimizing the rates of readmission.

Berwick, Nolan, and Whittington (2016) claim that improvement of the healthcare system in the United States requires the pursuit of three items. These include improving the experience of health care, improving the health of the population, and reducing the per capita costs in healthcare. The study also argues that CHF is just one of the cases that shows a broken healthcare system in the United States and needs new technology to integrate care across the network. Additionally, due to the weak and broken health system, caretakers become frustrated as they try to explore their efforts with patients. Telehealth technology is one of the most effective methods that are safe, timely, efficient, and patient-centered that all healthcare providers can apply to ease care for discharged patients. Furthermore, it holds great potential to help hospitals expand their services beyond their physical premises. Hence, telehealth can enable continuous improvement in all aspects of the healthcare system, reducing readmissions.

According to the WHO (2010), telehealth offers an excellent opportunity to developing countries, especially as they will be able to collect and gather data on different patients. Telehealth technology can provide surveillance that helps in fast-tracking as well as identifying public health issues in various areas of the country and suggesting trends to be followed (WHO, 2010). The ability of healthcare systems to easily track patient information remotely means it can monitor disease evolution and engage in supporting different communication channels as officials plan for the

mobilization of vaccination teams. Furthermore, the use of telehealth systems by various healthcare providers will significantly improve information management primarily through the development of network databases that use electronic record-keeping systems. Thus, telehealth technological systems ensure much more coordinated patient care as well as facilitating follow-up and evaluation, reducing readmissions.

For countries experiencing instability, war, or long-term insurgencies, healthcare providers can provide posttrauma counseling, expert treatment, and medication to patients using telehealth systems that can easily be set up in these areas and operated remotely (WHO, 2010). Telehealth systems also remain cost-effective when it comes to giving services to developing communities since the construction of hospitals and hiring of medical personnel may be expensive. Furthermore, due to the inaccessibility of areas hit by disasters, healthcare professionals can easily reach out to various parts of the country and give proper medical attention to those patients affected, severely injured, or in recovery. These systems benefit patients, doctors in the field, and those operating remotely, as healthcare providers can use expert trauma centers to communicate with colleagues and deliver excellent service. Thus, telehealth technologies can reduce readmissions if connected adequately across the country.

Progress in technology has also led to the expansion of telehealth to developing countries. Rosenstock (2014) stated that the declining costs of Information and Communication Technologies, increasing computing speeds, and high-speed bandwidth have created room for healthcare to take control of telehealth systems during patient care. He argues that simple applications like storing and forwarding of emails as regards to

telehealth still require a small investment in hardware and software networks as long as connectivity is available. These allow for much more detailed communication between patients and medical navigators, as images or pictures can also be shared (Rosenstock, 2014). Additionally, Internet-based telehealth systems allow for prescreening of patients in remote local areas, making telehealth systems an effective solution to the provision of healthcare services at a low cost. Therefore, enhancement of telehealth technology improves communication management of scarce health services as well as everyday activities in developing countries, reducing readmissions.

In their study, Kulshreshtha, Kvedar, Goyal, Halpern, & Watson (2010), argued that telehealth has been primarily advocated for during situations where medical professionals on duty have less access to experts. They state that with telehealth, medical providers can remotely give physicians access to the remote problem concerning the patient, saving the day, which in most cases offers a positive reassurance to both patients and medical personnel. Also, telehealth programmers or operators have shown ways this new technology can directly or indirectly reduce the issue of referring or transferring patients to other medical centers (Kulshreshtha, Kyedar, Goyal, Halpern, & Watson, 2010). Remote care and diagnosis of patients using telehealth systems, especially in low-income areas, benefits both patients and medical professionals as it reduces the costs of traveling. Therefore, an increase in the number of telehealth systems will highly motivate local medical providers to provide better services, leading to reduced readmissions.

Summary and Conclusion

This literature review was focused on previously published articles, journals, websites, and library information related to telehealth efforts to reduce hospital readmission of chronic health patients. Additionally, the chapter reviewed different factors that influence telehealth technologies in the healthcare system, the numerous opportunities that underlie telehealth, and the benefits of using telehealth systems by both patients and healthcare providers. Various theories and models were considered as frameworks for operating and improving telehealth systems.

Furthermore, through the reviewed articles, it can be concluded that outstanding telehealth systems are most beneficial in reducing hospital readmissions of patients in the healthcare system. This is because according to the literature review, several telehealth system resources can be fully utilized by medical professionals to deliver quality health services to patients remotely across the world. Hence, the successful use of telehealth systems leads to successfully reduced hospital readmissions of patients.

In Chapter 2, I reviewed the literature on telehealth, congestive heart failure and hospital readmissions in the United States. The literature identified a gap related to self-management behaviors in telehealth to reduce the rate of readmission amongst patient diagnosed with congestive heart failure. Chapter 3 includes a more detailed description of the study population and the criteria used for sample selection. The methodology and instruments used will be addressed as well as ethical concerns as it relates to this study.

Chapter 3: Research Method

The purpose of this quantitative study was to examine whether SM behaviors associated with telehealth programs affect hospital readmission in CHF patients. CHF has become a global health problem affecting 26 million worldwide and is associated with enormous health care expenditures (Liu, Xiang, Lagor, Liu, & Sullivan, 2016). The frequency of patient readmission within 12 weeks after discharge is approximately 25%, and two thirds of the cost of care is ascribed to hospitalization (Shafie, Tan, & Ng, 2018). With the increased population of the elderly, patients with CHF-linked hospitalization will amplify health costs. Presently in the United States, CHF affects 6.5 million people with 960,000 new cases per year (Benjamin et al., 2018).

Singular interventions to address the multiple needs of patients with CHF are not adequate, and individualized transition-of-care plans with comprehensive stabilize effects are critical for positive outcomes. Augmented readmissions may suggest a breakdown in the discharge process. Discharge planning should begin as soon as the patient is admitted, with nurses specifically reviewing, revising, and reassessing the plan of care with a CHF treatment team (CMS, 2017). By using the CHF treatment team to support the patient and patient's family with reeducation about self-care, the readmission rate can be reduced.

Prevention of CHF readmissions relies on self-care and SM; therefore, patients, caregivers, and patients' families must all understand the vital skills needed to address home treatment and preventative measures for CHF. Patients, caregivers, and families require SM education programs concerning the five patient identifying factors of distressing symptoms, unavoidable illness progress, psychosocial factors, imperfect self-

care, and health system failure. SM education programs covering self-efficacy as well as nutritional restrictions, exercise, and weight loss aid with adhering to deterrent or precautionary healthcare interventions (Abbasi, Ghezeljeh, & Farahani, 2018).

Research Design and Rationale

In this study, I used a retrospective quantitative analysis method to review a subset of patients diagnosed with CHF. Demographic, medical and compliance factors was used to analyze the data. A drill down was utilized to determine all CHF patients that were enrolled in a telehealth program during the specified time frame and d the patients' readmission status.

