NURSE HOME VISITS WITH EDUCATION: AN EFFORT TO REDUCE 30-DAY READMISSION RATES AND IMPROVE PATIENT SATISFACTION SCORES

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ABSTRACT

Eugeniu Ghidora: Nurse Home Visits with Education:
An Effort to Reduce 30-Day Readmission Rates and Improve Patient Satisfaction Scores
(Under the direction of Margaretenn House)

The purpose of this study was to evaluate a one-time home based nurse intervention with education for patients recently discharged from a hospitalization for heart failure as an effective and low-cost method to improve patient satisfaction and decrease the 30-day hospital readmission rate. This study used a single-center quasi experimental study. Participants were enrolled at their first visit to the heart failure clinic after hospital discharge from an admission with heart failure. They received a nurse home visit in the 3rd week after hospital discharge plus the usual care provided by the heart failure clinic. Patient satisfaction scores and 30-day all cause hospital readmission rates were assessed before and after the intervention.

The mean of the overall patient satisfaction score increased by 0.16, but was not statistically significant at 0.05 significance level. However, after analyzing only the survey questions that were likely to be impacted the intervention, a statistically significant increase in patient satisfaction mean of 0.265 was observed. The 30-day all cause hospital readmission rate decreased by 15.5% after the intervention, which was statistically significant at 0.05 level of significance.

This study reveals a significant reduction in 30-day all cause hospital readmission rate as well as an increase in patient satisfaction in relevant areas as a result of a nurse home visit with education for heart failure patients recently discharged from a hospitalization.

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TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

In the U.S., there are around 6.5 million people suffering from congestive heart failure, a condition that accounted for $30.7 billion per year in treatment related costs in 2013 (Aggarwal & Gupta, 2014). Moreover, about 25% of these patients are readmitted within 30 days of discharge readmission rate post hospital discharge (Aggarwal & Gupta, 2014).

Congestive heart failure is a chronic and complex condition that impairs the heart's ability to pump blood efficiently (Islam, O'Connell, & Lakhan, 2013). Despite great improvements in the medical management of people with this condition, patient participation in their own care remains a determining factor in the long-term success in the management of their condition (Chen, Yehle, Plake, Murawski, & Mason, 2011). These individuals are expected to comply with a restricted diet, take medications as prescribed, monitor their weight on a daily basis, and recognize and respond to symptoms when they occur by implementing prescribed interventions such as taking an extra diuretic for shortness of breath or calling the healthcare provider for additional treatment recommendations (Jurgens, Lee, Reitano, & Riegel, 2013).

Patients' lack of knowledge and the motivation to adapt to their condition have been identified as barriers towards achieving adequate management of heart failure (Chen et al., 2011). Educational activities are believed to be essential in optimal care of these patients, but there are knowledge gaps regarding the effectiveness of specific interventions (Feltner et al., 2014; Jaarsma, 2013).

The purpose of this study was to evaluate a one-time home based nurse intervention with education for patients recently discharged from a hospitalization for heart failure as an effective

and low-cost method to improve patient satisfaction and decrease the 30-day hospital readmission rate. The specific questions that this study answered are:

1. Will a one-time nurse home visit with patient education about medication management, dietary recommendation, self-care skills, and follow up care decrease 30-day hospital readmission rate for heart failure patients?

2. Will a one-time nurse home visit with patient education about medication management, dietary recommendation, self-care skills, and follow up care increase patient satisfaction scores in patients with heart failure?

CHAPTER 2: LITERATURE REVIEW

Recommended Care

In 2013, the American College of Cardiologists along with the American Heart Association (ACC/AHA) formulated guidelines for managing heart failure which included both pharmacologic and non-pharmacologic interventions (Yancy et al., 2013). The medical and pharmacologic treatment is very complex and includes use of medications such as ACE inhibitors, ARBs, diuretics, digoxin, statins, beta-blockers, aldosterone antagonists and calcium channel blockers (Yancy et al., 2013). Implantable cardiac defibrillators (ICDs) are also recommended in more advanced heart failure patients (Yancy et al., 2013). Non-pharmacological interventions including lifestyle modifications such as lower sodium intake, limiting fluid intake and increase physical activity play a role in management of this chronic disease (Yancy et al., 2013). A significant part of pharmacological and non-pharmacological interventions are performed by the patients, therefore referred to as self-care behaviors, and include: medication adherence, symptom monitoring, including daily weighing, restriction of dietary sodium intake, restriction of fluid intake, smoking cessation, alcohol restriction, regular exercise, weight loss, and keeping regular appointments (Yancy et al., 2013). Knowledge is without any doubt the centerpiece in management of such a complex health issue. Therefore, it is not surprising that the 2013 ACC/AHA guidelines recommend that patients receive education to facilitate heart failure self-care (Yancy et al., 2013). The education should be initiated in the hospital and continued in the outpatient setting with each visit or telephone encounter (Yancy et al., 2013).

The Gap between Recommended and Actual Care

The guideline recommendations broadly suggest that patients should be educated about self-care in a continuous manner that starts in the hospital and continues after the patient leaves the hospital (Yancy et al., 2013). However, there are many barriers at different levels impacting the implementation of these guidelines including patient level barriers, provider level barriers, and system level barriers (McEntee, Cuomo, & Dennison, 2009).

Patient Level Barriers

Knowledge. Managing heart failure is not a task for healthcare professionals alone because it depends so much on the performance of recommended self-care behaviors by patients (Holden, Schubert, & Mickelson, 2015). In general, 80% of patients lacked knowledge about appropriate self-care in heart failure at many levels (Holden, Schubert, & Mickelson, 2015). For example, 53% of patients lacked understanding about dietary recommendations; 27% of individuals with heart failure didn't know their recommended fluid intake; 21% were unaware of the importance of weighing daily (Barclay, Momen, Case-Upton, Kuhn, & Smith, 2011; Holden et al., 2015). Up to 37% of heart failure patients struggled to identify medications they were taking for heart failure management (Ruf et al., 2010; Siabani, Leeder, & Davidson, 2013). Additionally, as many as 60% of individuals with heart failure did not seek medical attention with early signs of exacerbation of the disease (McEntee et al., 2009).

Lack of knowledge about different aspects of self-care in heart failure was more often correlated to patients' low health literacy level (Mussi et al., 2013; Nasstrom, Idvall, & Stromberg, 2015). This correlation was found even after controlling for age, sex, race, income, marital status or insurance (Laramee, Morris, & Littenberg, 2007). Despite the lack of knowledge on the part of the patients, less than 20% wanted more information about their

condition, with the desire for knowledge regarding dietary and physical guidelines being low on the patient's priority list. (McEntee et al., 2009). Others refrained from asking providers questions about the treatment because they believe that providers "knew best" (McEntee et al., 2009).

Low health literacy level was repeatedly shown to be connected to poor self-care (Aboumatar, 2013; Azzolin Kde, Lemos, Lucena Ade, & Rabelo-Silva, 2015). As a result, adherence with exercise, daily weighing, sodium restrictions, and fluid restriction were low as well (Alosco et al., 2014). The patient's lack of knowledge about the names and schedules of their drugs lead to decreased medication compliance in 66% of patients (Fikenzer et al., 2014; McEntee et al., 2009).

Comorbidities. As many as 90% of patients with heart failure had other concomitant conditions that impact their ability to learn new information or perform self-care tasks (Holden et al., 2015; Mastromarino et al., 2014; Yancy et al., 2013). Patients with multiple comorbidities had a long list of drugs that they have to take every day, which impacted their medication compliance (Mastromarino et al., 2014). Almost half of the patients attributed lack of physical activity to their comorbid conditions (Schweitzer, Head, & Dwyer, 2007). Thirty-six percent of heart failure patients suffered from depression (Lucas et al., 2015a). Besides depression, individuals with heart failure were burdened by anxiety, insecurity, a sense of powerlessness, anger, dissatisfaction, and resentment (Browne, Macdonald, May, Macleod, & Mair, 2014; Lucas et al., 2015a). Additionally, these individuals with psychological issues accounted for greater physical impairment and mortality (Delaney & Apostolidis, 2010; Lucas et al., 2015a).

Socioeconomic factors. Financial difficulties have shown to be a barrier to self-care (McEntee et al., 2009). The primary impact of financial barriers is correlated with medication

adherence (Hawkins, Jhund, McMurray, & Capewell, 2012). Low-income patients also struggle with transportation to appointments and affording low-sodium foods (Hawkins et al., 2012). The same study reports that individuals from lower socioeconomic level are 30% more likely to be readmitted within 30-days after discharge from a hospitalization with a heart failure exacerbation (Hawkins et al., 2012).

