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**A Study Designed to Explore Trends in 30-Day Readmission Rates
of Patients with Congestive Heart Failure After Implementation
of New Patient Education Tools**

An honors thesis in partial fulfillment

Of the requirements for the degree of

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By

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Honors Nursing Student

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A Study Designed to Explore Trends in 30-Day Readmission Rates of Patients with Congestive Heart Failure After Implementation of New Patient Education Tools

Introduction

Congestive heart failure (CHF) is a major problem in the United States today. So many aspects to the disease process exist that creating and implementing interventions to manage symptoms during the progression of the disease presents a challenge. Providing effective patient education to patients with this chronic disease process is a challenge due to the high frequency of readmissions to the hospital for these patients. Recently a CHF discharge class and visual educational tool were implemented at a hospital in Northwest Arkansas in an attempt to improve knowledge retention of patient education material. The purpose of this study was to identify “gaps in knowledge” in CHF patients readmitted to the hospital within 30 days following discharge. The study examined knowledge about their chronic illness and identified gaps of knowledge provided by the discharge education process in CHF patients who were readmitted within 30 days of discharge.

Review of Literature

Congestive Heart Failure (CHF)

CHF is a major health problem in the United States. Over 5.1 million people currently have CHF, with the number expected to rise due to the increase in the elderly population (5 Million Lives Campaign, 2008). Currently, heart failure is the most frequent cause of hospital admissions in patients over 65 years of age

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(Ancheta, 2006; Strömberg, 2005). The national average for heart failure patients readmitted to the hospital within 30 days following discharge has risen to 23-24% (Desai & Stevenson, 2012). The Center for Medicare and Medicaid services, based on the Patient Protection and Affordable Care Act, has implemented a program that penalizes hospitals with the highest 30-day readmission rates and provides lowered reimbursement rates for patient care. This makes it essential for hospitals to prioritize efficient, effective care and patient education to reduce readmissions (Desai & Stevenson, 2012). Readmission of patients with CHF cost 17.4 billion dollars in 2004 (Desai & Stevenson, 2012; Jacobson, 2011).

CHF is a condition in which the heart does not pump blood effectively and adequately throughout the body (5 Million Lives Campaign, 2008). Signs of worsening heart failure include shortness of breath, edema, easy fatigability, decreased physical activity, and weight gain (Ancheta, 2006; Lockwood et al., 2004). Patients with CHF live with a complex slowly progressing chronic illness that eventually progresses to end stage heart disease and death. Because there is no cure, interventions are aimed at slowing the progression of symptoms.

According to the Center for Disease Control, 26.6% of all deaths in Arkansas result from heart failure, establishing it as the leading cause of death (Kochanek et al., 2012). Arkansas also ranks above the national average in numbers of heart failure patients with comorbidity risk factors (e.g., obesity, high blood pressure, high cholesterol, diabetes, and smoking) associated with acute care readmissions (Kochanek, Xu, Murphy, Miniño & Kung, 2011). Among the goals of the Arkansas Cardiovascular Health State Plan is to reduce acute care

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readmission rates for patients recently discharged following a heart attack, stroke or heart failure (Desai & Stevenson, 2012)

Discharge Education

The Joint Commission created core measures for management of heart failure, which include discharge instructions (VanSuch, Naessens, Stroebel, Huddleston & Williams, 2006). Core measures include receipt of discharge instructions, performance of an ejection fraction assessment while the patient was in the hospital, use of an Angiotensin Converting Enzyme (ACE)-inhibitor or Angiotensin II Receptor Blockers (ARB) by discharge, and counseling on smoking cessation (Paul, 2008). Required categories of discharge education for heart failure patients include activity level, diet, medications, follow-up appointments, weight monitoring, and recognizing the worsening of symptoms which need immediate care by a physician (Zeng-Treitler, Kim, & Hunter, 2008). While recommendations for ejection fraction determination, initiation of ACE/ARB, and the smoking cessation recommendations are well recognized in the literature, research evidence concerning discharge education recommendations is not well established (VanSuch et al., 2006). According to the Commonwealth Fund National Scorecard on US Health System Performance, only 50% of patients typically receive the full set of discharge instructions (Commonwealth Fund, 2008). One study examined the 6 components of the Joint Commission's discharge recommendations and found the number of components included in discharge education at the time of discharge correlated with readmission rates. Time to readmission was longer in patients in which more components were

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included in the discharge education (VanSuch et al., 2012).

Self-Care Measures

As evidenced by numerous research studies, certain self-care measures can slow the progression of CHF. The measures include restricting fluids to less than 2 liters per day, monitoring weight daily, following prescribed medications, following a low sodium diet (less than 2000 mg), cessation of smoking, participating in low to moderate activity, eliminating alcohol from the diet, reducing intake of high amounts of fat and cholesterol, and learning the signs and symptoms of CHF progression (Chriss, Sheposh, Carlson & Riegel, 2004; Paul, 2008). Decreased self-care measures, such as low medication adherence, failure to follow a low sodium diet, not weighing daily, and not restricting fluids have led to more frequent hospitalizations and a decreased quality of life (Chriss et al., 2004; Stromberg, 2005).