Descriptive Statistics

I reported the descriptive statistics for the sample as appropriate for the variable types. For scale variables, mean, median, standard deviation, standard error, skew, and kurtosis were reported. For nominal variables, frequencies and percentages for each category were reported. For ordinal variables, either or both of the previously mentioned approaches were used, depending on the number of levels and distribution of scores. Together, the descriptive statistics describe the participants in the study and provide general information on the prevalence of diagnoses, participation in telehealth services, and rate of readmission.

Hypothesis Testing

In this study, I investigated the research questions by predicting which patients were readmitted (i.e., the dependent variable) with a binary logistic regression. Independent variables (i.e., predictors) included the demographic variables of age, sex,

and race/ethnicity. Medical variables included hypertension and diabetes diagnoses. Finally, variables related to compliance and participation in the telehealth program were also used as predictors, including the percentage of daily data uploads completed as well as whether the uploads included the pertinent data for weight, blood pressure, heart rate, and pulse oximetry reading, if applicable.

Throughout the binary logistic regression process, I assessed the predictors for multicollinearity (i.e., variance inflation factor) and examined influence statistics (e.g., Cook's distance) in case of highly influential outliers. If problems arose, commonly used methods of exclusion or data transformation were implemented as appropriate. Keeping the focus on the patient's role in managing care should was consistent with Ryan and Sawin's (2009) theory of IFSM. The results of this quantitative analysis helped reveal the effectiveness of using telehealth services in preventing readmission status among CHF patients.

Methodology

I performed a retrospective quantitative study to examine the research questions in detail. The study involved a focus on CHF patients enrolled in a telehealth program and the patients' active role in managing their care with self-reporting telehealth variables. The patients in this study were veterans who received their care from a VA healthcare facility. The data collected were used to determine if SM of care in a telehealth setting affects the readmission status of patients diagnosed with CHF.

Population

The target size of the population studied was 110. The size of the population was determined by the data available upon the approval to begin this study. The demographics of this population consist of veteran patients, including male and female veterans, who have a CHF diagnosis. The research questions were tested with binary logistic regression, predicting participant readmittance (i.e., *yes* or *no*). I conducted an a priori power analysis for the study with several assumptions: a minimum of .80 power, .05 alpha level, 20% readmission rate, and effect size of 1.40 odds ratio for a two-tailed test. With these assumptions, a minimum sample size of approximately 442 participants was required to meet the .80 power minimum. If power is increased to .95, the sample size requirement was a minimum of 726. I expected to have a minimum of 1,200 participants with valid data, so power was expected to be high for the first hypothesis and adequate when testing genders separately (i.e., lower for females due to smaller sample size).

Sampling and Sampling Procedures

Frankfort-Nachmias and Nachmias (2008) defined sampling as a selection of participants from a population that a researcher plans to study. This study consisted of archival data of records from a clinical data warehouse. The initial population of patients diagnosed with CHF during the time frame of 2017 to 2018 consisted of the following:

- Aged 18 years old ≥,
- Diagnosed with hypertension (HTN),
- Diagnosed with diabetes (DM).
- Enrolled in the telehealth program, and

- Readmission status.

The population size and desired sample was determined once approval to collect the data was granted. SPSS software was used to calculate the sample size.

Archival Data

I analyzed archival data from CHF-diagnosed patients enrolled in a home telehealth at the study site medical facility. A preliminary time frame of the years 2015–2018 was captured. Data were requested and collected from a clinical data warehouse that stores electronic health information for a population of veteran patients. The following inclusions were requested for the participants in this study: (a) all CHF-diagnosed patients from the specified time frame, (b) diagnosis of hypertension and diabetes, (c) telehealth enrollment status, and (d) readmission status.

Key members of the IRB committee at the study site were consulted, and they were confident this data could be retrieved and released. Similar data had previously been released to secondary resources. I discussed the request of data with the facility research compliance officer, and it was noted that IRB would not be needed from the facility to conduct this study. However, an electronic Permission Access System request was required to obtain access to the Clinical Data Warehouse to proceed with this study.

Data Analysis Plan

I conducted the analysis process for this study using IBM Statistical Package for Social Sciences (SPSS), Version 25. The data for this study were imported into the SPSS software, which was used to maintain, manage, and analyze the data. The following

research questions and corresponding hypotheses were used to determine the outcomes of this study:

RQ1: For CHF patients receiving telehealth services, what demographic, medical, and compliance/participation factors predict readmittance?

$H_0$1: Demographic, medical, and compliance/participation factors are not predictors for readmittance among CHF patients receiving telehealth services.

H_a1: Demographic, medical, and compliance/participation factors are predictors for readmittance among CHF patients receiving telehealth services.

RQ2: Does gender predict demographic, medical, and compliance predictors in the readmission status of CHF patients receiving telehealth services?

$H_0$2: The relationship between demographic, medical, and compliance predictors and readmittance does not differ by gender.

H_a2: The relationship between demographic, medical, and compliance predictors and readmittance does differ by gender.

I tested Hypothesis 1 with a binary logistic regression, with readmittance as the dependent variable and demographic, medical, and compliance/participation factors as predictors. Hypothesis 2 was tested with a binary logistic regression, with readmittance as the dependent variable and gender as the specific predictor. All variables were entered into the model, and this full model will be reported in the results. Nonsignificant variables were also removed (i.e., least significant first) until only significant predictors

remained. The significant predictors-only model will also be reported in the results. For both models, the odds ratios for predictors will be reported as well as overall model statistics and classification tables (i.e., percentages of true and false positives and negatives). While only one model and modifications of the model was utilized, there are quite a few predictors in total. As a result, *p* values were reported in the standard form as well as with Bonferroni correction for multiple comparisons.

The rationale for including demographic covariates was that they may be directly related to health outcomes and, therefore, readmission may be related to successful technology utilization. For example, there may be a relationship between age and readmission that should be controlled for as well as a relationship between age and the impact of telehealth services. Any covariates that were not significant were also removed from the second model, ensuring that unnecessary covariates did not impact the results.

Threats to Validity

External Validity

External threats to this study were the secondary diagnoses of patients that may have contributed to patient readmission status. In addition to confounders, like diagnoses not included in the study, the sample may have limited generalization to the population based on the demographics of the participants. The results may be valid only for a certain age range, geographic area, etc.

Internal Validity

Internal threats compromise the researcher's confidence in stating that a relationship exists between the independent and dependent variables. Internal threats to

this study included the patients' accuracy and compliance when submitting telehealth predictor variables, such as weight, blood pressure, heart rate, and pulse oximetry readings. The severity of diagnoses and overall general health may also threaten internal validity because diagnoses can be more complex than their presence or absence.