Provider Level Barriers

Many healthcare providers have insufficient knowledge about the guidelines and recommendations for the management of patients with heart failure (Mahramus et al., 2014). Less than half of general practitioners reported that current guidelines are applied in their day-to-day practice (McEntee et al., 2009). Additionally, 30% to 70% of nurses had difficulties recalling self-care measures for patients with heart failure (Mahramus et al., 2014). More than 75% of practitioners viewed current heart failure treatment options as overwhelming and not straightforward making it a challenge for them to manage these already complex patients (McEntee et al., 2009). Many times appropriate medication management was not achieved as providers reportedly failed to prescribe beta-blockers 66% of the time and angiotensin-converting enzyme inhibitors 33% of the time when indicated (McEntee et al., 2009). Of those who prescribed beta-blockers, 46% reported that up-titration to an optimal goal was problematic because of polypharmacy or to limited due to side effects (Leslie, McKee, Imray, & Denvir, 2005). Communication was also shown as an important limiting factor, especially in trying to explain the seriousness of the disease process and the complexity of the disease management to patient in lay terms without causing anxiety or depression (Barnes et al., 2006).

Systems Level Barriers

The lack of continuity and integration within healthcare organizations was identified as a barrier by providers (Browne et al., 2014). Another system barrier is the lack of clarity regarding the responsibilities of different practitioners across healthcare teams and organizations have been reported as an important barrier (Browne et al., 2014). Limited healthcare resources including funding, facilities, access to services, limited specialist referrals and long waiting list were reported to increase a patient's difficulty in getting service from specialists, community services, and social services (McEntee et al., 2009).

Efforts to Close the Gap

Regarding education and self-care, the ACC/AHA guidelines suggested that education regarding self-care should be started in the hospital and continued after discharge (Yancy et al., 2013). Additionally, in literature, it was emphasized that heart failure education is an essential component of discharge instructions (Regalbuto, Maurer, Chapel, Mendez, & Shaffer, 2014). However, even with thorough heart failure education at discharge, only 10% of patients were able to correctly answer all 6 questions on the provided education immediately after being taught by the nurse (Regalbuto et al., 2014; Rodriguez-Gazquez Mde, Arredondo-Holguin, & Herrera-Cortes, 2012). Providing patients with a nurse home visit focused on education or reinforcement of previous teaching about medication management, dietary recommendation, self-care skills, and follow up care could have an impact on closing this gap.

Home Visit Decreases Hospital Readmissions

Perhaps the most prevalent theme in the realm of heart failure (HF) management literature is the high rate of hospital readmissions and what measures can be implemented to prevent or reduce them. That is not surprising since hospital readmissions can lead to financial

burden due to penalties in reimbursement (Adib-Hajbaghery, Maghaminejad, & Abbasi, 2013; Stamp, Machado, & Allen, 2014). Moreover, one study claims that almost 90% of hospital readmissions with heart failure exacerbation are preventable (Stamp et al., 2014) As a result, preventing readmission is the basis for many new treatments and interventions in the management of patients with heart failure (Adib-Hajbaghery et al., 2013; Stamp et al., 2014).

The problem is too complex to define a clear cause, but there are common themes that are associated with the increase in hospital readmissions for heart failure, one of them being the transition points, such as the ones from hospital to home, which can contribute to lapses in the quality and safety of healthcare delivery (Stamp et al., 2014). At this point, the amount, the quality, and the methodology of education that heart failure patients receive varies (Horwitz, 2010; Scott, 2010). One study claims that none of the patients that demonstrated complete understanding of discharge instructions were admitted within 30 days of being discharged (Regalbuto et al., 2014). However, patients who were able to show a complete understanding were more likely to be highly educated (Regalbuto et al., 2014). It is not appropriate to direct an intervention toward a population based on their educational level as this information is essential for all patients in the management of their heart failure.

The most common factor associated with a higher hospital readmission rate for heart failure is the patient's lack of knowledge about the disease process, medication regimen, dietary and physical activity recommendations, and symptoms monitoring (Adib-Hajbaghery et al., 2013; Azzolin Kde et al., 2015). Other studies further define the lack of knowledge as a low health literacy level, which, as described above, is also directly associated with increased hospital readmission rates for heart failure (Aboumatar, 2013; Mussi et al., 2013). Therefore,

educational interventions should be one of the main interventions to reduce on the risk for hospital readmissions.

Clinical practice guidelines recommend that nurses educate patients about disease processes and management to include medications, dietary restrictions, activity, follow up, and signs and symptoms to report (Leventhal et al., 2011; Yancy et al., 2013). Educational interventions have demonstrated an improvement in the patient's knowledge, and subsequently a reduction in hospital readmission rates with heart failure (Dunbar et al., 2015; Lacaze, 2011; Trojahn et al., 2013). Even education at the point of discharge from the hospital positively impacts hospital readmission rates (Adib-Hajbaghery et al., 2013). However, home-based education is especially important at reducing re-hospitalizations (Adib-Hajbaghery et al., 2013; Health Quality Ontario, 2013). There is an abundance of studies that demonstrate the impact of nurse home visit with education on the rate of hospital readmission (Agrinier et al., 2013; de Souza et al., 2014; Feltner et al., 2014; Horwitz, 2010; Leventhal et al., 2011; Sarwar, 2013; Scott, 2010; Tsuchihashi-Makaya et al., 2013; Yu et al., 2015). Some of the studies conclude that nurse home visits performed in combination with telemonitoring or multidisciplinary interventions are directly associated with lower readmission rates, especially when targeting self-care behavior improvement (Agrinier et al., 2013; Davis, Bender, Smith, & Broad, 2015; Riegel et al., 2009).

In light of the fact that high readmission rates are associated with a patient's lack of knowledge, hospitals implemented education programs during a patients' hospitalization with HF and emphasized at the point of discharge, which shows promising results (Regalbuto et al., 2014; Scott, 2010). However, there is room for improvement in patient's retention and understanding of the information they are taught when hospitalized despite excellent education

done in hospitals (Horwitz, 2010; Mehralian, Salehi, Moghaddasi, Amiri, & Rafiei, 2014; Scott, 2010). Moreover, many studies show that education done in patient's homes offer improvement in the patient's understanding of their heart failure and management beyond education provided by the discharge instructions at the time they are discharged home (Adib-Hajbaghery et al., 2013; Oosterom-Calo et al., 2013; Rodriguez-Gazquez Mde et al., 2012). These works recommend and demonstrate that the transition from hospital to home extends beyond the discharge process and continues into the patient's homes (Bryant-Lukosius et al., 2015).

Home Visit Improves Patient Satisfaction

Patient satisfaction scores have become important indicators of quality care that are closely monitored by hospitals, payers, and healthcare consumers (Varkevisser, van der Geest, & Schut, 2012). This is not surprising as hospitals with higher patient satisfaction scores attract more patients and subsequently more revenue (Varkevisser et al., 2012). Moreover, lower patient satisfactions scores are associated with increased hospital readmission rates for heart failure (Boulding, Glickman, Manary, Schulman, & Staelin, 2011). Despite the obvious importance of patient satisfaction in the context of heart failure management, there is a lack of studies evaluating interventions aimed at improving this quality indicator. However, there are few studies which demonstrate that patient education done by a nurse in the patient's own homes is effective in improving patient satisfaction (Bryant-Lukosius et al., 2015; Lucas et al., 2015b; Sindhu S, 2010).

Home Visit Improves Other Outcomes

Health literacy. As discussed above, hospital readmissions are often due to patient's lack of knowledge about the disease process, medication regimen, dietary and physical activity recommendations, and symptoms monitoring, all of which are under the umbrella of health

literacy (Adib-Hajbaghery et al., 2013; Mussi et al., 2013; Riegel et al., 2009). However, low health literacy not only increases a person's chance of being readmitted to the hospital, it also impedes one's performance of self-care and adherence to the medication regimen (Aboumatar, 2013; Barnason, Zimmerman, & Young, 2012; Browne et al., 2014; Masterson Creber et al., 2015; Riegel et al., 2009). Moreover, patients with lower health literacy levels are less likely to participate in the clinical decision process (Aboumatar, 2013; Nasstrom et al., 2015).

Therefore, interventions that target improvement of health literacy levels in patients with heart failure should be a primary focus of clinical management of this population. There are many studies that demonstrate the importance of nurse home visits with education on the patient's level of health literacy (Aboumatar, 2013; Azzolin et al., 2013; de Souza et al., 2014; Lacaze, 2011; Rodriguez-Gazquez Mde et al., 2012; Trojahn et al., 2013). These interventions are effective even in the older population (Lemay, 2011). Targeting health literacy levels not only improve patient's knowledge about the disease and its management, but have also improved the overall quality of life (Dunbar et al., 2015).

Self-care. Self-care has a central role in management of patients with heart failure and is defined as a "naturalistic decision-making process that patients use in the choice of behaviors that maintain physiological stability and the response to symptoms when they occur" (Riegel et al., 2009, p. 1141). In the realm of heart failure, self-care includes following the advice of providers regarding medications, adhering to a low-sodium diet, exercise, and symptom monitoring (Riegel et al., 2009). This outcome is especially important because it impacts hospital readmission rates (Riegel et al., 2009). Alike other outcomes mentioned in this work, poor self-care is also associated with poor knowledge or low literacy levels (Aboumatar, 2013; Barnason et al., 2012; Browne et al., 2014; Masterson Creber et al., 2015; Riegel et al., 2009). This

becomes evident with studies demonstrating that educating patients improve their self-care abilities (Mussi et al., 2013). Education performed in the context of home visits are especially effective in improving self-care, even when it consist of a single home visit (Azzolin et al., 2013; Bertuzzi, de Souza, Moraes, Mussi, & Rabelo, 2012; de Souza et al., 2014; Health Quality Ontario, 2013; Lacaze, 2011; Masterson Creber et al., 2015; Monteiro Mantovani, Brasil Ruschel, de Souza, Mussi, & Rabelo-Silva, 2015; Mussi et al., 2013; Nasstrom et al., 2015; Oosterom-Calo et al., 2013).