Various factors come into play when discussing reasons CHF patients are readmitted to the acute care system. Factors related to healthcare organizations include failure to focus on high-risk patients, failure to achieve optimal treatment, ineffective discharge planning, and ineffective discharge education and follow-up (Paul, 2008; Stromberg, 2005). A major patient factor influencing hospital readmission is the patient's adherence to the prescribed treatment regimen. Evangelista and Shinnick (2008) define adherence as the ability of the patient to follow treatment regimen recommendations. Adherence with self-care interventions has been demonstrated to reduce hospital readmissions (Rich et al., 1993). CHF patient management consists of a complex plan of medical treatment

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with numerous medications (Evangelista & Shinnick, 2008). Nonadherence to the treatment plan occurs in CHF patients across all age groups, cultural, and socioeconomic classes (Evangelista & Shinnick, 2008). Care of CHF patients demands many things from providers and patients alike. Providers must coordinate and monitor the complexity of the treatment plans and patients must have the knowledge, cooperation, and active participation in order to manage the disease process (Evangelista & Shinnick, 2008)

Barriers to Compliance

The relationship between knowledge and compliance in CHF education is a fickle one. Multiple studies suggest that a patient will not comply with a treatment regimen they do not understand. However, multiple studies also suggest that even if a patient has the knowledge, that does not mean compliance will follow suit (Desai & Stevenson, 2012). More often than not, there are reasons for noncompliance and healthcare professionals are tasked with the responsibility of figuring them out. A study of 954 heart failure patients analyzed barriers and benefits of self-care behaviors. Of the respondents, 51% did not follow a low sodium diet because “food tastes bad,” 57% of respondents did not take their diuretics because they did not want to “pee all night,” and 26% said they just “forget to weigh daily.” On the other hand, 84% knew diuretics “lessen swelling,” 87% knew that “salty food is bad,” and 48% knew daily weights help prevent hospitalizations (Van Der Wal, Jaarsma, Moser, Van Gilst, & Van Veldhuisen, 2007). One study identified that 55% of readmissions were the result of medication noncompliance and sodium restriction noncompliance (Paul, 2008).

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Self-Care Behaviors.

Evangelista and Shinnick (2008) defined self-care as “specific behaviors that individuals initiate and perform on their own behalf, with the intention of improving health, preventing disease, and maintaining their well-being” (page 2). In another study, 62.9% of patients rated shortness of breath during activity as “a lot of importance” while only 45.5% saw shortness of breath at rest “important” (Carlson, Riegel, & Moser, 2001). This indicates an apparent gap between receiving information, retaining information and the ability to incorporate it into their lives effectively (Stromberg, 2005). Hospitals are trying new tactics to promote patient self-care measures. In a study targeting low health literacy patients, the use of visual aides such as pictures, combined with a daily weights on a digital scale, and scheduled phone calls led to more patients weighing themselves daily one-year later (DeWalt et al., 2006). Britz and Dunn (2010) found the level of education and symptom severity predicted self-care, i.e. the better recognition of symptoms associated with increased knowledge leads to better self-care (Rockwell & Riegel, 2001).

Discharge Education.

As average hospital lengths of stays are decreasing, less time for healthcare professionals to provide education to patients is available (Rafi, Shahpoorian, & Azarbaad, 2008). In a study by Schemida and Savrin (2012), between 1993 and 2006, the length of the average hospital stay decreased from 8.8 to 6.33 days while the number of 30-day readmissions increased from 17.2% to 20.1%. Those providing discharge education in the hospital setting face many

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barriers including the patient's ability to concentrate, time constraints, and patient's denial of disease process (Rafi et al., 2008). Comprehension can also be influenced by many factors including cognitive and functional decline, depression, low self-esteem, lack of social support, complexity of care, and multiple comorbidities (Evangelista & Shinnick, 2008; Strömberg, 2005). Since the time to educate patients is so limited, effective education must center on matching the education priorities of the nurse and patient. For example, findings from Rafii et al. study (2008) of realistic discharge education noted nurses ranked diet as the 3rd most important heart failure topic to discuss with patients, whereas patient's ranked diet as the 8th most important topic. Additionally, patient's typically rated more information as "realistic to learn" as opposed to the ratings of the nursing staff (Rafii et al., 2008). Another study found that patient's education needs varied dependent on where they were in their disease process (Edwardson, 2007). Before discharge, patients wanted to learn information about medications, physical activity and treatments. After discharge, patients viewed learning about signs and symptoms, and medications as more important (Edwardson, 2007). Nurses tended to overestimate patient understanding and underestimate the patient's ability (Edwardson, 2007; Chugh, Williams, Grigsby & Coleman, 2009). In a survey study performed by Chugh et al. (2009), 89% of physicians and nurses said their patients understood the education delivered, whereas only 57% of patients said they understood. Beyond comprehension of the education materials, patients have trouble retaining information. Reasons for low retention may include factors such as anxiety, medication effects, decreased ability to

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concentrate, denial of disease process, emotional and logistical barriers (Evangelista & Shinnick, 2008).