Ethical Procedures

Participants in the study have previously completed questionnaires about their demographics and medical history prior to enrollment in home telehealth. Also, their participation and compliance will be analyzed. The treatment plans and services offered will not be manipulated by the study, so risks are limited to participation and monitoring described below:

- Institutional permissions, including IRB approvals that are needed (proposal) or were obtained (for the completed dissertation, include relevant IRB approval numbers in the final dissertation).
- Data collection and monitoring will not change patient behavior because have was collected retrospectively for the purpose of this research study. Patient participation was seen as a willingly.
- Participants were free to terminate participation at any time by contacting a member of their care coordination team. Also, a nonresponder (see Figure 2 – Nonresponder Algorithm) will automatically be removed from the program after 3 failed contact attempts for non-compliance to program requirements. Each attempt is documented in a HT Nonresponder Follow-up Note in the patient's chart (see Appendix A).

Describe treatment of data (including archival data), including issues of:

- Data contain the following sensitive information:
- All data files will be stored only on my personal laptop and transmitted via secure internet connection. Data will only be shared with the dissertation committee and statistical analyst and will be fully anonymized before sharing.

The study excludes individuals not receiving telehealth services. As a result, the study will not provide any findings regarding the efficacy of telehealth compared to other modes of delivery and does not contribute to improving outcomes for individuals not using telehealth services. Similarly, the study is limited to and will only benefit veterans. I obtained permission from the Wayne State University IRB committee to move forward with my project within the VA and the assigned number is WSU IRB Number 201962. The Walden University IRB approval number for this study is 10-04-19-0352737.

Summary

Quantitative research is consistent with understanding the details of a problem to help examine the relationship between known variables. The research question was investigated by predicting which patients were readmitted (dependent variable) with a binary logistic regression. Independent variables (predictors) will include demographic variables including age, sex, and race/ethnicity. Medical variables will include hypertension and diabetes diagnoses. In an effort to determine compliance and active participation in the telehealth program, daily submissions of predictor variables such as weight, blood pressure, heart rate, and pulse oximetry reading, if applicable, will be analyzed. As such, this quantitative study will assist in determining the effectiveness of

using telehealth services in preventing readmission status amongst CHF patients. In Chapter 4, the analysis and results of this quantitative study will be shared.

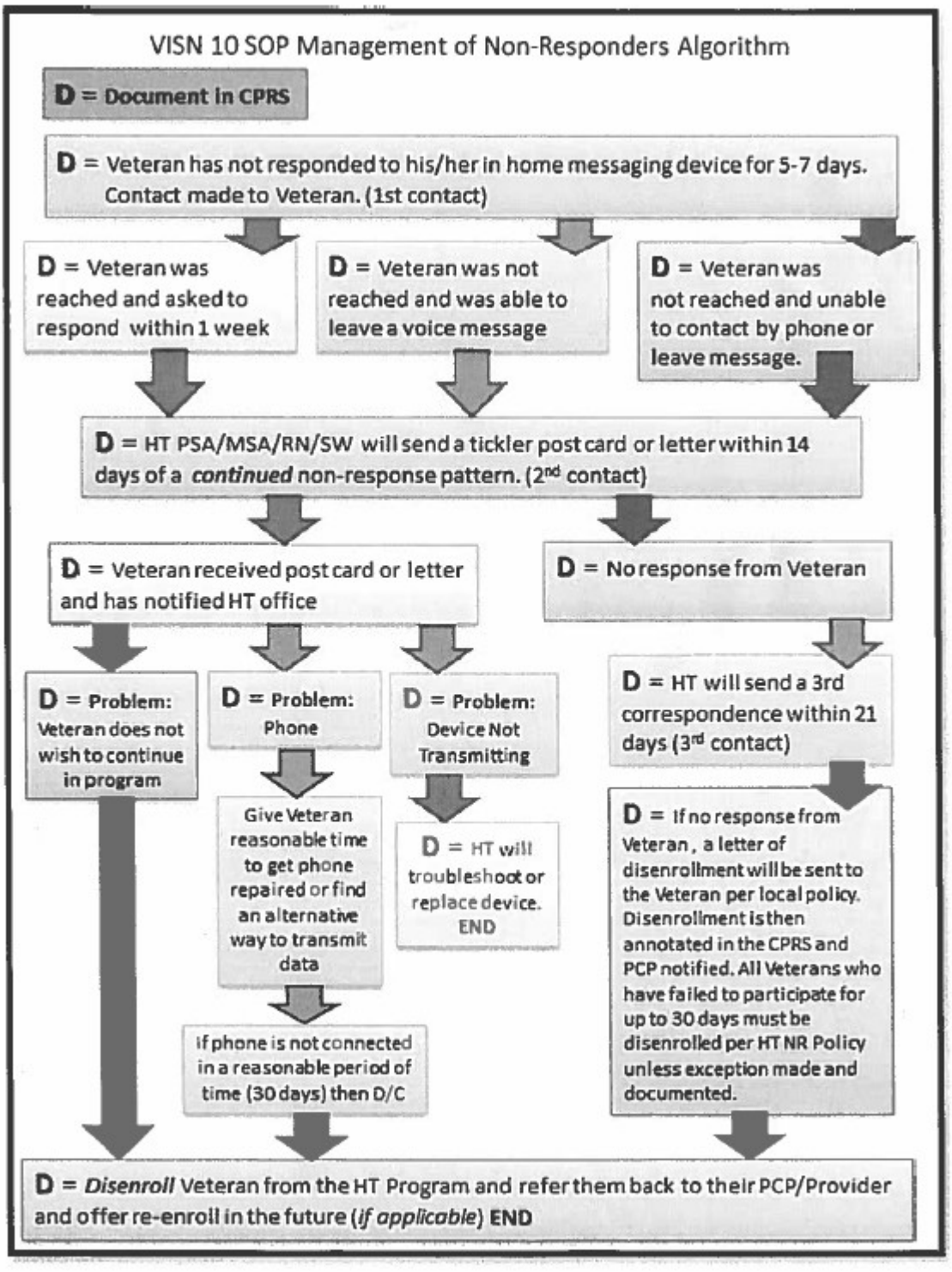

Figure 2. Nonresponder algorithm.

Chapter 4: Results

Introduction

The purpose of this study was to determine if telehealth services play a role in reducing the rate of readmission in CHF diagnosed patients. I determined this by analyzing the compliancy of SM behaviors required during the patient's telehealth enrollment period. I measured compliancy within the variable of telehealth discharge goal status with a *met* indicating the patient met all of the daily requirements fulfilling the program requirements or a *not met* indicating the patient did not fulfill the requirements to successfully complete the program (see Appendix B).

Two research questions were addressed in this study. The first research question was structured to address the various demographic, medical, and compliance factors that may predict readmittance amongst CHF patients enrolled in a home telehealth program. The null hypothesis was that demographic, medical, and compliance factors are not predictors for readmittance among CHF patients receiving telehealth services. The alternative hypothesis was that demographic, medical, and compliance factors are predictors for readmittance among CHF patients receiving telehealth services. The second research question addressed if gender plays a role in predicting demographic, medical, and compliance factors amongst CHF patients enrolled in a home telehealth program. The null hypothesis was that the relationship between demographic, medical, and compliance predictors and readmittance does not differ by gender. The alternative was that the relationship between demographic, medical, and compliance predictors and readmittance does differ by gender.