Summary

The literature review reveals several areas that need improvement in management of patients with heart failure. These are: hospital readmission rates, self-care, and patient satisfaction (Adib-Hajbaghery et al., 2013; Boulding et al., 2011; Riegel et al., 2009; Stamp et al., 2014). A common factor that relates to every one of these areas is patient's reported lack of knowledge about the disease and its management (Aboumatar, 2013; Azzolin Kde et al., 2015; Barnason et al., 2012; Browne et al., 2014; Masterson Creber et al., 2015; Mussi et al., 2013; Riegel et al., 2009; Sindhu S, 2010). Education provided by nurses in the context of home visits is presented as an excellent way to improve literacy levels and subsequently the hospital readmission rates, self-care, quality of life, and patient satisfaction (de Souza et al., 2014; Feltner et al., 2014; Health Quality Ontario, 2013; Masterson Creber et al., 2015). There is an abundance of literature suggesting the nurse home visits with education are the most effective on the above outcomes because it factors in the patient's environment and social support (Ruschel, Azzolin, & Rabelo, 2012; Stamp et al., 2014). However, there is lack of understanding of the intrinsic value of the education done in patients' homes because most studies evaluate this intervention in the context of other multidisciplinary efforts such as telemonitoring, phone calls, etc. (Agrinier et al., 2013;

Bryant-Lukosius et al., 2015; de Souza et al., 2014). In addition, in previously discussed studies the number of home visits varies (Feltner et al., 2014; Rodriguez-Gazquez Mde et al., 2012). Multiple home visits with education are costly and could become a financial burden for healthcare entities. Therefore, a study to evaluate the effectiveness of a one-time home-based nursing intervention with education on 30-day readmission rates and patient satisfaction could establish a baseline of the effectiveness of home visits alone and therefore providing a low-cost option to assist individuals with heart failure successfully manage heart failure.

CHAPTER 3: CONCEPTUAL AND THEORETICAL FRAMEWORK

Overview of Social Cognitive Theory

Initially used in psychology, Social Cognitive Theory is a framework formulated by Albert Bandura as a reaction to the simplistic schemes of Behaviorism. Social Cognitive Theory explains the process of learning as a response to external stimuli consisting mainly of rewards and punishments (Bandura, 2005). In contrast, Bandura described the learning process as social modeling (Bandura, 2005). Therefore, individuals adjust their behavior by observing other individuals and the society as a whole. In this context he proposed the term triadic reciprocal causation, which presents human functioning (including learning) as a reciprocal interaction of intrapersonal, behavioral and environmental determinants (Bandura, 2012). There are 2 main components of it, self-regulation and self-efficacy, which are most relevant to this project.

Main Constructs of Social Cognitive Theory

Self –regulation is a central concept in this theory and describes the structure of human behavior modeling (Bandura, 1991). It consists of 3 sub-functions: self-monitoring one's behavior, its determinants, and its effects; judgment of one's behavior in relation to personal standards; and affective self-reaction (Bandura, 1991). When people become mindful of these processes, they are more likely to engage in desired behavior changing activities (Bandura, 1991).

Self-efficacy is another crucial concept. It is defined as the individual's belief about their capabilities to exercise control over events that affect their lives (Bandura, 1989). Self-efficacy

influences people's cognitive, motivational, affective, and selective processes (Bandura, 1989).

Applicability of Main Constructs to This Study

The practical application of this theory, in the context of teaching heart failure patient's new information and new skills, relies on its major concept of self-efficacy. Confidence has emerged as a major theme that can impact on a patients ability to manage their chronic diseases (Wu & Chang, 2014) "Unless people believe they can produce desired effects by their actions, they have little incentive to act" (Bandura, 2000, p 299). The higher people's efficacy expectation level is towards achieving a particular result, the greater their success will be in attaining it (Bandura, 2000). It becomes clear that an intervention could help patients manage their chronic conditions if that intervention is aimed at improving the individual's self-efficacy. Bandura described 4 ways of influencing people's self-efficacy.

The first and the most effective way of improving the sense of efficacy is through mastery experiences (Bandura, 2000). The successful performance of a task builds a strong sense of confidence in personal efficacy, while failures undermines it (Bandura, 2000). In practice it is important to assess baseline skill level and then divide goals into steps that are small enough that can ensure a patient's success, therefore improving his/her self-efficacy (Wu & Chang, 2014). For example, in the context of heart failure management, diet modification should take a step-by-step approach to avoid certain failure.

The second way of strengthening self-efficacy is through vicarious experiences, which entails observing other people similar to oneself succeeding by sustained effort (Bandura, 2000). In practice, patients could observe the educator perform that particular task (Wu & Chang, 2014). In this study, the nurse can demonstrate skills such as blood pressure monitoring, weighing, and assessing for lower extremity edema. The third way of improving people's beliefs

that they have what it takes to succeed is social persuasion (Bandura, 2000). People who are persuaded that they have the abilities to successfully accomplish a task are more likely to mobilize their efforts and abilities to master that task (Bandura, 2000). This strategy alone does not have much impact on self-efficacy if it is not accompanied by the other 3 means of influencing someone's belief in efficacy (Wu & Chang, 2014). In this study, a baseline of patient's skill set will be assessed in order to be able to appropriately persuade patients in the capabilities they have to accomplish a task.

The fourth strategy of modifying beliefs in self-efficacy is self-appraisal and removal of self-doubt (Bandura, 2000). When learning new behaviors, people feel stress, anxiety, and fatigue (Bandura, 2000; Wu & Chang, 2014). Many times individuals tend to interpret these emotional states as signs of inefficacy (Bandura, 2000). Therefore it is important for the educator to assess how the patient's feeling during the learning process and ensure him/her that fatigue is common especially in learning new skills and that does not represent weakness or incompetence (Wu & Chang, 2014). Heart failure patients have to eliminate salt from their diet, a task that often causes great discomfort and displeasure in food. The nurse should assure patients that these feelings do not in any form represent weakness or failure.

The other crucial component of Social Cognitive Theory is the concept of self-regulation, which consists of self-monitoring one's behavior, judgment of one's behavior, and affective self-reaction (Bandura, 1991). Self-monitoring is when people pay attention to their own performance (Bandura, 1991). In practice, the nurse can best assist patients by teaching them how to gather information about their own behavior using any method of self-monitoring such as instruments or assessment skills (Tougas, Hayden, McGrath, Huguet, & Rozario, 2015).

Self-judgment is another component of self-regulation and entails taking the information

acquired during self-monitoring and evaluating it against personal standards as well as against social expectations (Bandura, 1991). In this context the educator can praise and support the patient's progress, compare management strategies with national guidelines, as well as engaging the patient with a role model (Tougas et al., 2015).

The third and last component of self-regulation is the self-evaluation. This concept was also called affective self-reaction (Bandura, 1991). It consists of gaining self-respect for completion of particular goals and setting tangible benefits (Tougas et al., 2015). In this phase, the nurse could guide the patient to gain self-respect, confidence, self-efficacy, and positive thoughts about behavior change (Tougas et al., 2015).

Summary

The social cognitive theory is one of the most common behavior change theories that has been used in the management of chronic diseases (Bandura, 2000; Tougas et al., 2015). It has been used to help people with arthritis, asthma, chronic pain, diabetes, heart disease, obesity, depression, and spinal cord injury (Jang & Yoo, 2012; Leahy-Warren, McCarthy, & Corcoran, 2012; Martin Ginis et al., 2011; Plotnikoff, Lubans, Penfold, & Courneya, 2014; Tougas et al., 2015; Wu & Chang, 2014). There are good reasons why this framework was chosen over and over again. The theory emphasizes the importance of self-regulation as the source of behavior change (Tougas et al., 2015). This notion holds the assumption that patients could be empowered to manage their health if given the right tools and education. This framework also highlights the centrality of belief in one's efficacy as a determinant of success in behavioral change (Bandura, 1989). People have no incentive to act unless they have belief in their abilities to succeed (Bandura, 1991; Bandura, 2000). Social Cognitive Theory reveals the importance of self-efficacy and can empower nurses to assist patients in elevating their self-efficacy.

CHAPTER 4: METHODOLOGY

Research Questions

1. Will a one-time nurse home visit with patient education about medication management, dietary recommendation, self-care skills, and follow up care decrease 30-day hospital readmission rate for heart failure patients?

2. Will a one-time nurse home visit with patient education about medication management, dietary recommendation, self-care skills, and follow up care increase patient satisfaction scores in patients with heart failure?