This chapter includes a summary of the data collection process that I used to analyze both research questions regarding telehealth efforts to reduce hospital readmissions of CHF patients. The procedures and exclusions in the data collection process are detailed to justify the methodology that I used to gather the results of this study. I also provide a detailed description of the data, including the population studied and the time frame of the data collected for the study.

Data Collection

The population for this study consisted of retrospective data that I obtained from a clinical data warehouse for the periods of 2017 and 2018. The data were a representation of patients admitted into the telehealth program during this time frame. All patients included in the study were veterans who receive their care at the medical facility studied. The length of time patients stayed in the telehealth program varied. The Length of Stay (LOS) is indicated in the report and is determined by the patient's specific needs and if the patients' needs are met according to the individualized plan created for the patient during the enrollment process.

I collected data using the inclusion criteria discussed in Chapter 3. The patient's personal identifiers were removed from this study, and each entity was assigned a randomly generated identifier not associated with identifying any component of the patients for this study. The data were collected and stored in a Microsoft Excel spreadsheet then uploaded, coded, and analyzed in SPSS software, Version 25. The data collected included patients who successfully completed and met the program requirements and those that did not successfully complete and did not meet the program

requirements. To identify the specific reason for meeting or not meeting the program requirements, I reviewed each chart to determine the outcome of the discharge reason.

The outcome of the data collected was different than I anticipated. The sample size of the population was smaller than expected. There were 130 cases initially retrieved for this study; however, 20 of the cases presented patients that were currently enrolled in the program at the time of the study, so they were excluded. This left 110 valid cases of patients that were enrolled in the home telehealth program with a CHF diagnosis during the 2017–2018 timeframe that I retrieved from the database. The reason for this outcome was also identified in this study. I included if the patient was readmitted into the hospital during their telehealth enrollment period in the telehealth program or if they were readmitted into the hospital after their enrollment period in the telehealth program. The ages for the population used in this study ranged from 43 to 95 years old. There were 105 males in the study and five females. Race/ethnicity was not identified in the study; therefore, it was not used as a variable.

Study Results

This section includes a comprehensive description of the results for this study I conducted to determine if telehealth efforts play a role in reducing hospital readmissions of patients diagnosed with CHF. The average age of the participants in this study was 68.82 years old with a standard deviation of 9.88 and a median age of 70 years old. The distribution of ages was approximate and normally distributed with minimal skew (.104) and kurtosis (-0.102). The youngest participant was 43 years old, while the oldest was 95 years old. Length of stay was 211.98 days on average with a standard deviation of 162.77

days. Length of stay was positively skewed (1.029), with slight excess kurtosis (.563). The shortest stay was 19.35 days and the longest was 715.30 days (see Table 3).

Age and gender were correlated ($r = .244$, $p < .05$), indicating that the male participants were older on average than the female participants. Length of stay and goals status were also correlated ($r = -.601$, $p < .01$), indicating that stays were longer on average for those who met the goals. In addition, the readmit variables were all correlated with each other, as would be expected. None of the predictors of age, gender, DM diagnosis (Dx), or goals status were correlated with any of the three dependent (i.e., readmission) variables. This finding suggests that there were significant relationships in the logistic regressions but is only a preliminary indication (see Table 6).

A cumulative frequency analysis established that older patients were readmitted at telehealth program in large numbers. People aged between 60 and 80 years old accounted for 67% of the sample size. The number of aged individuals was higher compared to other groups used in this study. There also was an increasing tendency for people to be readmitted as their age advanced. Male counterparts were also found to have a higher risk of readmission as opposed to women.

Additionally, the results provided evidence that compliance factors were directly related to the rate of admittance of CHF patients. I found that patients who had a lengthy stay to have low chances of readmission (0.08). When the patient's care services were administered better than services provided by tele-healthcare services, the patient had the least chances of being readmitted for the treatment program (0.08). Noncompliance with the medical requirements of telehealth services was established to be the primary cause of

readmission in the treatment program for patients suffering from CHF (0.41). Moreover, the discontinuation of telehealth services was established to contribute significantly towards the readmission of patients suffering from CHF heart failure (0.05). Consequently, caregivers' inability to operate devices and technology was established to contribute insignificantly towards the readmission of the patient (0.08; see Table 5).

In addition, the findings established a positive correlation between age and demographics ($r = 0.10$), indicating demographics and age had a close association with rates of readmission for patients with CHF. A negative correlation was also established between the age and status goals of the discharge ($r = -0.021$). This correlation indicates there was an inverse relationship between discharge goals status and age concerning the rate of readmission for patients suffering from CHF. Another negative correlation was established between the discharge goals status and gender ($r = -0.05$), indicating that the two factors have an inverse relationship towards readmission of the CHF patients.

The results established a positive correlation between patient readmission during the health treatment program and age ($r = 0.14$, $p < 0.05$). This relationship indicates that more aged patients between the ages of 60 and 79 years old were readmitted in the telehealth program as opposed to younger patients. In addition, gender and patient readmission during the telehealth program established a positive correlation ($r = 0.15$, $p < 0.05$), indicating that more men were readmitted during the telehealth program as opposed to women. A negative correlation was established between patient readmission during the telehealth program and discharge goals status ($r = -0.14$, $p < 0.05$), implying

that there is an inverse relationship between the two variables in regard to readmission of patients with CHF.

Furthermore, I found readmission after the health treatment program and gender to be correlated ($r = 0.078$, $p < 0.05$). This coefficient implies a slight but positive relationship; hence, it can be implied that more men were readmitted at telehealth after the treatment program was over. Additionally, posttelehealth readmission and telehealth discharge goals were correlated ($r = 0.07$, $p < 0.05$), implying that readmission during the program and discharge goals of the program has a direct and positive relationship (see Table 6.)

Through conducting a logistic regression analysis, I found that none of the variables were significant predictors of readmission at any time. The overall model also was not significant ($\chi^2 = 6.623$, $df = 4$, $p = .157$). As a result, there was not enough evidence to reject the null hypothesis (see Table 7). In another logistic regression analysis, I found that the model was significant ($\chi^2 = 12.686$, $df = 4$, $p = .013$; Nagelkerke $R^2 = .152$) and explained approximately 15.2% of the variance. Length of stay was a significant predictor ($\chi^2 = 5.392$, $p = .020$, $OR = 1.004$) of readmission during the program. For every additional day of stay there was a 0.4% greater chance of readmission. For every additional 100 days, there is an increase of 40% in the odds of readmitting during the stay (see Table 8).

I also calculated collinearity statistics for the predictors. No problems with multicollinearity were found because all predictors had Variance Inflation Factor (VIF) values ranging between 1.103 and 1.608. Generally only VIFs in excess of 5 are

considered problematic. Similarly, tolerance values ranged from .622 to .968, well within the acceptable range.

Patient satisfaction is important in telehealth because it is the link in the patient's comprehension in managing their day-to-day health care needs (Cleary, 2014). During this study, a retrospective review and analysis of the Home Telehealth (HT) Patient Satisfaction Survey was completed with patients that were enrolled in the telehealth program during the study period (see Appendix C). This review consisted of 537 participants previously enrolled in the HT program, and the results were not inclusive to CHF patients (see Appendix D). The study results were composed of all diagnoses. Eight questions were asked as they related to the patient's perceptions of their care while actively enrolled in the program. The survey concluded with an average cumulative score of 82% for the year 2017 and an average cumulative score of 88% for 2018. There was not target score set for this survey analysis. The results are used to assist in improving the patient's experience throughout the program. The lowest cumulative score for this survey in 2017 was 72% with the following question: "When I have questions, I am able to contact my care coordinator during business hours." The same question in 2018 improved by 13% with a score of 85%. The overall cumulative satisfaction survey score improved by 6% in 2018 in comparison to the previous year. This suggests that improvement in the patient's perception of their care has improved; however, additional collaborative efforts are needed.

Summary

The primary focus of this research study was to determine if telehealth efforts play a pertinent role in reducing hospital readmissions of CHF patients. SM behaviors are critical in-home telehealth and rely heavily on the patient and family being active and engaged in the daily needs of their care. Demographic variables demonstrated that a large portion of the study population were males. This analysis involved a quantitative retrospective review of 110 patients who were enrolled in a home telehealth program. The results of this study will help to improve gaps in examining how SM behaviors in a telehealth program play an integral role in reducing the rate of hospital readmissions amongst CHF patients. The study findings suggest that none of the variables were significant predictors of readmission. Readmission variables were analyzed during and after the enrollment period. As such, there was not adequate evidence to support rejecting the null hypothesis; therefore, I failed to reject the null hypothesis. These findings will help to examine future strategies for improving the SM behaviors of CHF patients enrolled in a telehealth program in efforts to reduce hospital readmissions.

Moreover, I conducted this study with a sample size of 110 participants, which is too small of a number to make general conclusions. For the purposes of accurate and reliable external validity, it is prudent to include a larger number in the discussion. However, the study findings reflect the effectiveness and reliability of telehealth program services through my rigorous and careful analysis of key determinant factors. The study was carried out accurately to fill in the gaps in the health sector, which the public sector had not been able to cover adequately. This study was also carried out in accordance with

the study site institution's established policies as well as in compliance with state regulations and policies governing research. In addition, various methods of data analysis were conducted to ensure the clarity and reliability of the findings. Various standard controls were also enacted to guide the research to remain objective to the needs of the subject in question.

Table 3

Descriptive Statistics for Scale Variables

	M	*SD*	Median	Skew (*SE*)	Kurtosis (*SE*)	Min.	Max.
Age	68.82	9.884	70.00	0.104 (0.23)	-0.102(0.46)	43	95
LOS	211.98	162.77	173.90	1.029(0.23)	0.563(0.46)	19.35	715.30

Table 4

Frequencies and Percentages for Demographic and Program Variables

Variable	Frequency	Percent
Age group		
49 or younger	2	1.8
50–59	16	14.5
60–69	35	31.8
70–79	43	39.1
80–89	11	10.0
90 or older	3	2.7
Gender		
Female	5	4.5
Male	105	95.5
Diabetes mellitus Dx		
No	66	60.0
Yes	44	40.0
Telehealth goals status		
Not met	37	33.6
Met	73	66.4

Table 5

Frequencies and Percentages for Readmission and Discharge Variables

Variable	Frequency	Percent
Readmitted during program		
No	74	67.3
Yes	36	32.7
Readmitted postprogram		
No	69	62.7
Yes	41	37.3
Readmitted any time		
No	47	42.7
Yes	63	57.3
Discharge reason		
Has met goals; no longer needs services	37	33.6
Prolonged hospitalization	4	3.6
Veteran care is greater than home telehealth services can provide	1	.9
Veteran has been admitted to higher level of care	3	2.7
Veteran has not responded to the requirements of the program	54	49.1
Veteran has relocated outside service area	2	1.8
Veteran/caregiver requests discontinue of service	7	6.4
Veteran/caregiver unable to operate devices	1	.9
Veteran/caregiver unable to operate technology	1	.9

Table 6

Correlations Between Key Study Variables

	1	2	3	4	5	6	7	8
1. Age	-	.244*	.089	.008	.159	.016	.124	.050
2. Gender		-	.000	-.063	.152	.078	.164	-.021
3. DM Dx			-	.071	.103	-.015	.105	-.050
4. Goals status				-	-.160	.071	-.109	-.601**
5. Readmit during					-	.023	.602**	.292**
6. Readmit post						-	.666**	-.077
7. Readmit any							-	.206*
8. Program LOS								-

Note. Spearman Rank-order correlation used for Program LOS due to positive skew. Phi coefficient was used for comparisons between two binary variables. Point-biserial correlation was used between continuous and binary variables.

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 7

Logistic Regression Predicting Readmission at Any Time

	B	*SE*	Wald. χ^2	*df*	*p*	*OR*
Age	.022	.021	1.145	1	.285	1.022
Goal status (met)	.042	.533	.006	1	.938	1.042
DM Dx	-.451	.412	1.200	1	.273	.637
LOS	.002	.002	2.229	1	.135	1.002
Constant	-1.459	1.468	.988	1	.320	.232

Note. Omnibus $\chi^2 = 6.623$, $df = 4$, $p = .157$

Table 8

Logistic Regression Predicting Readmission During Program

	B	*SE*	Wald. χ^2	*df*	*p*	*OR*
Age	.007	.020	.108	1	.742	1.007
Goal status (met)	.102	.537	.036	1	.850	1.107
DM Dx	.086	.409	.044	1	.833	1.090
LOS	-.002	.002	1.646	1	.200	.998
Constant	-.636	1.456	.191	1	.662	.529

Note. Omnibus $\chi^2 = 2.366$, $df = 4$, $p = .669$

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to determine the role telehealth plays in reducing the rate of hospital readmissions amongst patients diagnosed with CHF. In this study, I focused primarily on Ryan and Sawin's (2009) theory of IFSM, which involves the patient and their family actively engaging in initiatives to assist in improving their care daily. As noted in Figure 1, knowledge and beliefs, self-regulation, skills and abilities, and social facilitation are critical components that directly impact the outcomes of the program and the patient's overall health goals (see Ryan & Sawin, 2009). Even with proper planning and goals put in place, there is still opportunities for errors in the process of achieving successful outcomes, and this was validated by the results of this study and the finding that program participants who had a *not met* documented as their telehealth discharge goal.