Purpose Statement

Despite great improvements in the medical management of people with heart failure, patient participation in their own care remains a determining factor in the long-term success in the management of their condition (Chen et al., 2011). These individuals are expected to comply with a restricted diet, take medications as prescribed, monitor their weight on a daily basis, and recognize and respond to symptoms when they occur by implementing prescribed interventions such as taking an extra diuretic for shortness of breath or calling the healthcare provider for additional treatment recommendations (Jurgens et al., 2013). The purpose of this study is to evaluate a one-time home based nurse intervention with education for patients recently discharged from a hospitalization for heart failure as an effective cost-effective method to improve patient satisfaction and decrease the 30-day hospital readmission rate.

Specific Aims

The aim of this study is to implement a one-time nurse home visit with patient education and to assess its effects on patient satisfaction and 30-day hospital readmission rate.

Hypothesis

1. A one-time nurse home visit with patient education about medication management, dietary recommendation, self-care skills, and follow up care will significantly increase patient satisfaction.
2. A one-time nurse home visit with patient education about medication management, dietary recommendation, self-care skills, and follow up care will significantly decrease 30-day hospital readmission rates.

Design Overview

This study used a Quasi-experimental study design to assess the effectiveness of a nurse home visit with education on patient satisfaction scores and 30-day readmission rates in heart failure patients. This design was selected to demonstrate causality between an intervention and an outcome (Harris et al., 2006). Although randomized controlled studies have the highest level of credibility with regard to determining causality, quasi-experimental studies are most often used when testing an intervention that has been proven effective (such as patient education) (Harris et al., 2006). Each participant received a nurse home visit with patient education about medication management, dietary recommendation, self-care skills, and follow up. Immediately before and right after the education session, participants were asked to complete a self-administered questionnaire that measures patient satisfaction. Thirty days after hospital discharge, participant's health records were reviewed to determine the 30-day all cause hospital readmission rate.

All the data related to this project was stored in a password-protected laptop maintained by the student researcher. The storage disk on the computer was encrypted and all documents containing patient data were password-protected.

Sampling

This study used a convenience, consecutive sample of heart failure patients followed by the UNC Rex Heart Failure Clinic. This study sampling includes individuals who met the entry criteria and were easily accessible to the investigator (Hulley, Cummings, Browner, Grady, & Newman, 2013). Selection bias was minimized by including the entire accessible population over a period of time (6 months) enough to address the research question (Hulley et al., 2013).

Inclusion criteria

- Admission to the hospital with a diagnosis of heart failure;
- Referral to the heart failure clinic;
- Male or female;
- Ages 55 to 75;
- Alert, oriented;
- English speaking;
- Willing to participate.

Exclusion criteria

- Patients discharged to short-term or long-term nursing facilities;
- Patients unwilling to participate.

Recruitment

After receiving approval from UNC Rex Healthcare Chief Nursing Officer and Director of NC Heart and Vascular, Internal Review Board (IRB) approval was obtained from the UNC Healthcare System on May 18, 2016 (see Appendix D). This study enrolled heart failure patients who were referred by hospital providers to the heart failure clinic. In 2015, UNC Rex Healthcare provided inpatient care for 16,417 patients admitted with a diagnosis of Heart failure (i2b2@UNC). Patients who are admitted with heart failure as a principal problem and are considered at higher risk for readmission, and are more likely to be referred to the heart failure clinic. Individuals who were referred by their provider to the heart failure clinic and subsequently enrolled to receive services from the clinic were given the option to participate in the study.

Human Subjects Consideration

Before the enrolment process, IRB approval was obtained from the University of North Carolina and from UNC Rex Healthcare system. All potential participants were contacted by the primary investigator in person or by phone in order to provide an explanation about the study including purpose, methods, risk and benefits, rights of confidentiality, and voluntariness. After signing the consent form (Appendix C), individuals were considered participants in the study. Signed consent forms were maintained by the primary researcher in a securely locked cabinet. Confidentiality and anonymity were ensured by storing research data in a well-encrypted laptop computer.

Measures

Patient satisfaction was measured using the Michigan Academic Consortium Patient Satisfaction Questionnaire (MAC-PSQ). This tool was developed fairly recently (2002) by

Michigan Academic Consortium in order to evaluate patient satisfaction in outpatient clinics that use nurse practitioners as providers (Benkert, 2002). It is a self-administered questionnaire that has 21 questions which are rated on a 4-point Likert-type rating scale that ranges from strongly agree to strongly disagree (Benkert, 2002). The questions are divided in 3 components of the questionnaire: patient's perceptions of care, phone contact, the patient's willingness to return to or recommend the clinic (Benkert, 2002). MAC-PSQ has high internal consistency (Cronbach's alpha =0.94) (Benkert, 2002). Questionnaire items were drawn from literature review of similar tools then reviewed by experts which increased validity (Benkert, 2002). MAC-PSQ was subsequently used along with other tools to determine patient satisfaction with different aspects of care (Benkert, 2002). Permission to use this tool in the study was obtained from the authors and can be found in Appendix B. A sample of the tool is included in Appendix A.

Setting

This study was conducted in the Heart Failure Clinic at UNC Rex Healthcare, which is part of the University of North Carolina Healthcare System. This clinic is a new addition to the numerous services that UNC Rex Healthcare provides to their cardiovascular patient population. It opened its doors on February 1st, 2016. The Heart Failure Clinic staff includes a Nurse Practitioner who is the Coordinator of the clinic, a Clinical Nurse Specialist (CNS), three Registered Nurses, a Pharmacist, and the Office Manager. A physician specializing in heart failure joined UNC Rex Healthcare as the Medical Director of this new service line on September 1st, which was after completion of the intervention for this study. The clinic enrolls patients that are referred by providers at UNC Rex Healthcare and other healthcare providers in the community. The Clinical Nurse Specialist and three Registered Nurses make follow up phone calls on a weekly or bi-weekly basis, depending on how stable patients are. Heart failure

patients are seen in the clinic within 7 to 14 days of discharge from an inpatient hospitalization. Additional acute visit appointments are scheduled if during a follow-up phone call done by the Clinical Nurse Specialist or the Registered Nurses a patient reports experiencing symptoms that require further evaluation. During each clinic visit, a heart failure patient receives teaching about heart failure management provided by a registered nurse, receives education about medications from a pharmacist, and is examined by the Nurse Practitioner. This multidisciplinary team comes together and determines whether or not patients are receiving optimal therapy and are compliant with the recommended treatment. The Nurse Practitioner, with great insight from the Pharmacist, the Clinical Nurse Specialist, and Registered Nurses, determines and adjusts the treatment plan as needed. This team communicates the plan with patient's primary cardiologist and primary care providers.

Procedures

The primary researcher met with the Chief Nursing Officer, Director of Quality Programs, Director of Heart and Vascular Services at UNC Rex Healthcare, Director of Rex Home Care Services, and the Vice President of Heart and Vascular Services at UNC Rex Healthcare to describe the research study and obtain permission for implementation. Benefits of the project and potential barriers were discussed during these meetings. The Director of UNC Rex Home Care Services provided education and training to ensure that primary researcher was prepared and equipped to conduct home visits. The stakeholder group was identified and consisted of the heart failure NP clinic coordinator, CNS, nurses, pharmacist; patient's primary care provider; UNC Rex Healthcare; and the patients and their families. The working group included the clinic's Nurse Practitioner, Clinical Nurse Specialist, and Registered Nurses. This group communicated at least monthly prior to the implementation of the project intervention,

weekly during the intervention, and again monthly upon completion of the intervention until the project was finalized and presented. The means of communication included in-person meetings, group email, and group text. This working group ensured that the recruitment process was adequate and the educational intervention was compatible to and reinforced the education provided by the heart failure clinic.

Patients enrolled in the heart failure clinic are expected to be seen in the clinic within 7 to 14 days from the date of hospital discharge. Based on individual patient needs, a subsequent visit to the clinic may be scheduled. During the post hospital follow up appointment at the UNC Rex Heart Failure Clinic, all participants that met the inclusion criteria were offered the opportunity to participate in the study by the principal investigator. If the potential participant expressed interest in participation, the primary researcher explained all the risks and benefit. If potential participants agreed to participate, they were asked to sign the informed consent form and were enrolled in the study. All participants received the usual care from the Heart Failure Clinic including follow up phone calls and heart failure clinic appointments during which participants are examined by the Nurse Practitioner, their medications are reconciled by the Pharmacist, and they receive education by the Clinical Nurse Specialist or by the Registered Nurse in addition to the intervention.