Interpretation of Findings

The findings of this study contribute towards filling the gaps in education and patient behaviors in improving and modernizing telehealth services in efforts to minimize the unwarranted readmission rates of CHF patients. The findings indicated reasons why CHF patients are not successfully fulfilling their outcome goals in the telehealth program. The findings of this study provide information that will assist in maximizing collaboration efforts in improving SM behaviors amongst CHF patients enrolled in a telehealth program. Even though predictors, as a group in this study, did not show evidence to predict readmission amongst CHF patients enrolled in a telehealth program,

the descriptive statistics show readmission is more likely to occur if the patient's telehealth discharge status is not met. Out of the 73 cases that did not meet the program requirements, 54 were documented as "Veteran has not responded to the requirements of the program." This is the case when the patient has not fulfilled the daily participation requirements of the program, such as uploading pertinent data for weight, blood pressure, and heart rate or answering the daily care management questionnaire. Telehealth programs rely heavily on the patient or at-home caregiver's ability to successfully engage in normal day-to-day behavior. Successfully engaging in the daily activities is expected to increase desired outcomes and goals. As such, I recommend (a) further exploring the reasons a patient is a nonresponder and (b) reevaluating the guidelines and criteria for program enrollment is recommended.

The research findings can be utilized to complement the use of technology to play a key role in reducing the readmission of patients suffering from CHF. This finding effectively corresponds to those of Rosenstock (2014), which relate to the progress of technology in developing countries as the key factor in the expansion of telehealth services. This finding also confirms the decline in the costs of information technology playing a critical role in healthcare organizations' adoption of telehealth systems to manage the needs of patients (Rosenstock, 2014). For example, patient readmission rates can be managed by technology by allowing professional healthcare providers to connect with patients even after hospitalization; For example, technology has provided various models, such as patient-centered virtual visits, daily biometric surveillance models, among other efficient models (Rosenstock, 2014). The technological models can be

utilized in managing patients' needs virtually through remote connection. Alternatively, a healthy relationship is fostered between the patient and service provider through quality and timely service delivery.

Additionally, I found compliance to be inversely related to the rate of readmission of CHF patients in this study. According to Kulshreshtha et al. (2010), failure to adhere strictly to medical professionals' requirements and guidance increases the chances of readmission for patients' suffering from CHF. Compliance reduces rates of readmission by ensuring strict health and physical discipline is followed during and after hospitalization of patients. For example, CHF patients may be advised to adopt a certain mode of livings, such as regular exercising, healthy diets, and avoidance of certain products that increase risk factors, among other practices and adhering to such discipline enhances their body strength and reduces risk factors associated with CHF. Managing risk factors and creating body strength improves an individual's health, resulting in reduced chances of readmission for the patients.

Demographic factors, such as age and gender, have been established in this study to be effective in predicting readmission status of CHF patients. For instance, older adults and male individuals have been found to be prone to suffering CHF (WHO, 2010). This argument can be explained by the philosophy that men do not seek medical attention as often as female (WHO, 2010). According to the WHO (2010), the readmission in telehealth services among the older and male populations is higher compared to their counterparts. Men also have a tendency to persevere even during the hard times, resulting in internal suffering in contrast to women who find it difficult to maintain silence during

challenging times (WHO, 2010). As a result of perseverance, the men's heart is overworked to cover unexpressed feelings and emotions, resulting in cardiac disorders such as CHF (WHO, 2010). Consequently, the older population records higher chances of readmission because the human body system grows weaker during the late stages of life (WHO, 2010). Immunity to diseases is also reported to decrease due to reduced rates of activity for the body, and as a result, the body grows increasingly weaker as people age (WHO, 2010).

In summary, medical factors have been found to significantly reduce readmission for CHF. For instance, medication allows the patients to receive necessary health attention whenever the need arises. As a result, an individual's immune deficiencies are addressed on time to enhance the immunity system. Additionally, demographic factors assist in the prediction of patients' readmission, which plays a major role in designing the telehealth program to address the needs of the patients accordingly. Technology has played a vital role in enhancing the success of telehealth programs across the world (Louis, Turner, Gretton, Baksh, & Cleland (2015).

Limitations of the Study

There were several limitations in this study. One limitation pertained to the independent variables related to compliance and participation in the telehealth. My initial goal was to measure the percentage of daily data uploads completed as well as whether the uploads included the pertinent data for weight, blood pressure, heart rate, and pulse oximetry reading, if applicable. However, upon receiving IRB approval and retrieval of the requested data, the available data relating to compliance was dichotomous. The output

to measure compliance was either *met* or *not met*, with a notation of the reason for the outcome. Another limitation to the study was the number female participants in the study. There were only five valid cases for female participants that were included in the study compared to 105 valid cases of male participants.

Recommendations

I recommend further exploring the specific discharge reasons for why the patient did not meet the requirements to complete the program successfully. The top reason identified in this study was: "Veteran has not responded to the requirements of the program" (see Figure 3). I assumed that SM behaviors were poor or inadequate and placing more emphasis to further drill-down reasons is warranted. The current literature in the field support telehealth usage as a meaningful mode of communication between the patient and care team after hospitalization (Punchik et al., 2017).

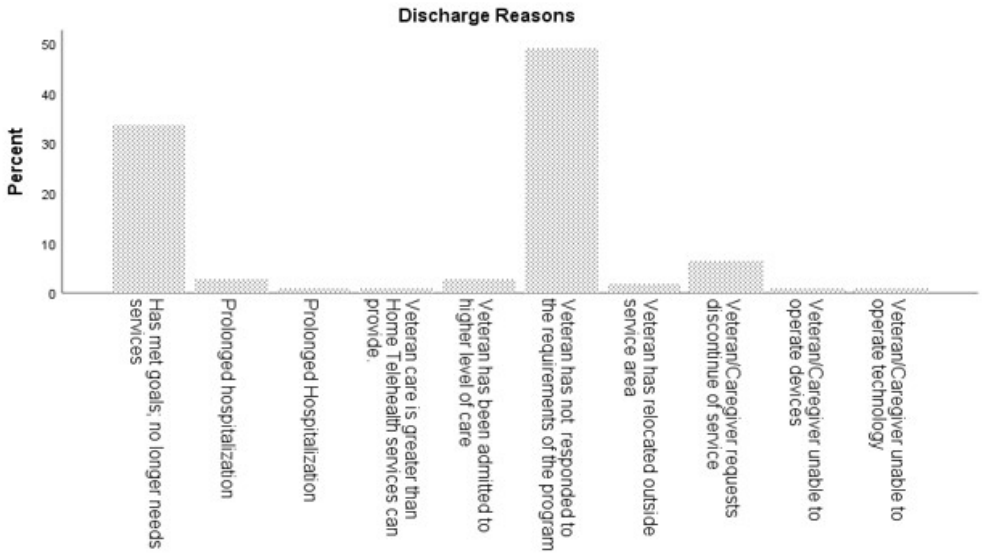

Figure 3. Telehealth program discharge reasons.