The intervention was a home visit with education from the primary researcher. The purpose of the nurse home visit was to reinforce the education provided in the heart failure clinic, assess for further education needs and provide the patient with any new information necessary to enable them to successfully manage their heart failure and overall level of health and well being. The intervention was provided to the participant between the 18^{th} to 22^{nd} day after the hospital discharge date. This time frame was chosen mostly to anticipate a decline in

participant's management of their condition since the heart failure clinic's staff noted that most of their readmissions happen after day 25 after hospital discharge. At the beginning of the home visit, all participants completed the patient satisfaction questionnaires. Those questionnaires were placed in a folder marked "Pre-intervention". Then, participants were asked about their strategies and level of success in achieving recommendations regarding diet, fluid intake, salt intake, and exercise. The primary researcher assessed the participant's knowledge about their medications as well as their compliance by examining medication bottles and pillboxes. Based on the amount of medication in the pill bottles and the date the medication was filled by the pharmacy, the primary investigator was able to assess participant's compliance. Examining the pillboxes, the investigator could determine whether or not participants are taking their medications correctly (right time, right dose, etc.). This assessment provided the primary investigator with a baseline of participant's knowledge and skills of managing heart failure. Participants received further education in all above-mentioned areas. Most participants had areas in which they struggled. Some of them didn't know the correct amount of fluid they were allowed to have, or they reported that they are not always compliant with fluid restrictions. Others had the same difficulties with salt restrictions, recommendations regarding daily weighing, or exercise. The primary researcher provided more education in areas that participants struggled more. Immediately after the education was complete, patients completed exactly the same patient satisfaction questionnaires that they filled out pre-intervention, which were stored in a separate folder marked "Post-intervention".

In order to maintain consistency and internal validity of the study, the primary researcher was the only person who conducted the intervention, collected, stored, and analyzed the data. The working group, mainly the project chair and the clinic's Nurse Practitioner, were consulted

on a weekly basis during the intervention and data collection in order to ensure that all steps were executed according to the project proposal that was approved by the DNP project's chair and committee members and by the UNC IRB. The accuracy of the data analysis and interpretation was completed or under the guidance of an UNC-affiliated statistician-consultant.

Timeline

This study was completed in 10 months. The study proposal was finalized and approved by the DNP Project Chair and committee at the end of March 2016. The study proposal was submitted to The University of North Carolina and UNC Rex Healthcare IRBs and approval was received 5/18/2016 (see Appendix D). Participant recruitment and implementation of the intervention began on 06/01/2016 and concluded on 08/31/2016. Data was analyzed in September and October of 2016. The final version of the project was presented and approved by the project committee by the end of February 2017.

Data Collection

The baseline 30-day hospital readmission rate for patients enrolled in the UNC Rex Heart Failure clinic was assessed for the months of March, April and May of 2016. The electronic health record (EHR) was used to determine individuals who would otherwise meet the inclusion criteria, which included those potential participants who had a clinic visit within 14 days of being discharged from the hospital. The EHR was used to assess the 30-day readmission rate of those who met the inclusion criteria. This was done by reviewing nurse follow-up call notes which are documented in the EHR. Nurse follow up calls are done on a weekly or bi-weekly basis. Potential participants are asked about their compliance with medications, daily weight checks, food, salt, and fluid intake. They are also asked about whether or not they went to the emergency room or hospital since the last phone call. One month after the intervention was completed, the

EHRs of the participants were reviewed in the same manner to assess the 30-day all cause hospital readmission rate for participants enrolled the months of June, July, and August of 2016.

Patient satisfaction was assessed pre and post intervention using t-test statistical analysis. Participants completed the Michigan Academic Consortium Patient Satisfaction Questionnaire (MAC-PSQ) right before and immediately after the intervention. Upon completion of each respective survey, they placed it into a sealed envelope marked "Pre-intervention" or "Post-intervention". All envelopes were collected, put in a folder, and kept in a secure cabinet only accessible by the principal investigator. After the intervention phase was concluded, surveys were sorted into a pre-intervention and post intervention folders. The content from each of the surveys was scored and manually transferred into one Excel spreadsheet for statistical analysis. The entered responses in Excel were sorted by participant in order to see how each of them answered survey questions before the intervention and after the intervention.

Data Analysis

Aim 1: In order to determine if home visits with education were effective in reducing 30-day readmission rates, the steps presented below were followed:

- Descriptive statistics were used to show the number of patients that were readmitted at the 30-day post discharge before the intervention was implemented (fig 1). Subsequently, the same methodology was used to present the 30-day readmission rate among qualified individuals after the intervention was implemented (fig 1).
- The post-intervention 30-day readmission rate, for participants enrolled in June, July and August was compared to the 30-day readmission rate among patients enrolled to the heart failure clinic during the months of March, April and May.

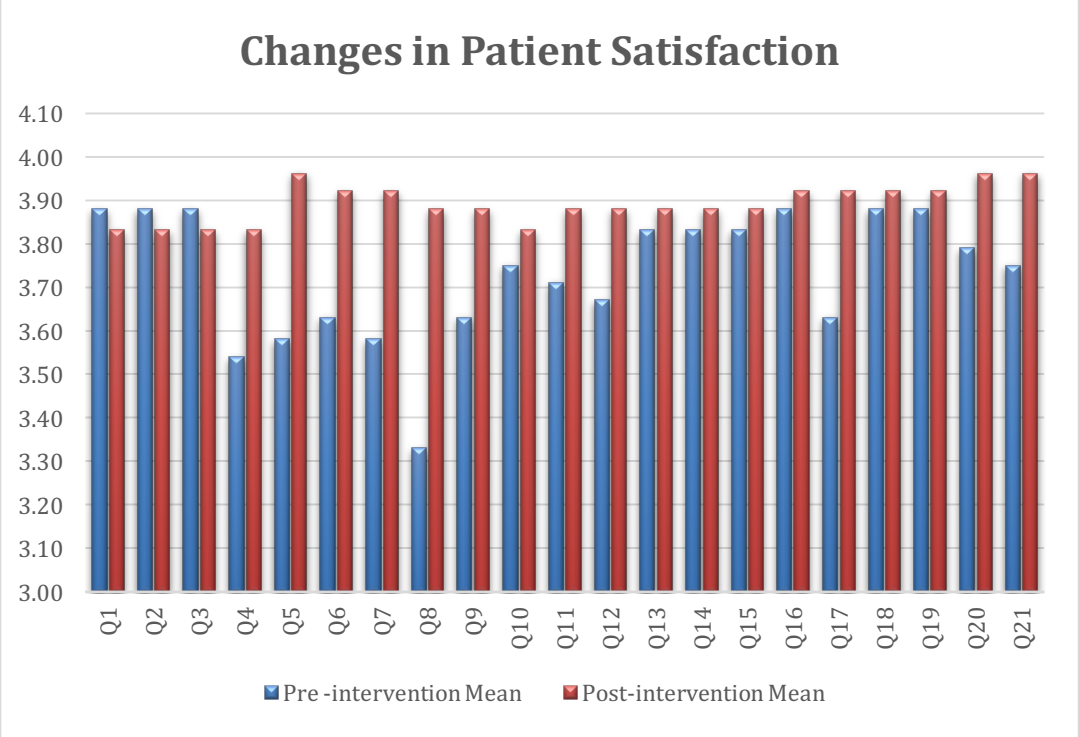
Figure 1. Summary or pre-intervention and post-intervention readmission data.

	Total number of patients seen in the Heart Failure clinic	Number of patients that met inclusion criteria.	Number of patients readmitted within 30 days from discharge	30-day Hospital readmission rate
Preintervention	108	31	7	23%
Postintervention	168	40	3	7.5%

Aim 2: In order to determine if home visits with education were effective at increasing patient satisfaction scores, the steps presented below were followed.

- Pre and post intervention patient satisfaction surveys were scored. The results were manually entered in an excel spreadsheet. Descriptive statistics was used to determine frequency distributions, means, and standard deviations of responses to each question (fig. 2).
- Post-intervention results were compared with pre-intervention results using t-test analysis, which is especially useful when working with small samples.

Figure 2. Pre and post intervention changes in patient satisfaction.



Alpha (the level of significance) was set at 0.05 when analyzing data for both of this study's aims. At this level, investigators set 5% as the maximum chance of erroneously rejecting the null hypothesis if it is true. Most studies choose a level of significance between 0.01 and 0.1. Alpha is set lower (0.01) when is critical to avoid rejecting the null hypothesis incorrectly such as in testing the efficacy of a dangerous drug. For a project that evaluates an educational intervention, a 0.05 level of significance is appropriate and used in many studies.

Results

The main outcomes assessed in this study were patient satisfaction and 30-day readmission rates.

Thirty-day readmission rate

A baseline 30-day all cause readmission rate was calculated through the completion of a retrospective chart review was conducted which looked at all the patients seen in the clinic during the months of March, April, and May. During this time, a total of 108 patients were seen in the UNC Rex Heart Failure clinic. Thirty-one patients or 29% of all the Heart Failure Clinic's patients met the study inclusion criteria, which are: a hospital discharge from an admission with heart failure followed by a visit at the Rex Heart Failure Clinic. Seven of the 31 patients were readmitted to the hospital within 30 days. The chart review revealed the 30-day all cause readmission rate at 23%, which is right above the national average (25%) (Aggarwal & Gupta, 2014).

From 06/01/2016 to 08/31/2016, a total of 168 patients were seen in the Heart Failure Clinic. The last participant was enrolled on August 25, 2016. Forty patients or 24% of all the Heart Failure Clinic's patients met the inclusion criteria for the study. Twenty-four individuals agreed to participate in the study. Therefore, the response rate was adequate at 60%. Participants that were declined participation in the study provided diverse reasons for declining with the most common reasons including feeling overwhelmed by the amount of doctor's appointments, expressing doubts about the effectiveness of the intervention provided by a student, or simply feeling uncomfortable to let any stranger enter their house. It is very likely that some of these reasons could have been minimized if the intervention was provided by one of UNC Rex Heart Failure Clinic's staff member.

After the intervention phase was completed was implemented, the electronic health records were again reviewed to assess all cause readmission rate for patients who visited the

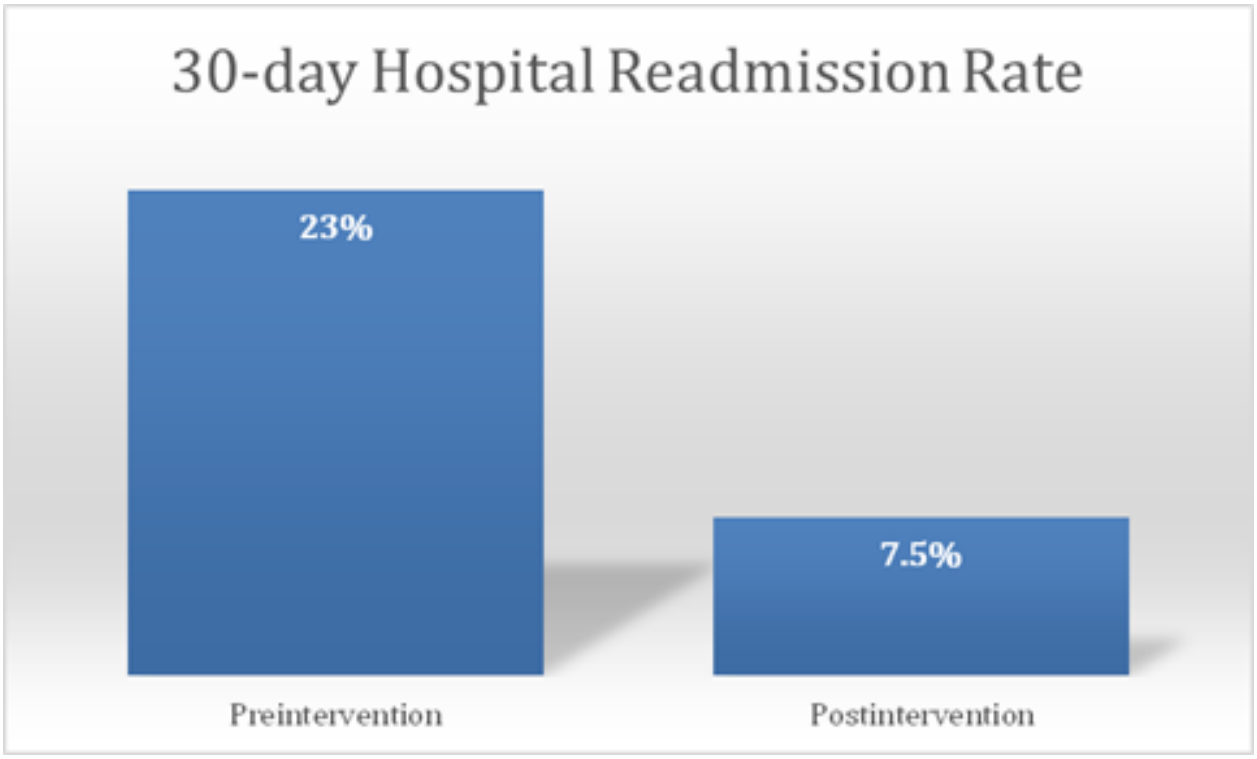
heart failure clinic during the months of June, July and August. There were 40 individuals who met the inclusion criteria. Only three patients were readmitted to the hospital within 30 days, setting the 30-day all cause readmission rate at 7.5% (n=40). Among participants that received a home visit, only one was readmitted within 30 days from hospital discharge, marking the 30-day readmission rate at 4% (n=24) for this particular group. Among individuals who met inclusion criteria but refused the nurse home visit, two were readmitted within 30 days from hospital discharge, setting the 30-day readmission rate at 13% (n=16) for this particular group.

Figure 1. Summary or pre-intervention and post-intervention readmission data.

	Total number of patients seen in the Heart Failure clinic	Number of patients that met inclusion criteria.	Number of patients readmitted within 30 days from discharge	30-day Hospital readmission rate
Preintervention	108	31	7	23%
Postintervention	168	40	3	7.5%

This is a 15.5% drop in readmission rate following the implementation of home visits with education, $z = 1.94$ and $p=0.02$. It can be concluded that at 0.05 significance level, the reduction in 30-day hospital readmission rate was statistically significant. These results are further confirmed by the difference in 30-day readmission rate between the group who received the nurse home visit (4%) and the group that refused the nurse home visit (13%).

Figure 3. Pre and post intervention changes in 30-day hospital readmission rate.



Patient Satisfaction

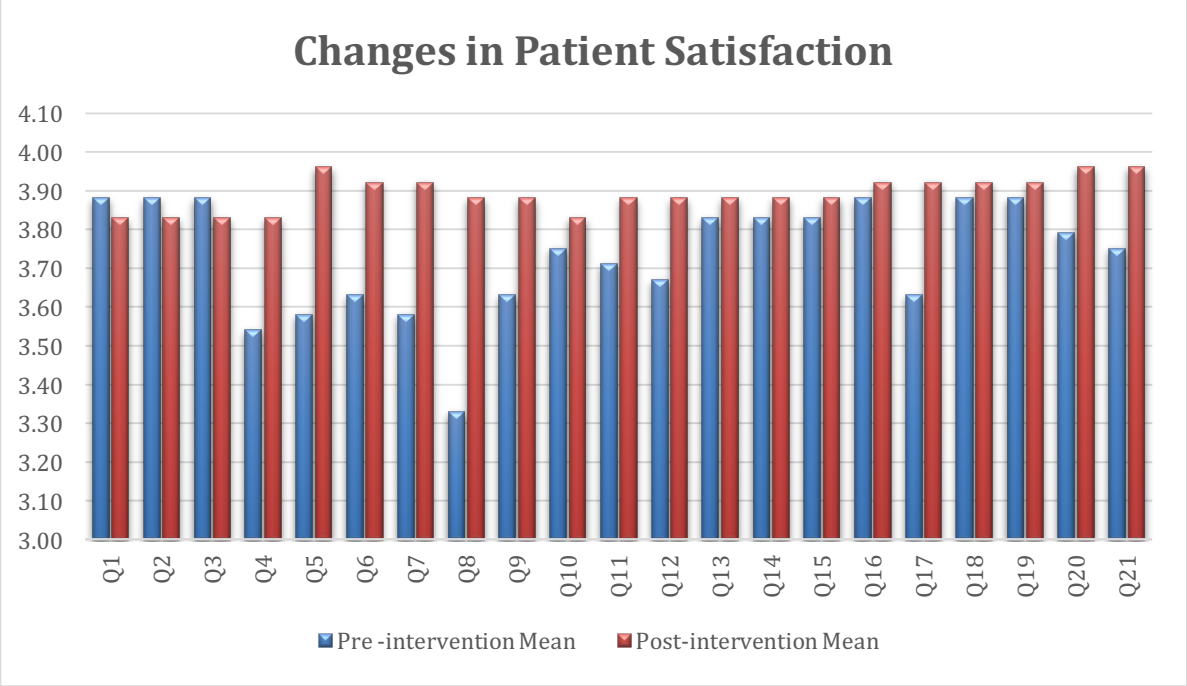
All completed patient satisfaction surveys were scored on a Likert scale of 1 to 4 and the means were calculated. The mean of the overall patient satisfaction score was $x=3.73$ ($SD=0.47$) before the intervention and $x=3.89$ ($SD=0.31$) after the intervention. There was a small increase post intervention of 0.16. However, at significance level of 0.05, this difference was not statistically significant, $t=1.39$, $p=0.1$. Statistical program R Software was used to analyze the data and obtain the above-mentioned results. This software was used because the statistician was most familiar with it and had used it for many years to get reliable results.

After the principal investigator individually analyzed all the questions there were 2 categories: those that focus on the processes and courtesy of the clinic staff, and those that are directly impacted by the intervention provided in this study. Questions that are directly impacted by the intervention revealed significant increases in patient satisfaction. These questions include:

question 4 “The clinician answered my questions in a way I could understand”, question 5 “The clinician listened carefully to what I had to say”, question 6 “The clinician explained problems and treatments clearly”, question 7 “The clinician was careful and thorough”, question 8 “I am satisfied with the amount of time the clinician spent with me during my visit”, question 9 “The clinician showed me respect and courtesy”, question 12 “I was satisfied with the care I received at the clinic”, question 17 “ The clinic follows up on the tests, treatments and referrals”, question 20 “I would tell a relative or friend to use this clinic”, and question 21 “I will probably use this clinic again”. Questions that were not impacted by the intervention include: question 1 “It was easy to make contact with the clinic by phone”, question 2 “The person on the clinic phone was very helpful”, question 3 “The clinic staff returned phone calls as soon as possible”, question 10 “The office staff showed me respect and courtesy”, question 11 “The clinician considered my beliefs about health and healing”, question 13 “The handouts that I received were easy to read and follow”, question 14 “The overall quality of care I received at the clinic was good”, question 15 “I am treated the same as other people who get care here”, question 16 “The clinic works with me to make care affordable”, question 18 “The clinic helps me get the health care I need”, and question 19 “I can get an appointment when I need it”.