Barriers to communication may exist if adequate education prior to the patient's discharge is not accomplished. Heijmans, Waverijn, Rademakers, van der Vaart, and Rijken (2015) stated that education and health literacy have a direct correlation with successful health outcomes. Telehealth technologies can provide a plethora of advantages if proper and relevant training is implemented prior to hospital discharge. A drill down into some of the nonresponder chart documentation revealed on several occasions the patient could not be reached. Additionally, I recommend an in-depth drill down into the reasons why patients are not adhering to the program requirements to successfully have goals met. Furthermore, I further recommend incorporating homecare services, such as home-based primary care, into the patient's admission process for high-risk patients who may be susceptible to noncompliant behaviors during their enrollment period. Such homecare services can assist patients during their beginning stages of enrollment to facilitate a smooth transition into the telehealth program. A telehealth partnership with homecare can assist in preventing the unnecessary and unwarranted burdens of hospital readmissions or patients being discharged from the home telehealth program without successfully meeting their goals. Homecare services may prove useful in assisting CHF patients incorporate successful SM behaviors into a home telehealth program during the beginning stages of care.

In efforts to maximize the full potential of the telehealth program, I recommend that expansion opportunities are explored to increase the number of CHF patients that are enrolled in the program. Opportunities exist for growth in the program because there are approximately 930 documented cases of patients at the study site currently diagnosed

with CHF, however, only 110 valid cases of unique patients were enrolled in the program during the period of 2017–2018. Increasing the sample size in future studies will allow greater opportunities in understanding and minimizing barriers that may exist in using telehealth efforts to reduce the rate of readmission amongst CHF patients.

Implications

The findings from this study have a potential impact on the promotion of positive social change through enhancing telehealth efforts in healthcare. Telehealth services play a pertinent role in the SM of critical conditions such as CHF. This study was justified because there is an urgent need to increase the SM behaviors of patients receiving telehealth services. Evidence suggests that there is a need to evaluate enrollment criteria and review program initiatives and prospective collaborative efforts to assist patients and their families improve engagement in SM behaviors in the telehealth program (Ryan & Sawin, 2009). SM behaviors encompass care coordination with the patient, his/her family, and their care team. It is important for patients to fully understand all elements of their conditions and how manage their care in efforts to improve their health outcomes and meet the established goals.

I used Ryan and Sawin's (2009) theory of IFSM in this study because of the implication that the patient and their family are influenced by the underlying factors of their daily routines and environment. Factors, such as symptoms management, adherence to medication management, recognizing symptoms, and managing day-to-day routines, are important and lifestyle modifications should be emphasized to adhere to these factors and meet established goals. This study aligned with the IFSM model because

collaboration is critical in providing the best care to CHF patients enrolled in telehealth in efforts to reduce their rate of readmission.

Conclusions

The goal of this study was to determine if telehealth efforts assist in reducing the rate of readmission amongst CHF patients. Research has proven that effective SM behaviors facilitated by telehealth programs play a vital role in improving health outcomes (Heijmans, Waverijn, Rademakers, van der Vaart, & Rijken, 2015). Despite the numerous studies on telehealth initiatives, reducing hospital readmission, and improving outcomes of CHF patients, a gap still existed in improving SM behaviors that affect the role the patient and the family play in establishing successful outcomes once enrolled into a telehealth program to lower the rate of readmission amongst CHF patients. Collaboration is vital and, if successfully incorporated into telehealth, allows opportunities for healthcare professionals and the patient to improve outcomes and discover barriers that impede the facilitation of quality care for all stakeholders in the patient's journey to excellent, quality care.

The findings of this study provided insight into the barriers that exist with patients diagnosed with CHF successfully completing the home telehealth program. SM behaviors involve the patient and family incorporating their perceptions about their care and health condition into the patient's care management plan and are important in stabilizing and improving the patient's health outcomes. Engaging patients in every facet of self-efficacy in their care can lead to successful health outcomes. The results of this study proved that CHF patients who successfully complete the telehealth program and meet all of their

established goals minimize the risk of being readmitted into the hospital, allowing opportunities for improved health outcomes and enhanced quality of life.

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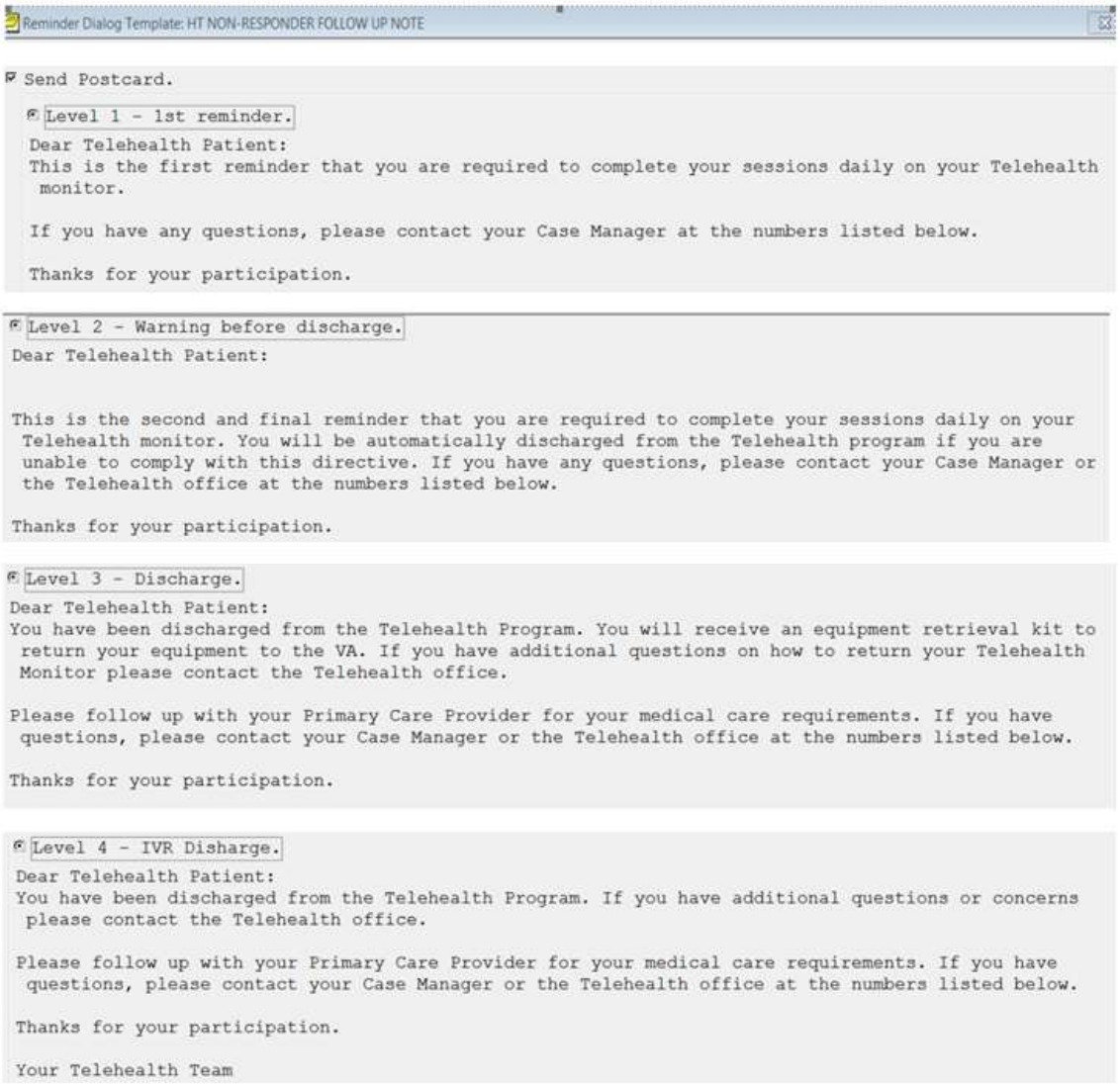
Appendix A: HT Nonresponder Follow-Up Note