It is not surprising that the results did not reveal any meaningful improvement since about half of the questions are not likely to be impacted by this intervention. Therefore, a closer look at the relevant questions alone became desirable.

Figure 2. Pre and post intervention changes in patient satisfaction.



Additional statistical analysis was performed using the same R software. This time, only the questions that were most likely to be impacted by the intervention were included (Q4, Q5, Q6, Q7, Q8, Q9, Q12, Q13, Q17, Q20, and Q21). When comparing the results, a completely different picture emerged. There was considerable improvement in the mean of 0.265 with $t=6.06$, $df=23$, and $p=0.000004$. The 95% confidence interval lies between 0.17 to 0.35. In other words, at 0.05 significance this intervention increased patient satisfaction at least 0.17 and up to 0.36. Therefore, it can be inferred that there was a non-zero increase in the test score and the null hypothesis can be rejected.

CHAPTER 5: DISCUSSION

This study evaluated the impact of a one-time home visit with education for patients with heart failure on 30-day all cause hospital readmission rates and patient satisfaction scores. Both of these outcomes are considered pivotal quality indicators in current healthcare. The project revealed a considerable reduction in the 30-day hospital readmission rate in heart failure patients that were enrolled at UNC Rex Heart Failure Clinic 15.5%, with $z=1.94$ and $p=0.02$. This reduction was statistically significant even when adjusted to the sample size ($n=31$). It is very important to note this study revealed benefits provided by nurse home visits that go beyond the ones provided by other interventions such as heart failure clinic visits, follow up phone calls, and monitoring devices.

It is worth noting that when comparing the readmission rate between the group that received the home visit and the group that refused to receive the intervention, the 30-day readmission rate is much lower in the group that received the intervention (4% versus 13%). However, the validity of this comparison is questionable because sample sizes are different ($n=24$ for those who received the home visit versus $n=16$ for those who refused the intervention), and because sample sizes are small for both groups. Additionally, the risk for readmission among individuals that refused the home visit might be lower since some of the reasons for refusing the intervention are having other healthcare services at their disposal.

The impact on patient satisfaction was initially seen as insignificant. However, when test questions only pertinent to the intervention were analyzed, a significant increase in patient satisfaction emerged. This phenomenon is very intuitive. Questions that assess clinician

performance are more likely to be affected by the educational intervention than questions that assess the office staff's processes and courteousness for instance. When eliminating questions that were not directly related to the intervention, the results showed a significant increase in patient satisfaction, namely a mean increase of 0.265 ($p=0.000004$).

Offering nurse home visits for patients with heart failure is not a new phenomenon. These types of services are provided by home care agencies and care coordination services for Medicaid patients. However, this study sheds light on new areas. Nurse home visits provided as the intervention part of this study were done in close collaboration between the primary investigator, the Nurse Practitioner, the Clinical Nurse Specialist (CNS), the Registered Nurses, the Pharmacist, and the Office Manager, which could have played a role in the positive results of the study. Also, this collaboration made home visits become personalized and relevant to each particular patient emphasizing the continuity of care.

Perhaps one of the most valuable findings was the fact that nurse home visits have the potential to reduce all cause hospital readmission in patients with heart failure beyond the reduction provided by the other services offered by the current heart failure clinics multidisciplinary approach to patient care and management.

Limitations

This study has several limitations that are worth noting. First, the sample size is small which has the potential to have an impact on the results. Second, the clinic is new and is still establishing itself, making it possible to speculate that the services provided by the clinic were also improving over the duration of the study, therefore reducing the impact of the study itself on the outcomes. Third, the study involved only subjects from a single health care entity, which can limit the generalizability of the results. Fourth, findings regarding changes in patient satisfaction

scores might be modest because the pre-intervention scores were high; therefore, there was not a lot of room for improvement. Fifth, the study reveals only a limited 3-month snapshot at 30-day all cause readmission rate that could average out when annualized as significant improvement or unchanged. Finally, samples were not stratified and adjusted according to age, sex, comorbidities and severity of the disease, which can potentially impact the findings.

Implications for Research

There is lack of studies that assess the impact of nurse home visits on patient satisfaction scores in individuals with heart failure. This small-scale study demonstrates an increase in patient satisfaction especially in the areas relevant to the educational intervention but also in overall satisfaction scores and willingness to return to the clinic. Confirmation of these findings with larger studies is needed in order to impact policy and future standards of practice. This study also revealed a considerable reduction in 30-day all cause hospital readmission rate beyond other services provided by the heart failure clinic such as telephone calls, clinic visits, and monitoring devices. Further investigation is needed to confirm these results with larger samples where results can be adjusted according to age, sex, comorbidities and severity of the disease. A cost-benefit analysis will determine if these reductions in 30-day readmission rates provide enough cost reduction that would justify the added cost of implementing nurse home visit services.

Implications for Nursing Practice

Home visits are effective in reducing readmissions as well as increasing patient satisfaction. Both of these outcomes were impacted beyond the services already offered at the heart failure clinic.

Although some patients receive home visits in some forms "Home Health" or Medicaid care coordination, these are not yet tightly coordinated with the UNC Rex Heart Failure Clinic. This study does not undermine the role of home care agencies in assisting individuals with heart failure to manage their chronic condition. On the contrary, this study emphasizes the importance of a tight collaboration between the heart failure clinic and the home care agency.

Moreover, some patients don't even qualify for home care services. UNC Rex Healthcare cannot provide continuity of care if it relies on patient's health plans and their financial well being. Therefore, this healthcare entity will most likely benefit from offering a nurse home visit service provided either by the Heart Failure Clinic's staff or by a home care agency that will be in close collaboration with the Hear Failure Clinic and will accept all heart failure patients served by the heart failure clinic regardless of their ability to pay.

Summary and Conclusions

This study has shown a positive effect of a nurse home visit with education in patients with heart failure on reducing 30-day all cause hospital readmissions and on improving patient satisfaction beyond the improvements already achieved with the other services provided by the UNC Rex Heart Failure Clinic. The intervention was conducted in close collaboration with the heart failure clinic personnel, which included the Nurse Practitioner, the Pharmacist, the Office Manager, the CNS, and the Registered Nurses, which may have ensured the positive results of the study. Patient satisfaction was also increased in areas pertinent to the educational intervention that was implemented. Besides increasing patient satisfaction and reducing 30-day readmission rate, this educational intervention is very likely to have made a big impact in patient's knowledge about managing heart failure and in their overall quality of life based on the results of other similar studies. Therefore, this healthcare organization might benefit from offering nurse home

visits in collaboration with the heart failure clinic to all heart failure patients that are at higher risk for readmissions, regardless of their insurance. It is very likely that the cost savings produced by nurse home visits will offset the cost of implementing this intervention.

APPENDIX A: PATIENT SATISFACTION SURVEY TOOL

Satisfaction Survey
Rex UNC Heart Failure Clinic

The health center would like to know how well we served you. Please tell us how much you agree or disagree with these statements and check only one box for each statement.

NOTE: The clinician is the person who saw you at the clinic today (the nurse practitioner, the physician, the student nurse practitioner, the social worker, dentist or dental hygienist.)

Date: ____/_____/_____

Mark one box in each line.	Strongly Agree	Agree	Disagree	Strongly Disagree	Doesn't Apply
1. It was easy to make contact with the clinic by phone.	☐	☐	☐	☐	☐
2. The person on the clinic phone was very helpful.	☐	☐	☐	☐	☐
3. The clinic staff returned phone calls as soon as possible.	☐	☐	☐	☐	☐
4. The clinician answered my questions in a way I could understand.	☐	☐	☐	☐	
5. The clinician listened carefully to what I had to say.	☐	☐	☐	☐	
6. The clinician explained problems and treatments clearly.	☐	☐	☐	☐	
7. The clinician was careful and thorough.	☐	☐	☐	☐	
8. I am satisfied with the amount of time the clinician spent with me during my visit.	☐	☐	☐	☐	
9. The clinician showed me respect and courtesy.	☐	☐	☐	☐	
10. The office staff showed me respect and courtesy.	☐	☐	☐	☐	
11. The clinician considered my beliefs about health and healing.	☐	☐	☐	☐	
12. I was satisfied with the care I received at the clinic.	☐	☐	☐	☐	
13. The handouts that I received were easy to read and follow.	☐	☐	☐	☐	☐
14. The overall quality of care I received at the clinic was good.	☐	☐	☐	☐	
15. I am treated the same as other people who get care here.	☐	☐	☐	☐	