Reminder Dialog Template: HT NON-RESPONDER FOLLOW UP NOTE

Send Postcard.

Level 1 - 1st reminder.

Dear Telehealth Patient:
This is the first reminder that you are required to complete your sessions daily on your Telehealth monitor.

If you have any questions, please contact your Case Manager at the numbers listed below.

Thanks for your participation.

Level 2 - Warning before discharge.

Dear Telehealth Patient:

This is the second and final reminder that you are required to complete your sessions daily on your Telehealth monitor. You will be automatically discharged from the Telehealth program if you are unable to comply with this directive. If you have any questions, please contact your Case Manager or the Telehealth office at the numbers listed below.

Thanks for your participation.

Level 3 - Discharge.

Dear Telehealth Patient:
You have been discharged from the Telehealth Program. You will receive an equipment retrieval kit to return your equipment to the VA. If you have additional questions on how to return your Telehealth Monitor please contact the Telehealth office.

Please follow up with your Primary Care Provider for your medical care requirements. If you have questions, please contact your Case Manager or the Telehealth office at the numbers listed below.

Thanks for your participation.

Level 4 - IVR Disharge.

Dear Telehealth Patient:
You have been discharged from the Telehealth Program. If you have additional questions or concerns please contact the Telehealth office.

Please follow up with your Primary Care Provider for your medical care requirements. If you have questions, please contact your Case Manager or the Telehealth office at the numbers listed below.

Thanks for your participation.

Your Telehealth Team

Appendix B: Telehealth Enrollment Guideline

Telehealth Enrollment Guideline

Home Telehealth Enrollment Criteria:

1. The Veteran is enrolled at the [redacted] Medical Center or associated [redacted] clinics.
2. The Veteran has an assigned Primary Care Provider who agrees with enrollment and is willing to participate.
3. The Veteran agrees to participate in the program.

In addition, the following DMP specific criteria:
Diabetes: HbA1c > 9 within 90 days.
Hypertension: *At least* 2 current consecutive visits with B/P readings> 150/90 within 90 days.
Chronic Obstructive Pulmonary Disease (COPD): 2 admissions / Urgent Care visits for COPD within past 6 months.
Congestive Heart Failure (CHF): Inpatient admission for CHF and meets one of the following criteria:

- One or more admissions or ER visits for CHF within the last 6 months
- Current Exacerbation within 30 days
- Newly diagnosed CHF
- Non-adherent to treatment regime
- Requires oxygen
- In need of education about heart failure and self-management

Exclusion criteria for the program:

1. The Veteran's life expectancy is less than 6 months.
2. The Veteran is admitted or residing in a long-term care facility.
3. There is an inability to contact Veteran.
4. Veteran is required to have current PCP visit and updated medication orders within 6 months.
5. Veteran must be able to perform and/or have dependable person to perform the necessary task of entering DMP data into an in-home messaging device and/or be able to hear and verbally speak DMP information into a telephone receiver if necessary.

Appendix C: Home Telehealth (HT) Patient Satisfaction Survey

Home Telehealth (HT) Patient Satisfaction Survey

THE PAPERWORK REDUCTION ACT OF 1995 requires us to notify you that this information collected is in accordance with the clearance requirements of section 3507 of this Act. The public reporting burden for this collection of information is estimated to average 1.5 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. No person will be penalized for failing to furnish this information if it does not display a current valid OMB control number. This collection of information is intended to fulfill the need identified by the Department of Veterans Affairs in their call for evaluation and improvements to the current Patient Satisfaction program. Your obligation to respond to this survey is voluntary and failure to furnish this information will have no effect on any of your benefits.

1. My care coordinator explains things in a way that is easy to understand.
□ Always
□ Usually
□ Sometimes
□ Never

2. The information provided by my care coordinator has helped me manage my health problem(s).
□ Strongly Agree
□ Agree
□ Disagree
□ Strongly Disagree

3. Over the past 3 months, my home telehealth equipment works:
□ Always
□ Usually
□ Sometimes
□ Never

4. My home telehealth equipment is easy to use.
□ Strongly Agree
□ Agree
□ Disagree
□ Strongly Disagree

5. I have made changes in the way I take care of myself as a result of the VA home telehealth program.
□ Strongly Agree
□ Agree
□ Disagree
□ Strongly Disagree

6. When I have questions, I am able to contact my care coordinator during business hours.
□ Always
□ Usually
□ Sometimes
□ Never

7. Using the VA home telehealth program has made a positive difference in my health.
□ Strongly Agree
□ Agree
□ Disagree
□ Strongly Disagree

8. I would recommend a home telehealth program to others.
□ Strongly Agree
□ Agree
□ Disagree
□ Strongly Disagree

Appendix D: Home Telehealth (HT) Patient Satisfaction Survey Results

Question	2017 Cumulative %	2018 Cumulative %
1) My care coordinator explains things in a way that is easy to understand.	78%	92%
2) The information provided by my care coordinator has helped me manage my health problem(s).	80%	85%
3) Over the past 3 months, my home telehealth equipment works:	88%	90%
4) My home telehealth equipment is easy to use.	89%	89%
5) I have made changes in the way I take care of myself as a result of the VA home telehealth program.	81%	85%
6) When I have questions, I am able to contact my care coordinator during business hours.	72%	85%
7) Using the VA home telehealth program has made a positive difference in my health.	80%	86%
8) I would recommend a home telehealth program to others.	88%	89%
Patient Satisfaction Index	82%	88%

Based on 537 survey(s) received that were completed from 01/2017 through 01/2019