Please turn over to page 2

(Mark one box in each line.)	Strongly Agree	Agree	Disagree	Strongly Disagree	Doesn't Apply
16. The clinic works with me to make care affordable.	☐	☐	☐	☐	
17. The clinic follows up on my tests, treatments, and referrals.	☐	☐	☐	☐	☐
18. The clinic helps me get the health care I need.	☐	☐	☐	☐	
19. I can get an appointment when I need it.	☐	☐	☐	☐	

	Definitely Yes	Probably Yes	Probably Not	Definitely Not
20. I would tell a relative or friend to use this clinic	☐	☐	☐	☐
21. I will probably use this clinic again	☐	☐	☐	☐

22. Main reason for visit: (Please check only one response.)	Routine Checkup	Illness or Injury	Follow-up Visit	Prenatal Care
	☐	☐	☐	☐

23. Whom did you see today?	Nurse Practitioner or Midwife	Physician	Student Nurse Practitioner	Social Worker	Dentist or Dental Hygienist
	☐	☐	☐	☐	☐

24. Your gender:	Male	Female
	☐	☐

25. Race/Ethnicity (check all that apply)

- ☐ White
- ☐ Black/African American
- ☐ American Indian/Native Alaskan
- ☐ Asian
- ☐ Native Hawaiian/Pacific Islander
- ☐ Hispanic

26. Age: _____

27. Do you have any additional comments about the clinic or your visit here today?

Developed jointly by the Institute for Nursing Centers and the Nursing Centers Research Network, 2008

APPENDIX B: COPY OF PERMISSION TO USE THE SURVEY TOOL

Joanne Pohl [jpohl@umich.edu]

Tuesday, March 08, 2016 3:48 PM

I am attaching the tool here. I assume you read about it so have a reference for it? All the best with your work.
There are 4 bolded items which we added when we revised it. The MAC tool you refer to may not have these 4 items.
I left it as a word document so you could insert your clinic name etc.

All the best

Joanne

Ghidora, Eugeniu

Actions

To: jpohl@umich.edu

Cc: ctanner@mphi.org

Sent Items

Tuesday, March 08, 2016 12:47 PM

Hi.
My name is Eugene Ghidora. I am a graduate student at University of North Carolina School of Nursing in the DNP program. I am interested in using the MAC-PSQ tool to assess patient satisfaction for clients of a heart failure clinic. What is the procedure to obtain and use this tool?

Thank you,

Eugene.

APPENDIX C: COPY OF WRITTEN INFORMED CONSENT

Home Visits with Education
Informed Consent Form

Introduction

I am a Nurse Practitioner Student at UNC Chapel Hill. In collaboration with the Rex UNC heart failure clinic, we are implementing a project that includes a nurse home visit with education for each participant. We are inviting you to participate in our project. You do not have to make a decision today whether to participate. Before you decide, you can talk to anyone you feel comfortable about the project.

There may be some words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain.

Purpose of the research

Heart failure is a chronic condition that is difficult to manage. Patients need a lot of education and support in order to be successful in management of this disease. This project intends to implement nurse home visits with for patients with heart failure in order to offer them more education about managing this chronic condition. Then the researchers will evaluate the results to determine if this intervention is effective in keeping patients out of the hospital longer and in increasing their satisfaction.

Participant Selection

We are inviting all Rex UNC Heart Failure Clinic's patients that have their first appointment during this enrollment period to participate in this project.

Voluntary Participation

Your participation in this project is entirely voluntary. Whether you choose to participate or not, all the services you receive at this clinic will continue and nothing will change. If you choose to participate in this project, you will be offered the treatment that is routinely offered in this clinic plus a nurse visit in your home with more education. You may change your mind and stop participating at any point in the project.

Procedures and Protocol

It is well known that patient education is very important in management of heart failure. Many studies suggest that education done in patient's homes, after they are discharged from the hospital, is very effective. This project will determine if only one home visit can help patients stay out of the hospital and be more satisfied with their care. The process that this project will follow is this:

- During the first Heart Failure Clinic after hospital discharge patients are offered to participate in the project.
- If you accept to participate, you will fill out a patient satisfaction survey to determine your satisfaction with your current care.
- A nurse home visit will be scheduled to take place about 2 weeks after the Heart Failure Clinic visit
- During the nurse home visit, you will receive information and guidance on how to better manage your heart failure.

- After the education during the home visit, you will be asked to fill out the patient satisfaction survey again.

Risks
By participating in this research it is possible that you will be at greater risk than you would otherwise be. The main risk is that your personal and medical information might be mishandled. However, the research team is trained and equipped with necessary tools to protect your personal and medical information.

Benefits
If you participate in this research you will have the following benefits:

- You will receive a visit from a registered nurse with experience in educating patients about heart failure management.
- You will receive guidance regarding the latest strategies in managing this condition
- If any signs of exacerbation of your heart failure will be noted at the time of the visit, the clinic will be notified and you will be further evaluated.
- Future heart failure patients will also benefit from the results of this project.

Confidentiality
The information that we collect from this project will be kept confidential. Information about you that will be collected during the research will be put away and no-one but the primary investigator will be able to see it.

Sharing the results
The knowledge that we get from doing this research will be shared with you through newsletters that will be mailed to you.

Right to Refuse or Withdraw
You do not have to take part in this research if you do not wish to do so and refusing to participate will not affect your treatment at this clinic in any way. You will still have all the benefits that you would otherwise have at this clinic. You may stop participating in the research at any time that you wish without losing any of your rights as a patient here. Your treatment at this clinic will not be affected in any way.

Who to Contact
Principal Investigator - Eugeniu Ghidora – RN, BSN (UNC FNP Student)
Email: genyuss@email.unc.edu
Phone: 919-671-8170

This proposal has been reviewed and approved by UNC Health Systems IRB which is a committee whose task it is to make sure that research participants are protected from harm. If you wish to find about more about the IRB, contact University of North Carolina-Chapel Hill at (919)966-3113

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

Print Name of Participant_____

Signature of Participant _____

Date (Day/month/year) _____

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

A copy of this ICF has been provided to the participant.

Print Name of Researcher/person taking the consent_____

Signature of Researcher /person taking the consent_____

Date _____
Day/month/year

APPENDIX D: COPY OF IRB APPROVAL

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

OFFICE OF HUMAN RESEARCH ETHICS
720 Martin Luther King, Jr. Blvd.
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CB #7097
Chapel Hill, NC 27599-7097
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Federalwide Assurance (FWA) #4801

To: Eugeniu Ghidora
School of Nursing

From: Non-Biomedical IRB

Approval Date: 5/18/2016
Expiration Date of Approval: 5/17/2017
RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
Submission Type: Initial
Expedited Category: 5.Existing or non-research data,7.Surveys/interviews/focus groups
Study #: 16-0841

Study Title: Nurse Home Visit with Education: An Effort to Reduce 30-day Readmission Rates and Improve Patient Satisfaction Scores

This submission has been approved by the IRB for the period indicated. It has been determined that the risk involved in this research is no more than minimal.

Study Description:

Purpose: To evaluate a one-time nurse home visit with education for patients recently discharged from a hospitalization for heart failure as an effective method to improve patient satisfaction and decrease the 30-day hospital readmission rate.

Participants: Individuals (males and females) who were discharged after a hospitalization for heart failure and were enrolled at Rex UNC Heart Failure Clinic.

Procedures (methods): Prior to implementation of the intervention, 30-day readmission rate for Rex UNC Heart Failure Clinic will be assessed to establish a baseline. Participants will complete a self-administered questionnaire to determine the baseline score for patient satisfaction. The principal researcher will perform one home visit for each participant and provide education about heart failure management. Each participant will then fill out the same patient satisfaction questionnaire to determine whether there was an improvement in patient satisfaction after the intervention. Also, for the following three months, 30-day readmission rates will be reassessed to determine if there has been an improvement.

Regulatory and other findings:

The IRB has determined that the study-specific rationale provided by the investigator is sufficient to justify a waiver of HIPAA authorization according to 45 CFR 164.512 for the existing data that are abstracted without identifiers.

Investigator's Responsibilities:

Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator's responsibility to submit for renewal and obtain approval before the expiration date. You may not continue any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

Your approved consent forms and other documents are available online at http://apps.research.unc.edu/irb/index.cfm?event=home.dashboard.irbStudyManagement&irb_id=16-0841.

You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented. Any unanticipated problem involving risks to subjects or others (including adverse events reportable under UNC-Chapel Hill policy) should be reported to the IRB using the web portal at http://irbis.unc.edu.

Please be aware that additional approvals may still be required from other relevant authorities or "gatekeepers" (e.g., school principals, facility directors, custodians of records).

The current data security level determination is Level III. Any changes in the data security level need to be discussed with the relevant IT official. If data security level II and III, consult with your IT official to develop a data security plan. Data security is ultimately the responsibility of the Principal Investigator.

This study was reviewed in accordance with federal regulations governing human subjects research, including those found at 45 CFR 46 (Common Rule), 45 CFR 164 (HIPAA), 21 CFR 50 & 56 (FDA), and 40 CFR 26 (EPA), where applicable.

CC:
Elaine Harwood, School of Nursing
Margaret House, School of Nursing
Crystal Keen, UNC Hospitals - Rex

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