In some studies, up to 54% of readmissions were deemed preventable and due to inadequate education (Paul, 2008). Education has been shown to be the most important non-pharmacological intervention in heart failure treatment (Edwardson, 2007). A variety of teaching methods have been implemented in various healthcare organizations, such as the “teach-back” method. The teach-back method consists of asking the patient to “teach back” the information received in previous educational sessions with a healthcare provider. In most cases, the method follows the “what?, why?, how?” concept. The nurse can assess the patient’s general knowledge by asking “what?” then his or her attitude by asking “why?” and lastly the patient’s behavior potential by asking “how?” This method helps the patient see what information is important and it allows the nurse to identify where gaps in understanding occurred (“To reduce heart failure”, 2011). The “teach back” method along with follow-up calls is recommended by the Transforming Care at the Bedside report to create a more ideal transition home (Jacobson, 2011). In the study, specific nurses conducted the education sessions over a few days. This method reduced readmission rates at University of California San Francisco Medical Center by one-third (“Initiative”, 2013).

The variety of teaching methods, resources, and content, makes analyzing the effects of patient knowledge retention related to heart failure difficult (Kociol et al., 2012; Schmeida & Savrin, 2012). The Center for Medicaid and Medicare Services penalties to control escalating healthcare costs by controlling

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readmission rates make it essential to provide effective discharge education. However, to date little research has been conducted evaluating the effect of various teaching interventions and their impact on readmission rates (Desai & Stevenson, 2012; Schmeida & Savrin, 2012). Most patient-specific discharge instructions still contain only free text. The quality of information provided frequently has not been assessed and provides only the documentation that discharge education has been completed (Paul, 2008; VanSuch et al., 2006). A number of studies have shown that pictographs can improve patient comprehension of health information (Austin, Matlack, Dunn, Kesler, & Brown, 1995; Mayer & Gallini, 1990). In a study by Austin et al. (1995), participants taught with illustrations were 1.5 times more likely to respond above the median level of knowledge than participants who received strictly words instruction.

With such importance being placed on patient education, organizations are scrambling to come up with effective education solutions. In a study where information about heart failure was provided to patients in written form, verbal form, or both forms, only 14% of patients felt they “knew a lot” and 38% responded they “knew little to none” (Desai & Stevenson, 2012). Some hospitals have found success with computer-based education (Strömberg, 2005). Various education materials have been developed including books, newsletters, videos, and websites, all of which can be used face to face or by phone (Strömberg, 2005). Most importantly, education has been shown to be more effective if supported by reinforcement, monitoring of symptoms and interdisciplinary teamwork (Edwardson, 2007).

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Transitional Care

Another approach in some organizations is the use of specialized heart failure teams, including physicians, case managers, and nurse educators among others. One study analyzed the outcomes of two groups of patients, one experiencing usual care and the second experiencing care performed by a heart failure team. The usual care group experienced 4 times the readmissions compared to the group utilizing interdisciplinary intervention and follow-ups (Paul, 2008). The traditional management model of care involves the patient moving from home to an inpatient setting and back home again. Current evidence supports a more integrated medical home model (Desai & Stevenson, 2012) using a multidisciplinary approach that follows the patient through post-discharge (Edwardson, 2007). It is critical that nurses' play a role in planning for this team approach because nurses remain the frontline in patient care, discharge planning, care coordination, and knowledge assessment (McHugh & Ma, 2013). A study of 30-day readmissions among Medicare patients discovered that a seven percent higher readmission rate existed when nurses experienced a higher patient load (McHugh & Ma, 2013).

The primary aim of this study was to examine the knowledge base of CHF patients readmitted within 30 days of initial hospital discharge.

Research questions for this study include:

- How and by whom the patient did received discharge instructions in the initial hospitalization?

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- Do patients readmitted to the hospital within 30 days have a gap in knowledge about self-care and CHF?
- Are there themes that emerge concerning gaps of knowledge between discharge teaching and readmission to the hospital in CHF patients?

Methodology

This research project was conducted following approval of the University of Arkansas and the study hospital's Institutional Review Boards. Potential patient subjects were identified via a daily list of patients currently in the hospital that were being followed in a Congestive Heart Failure Clinic. An initial chart review was conducted to determine if selected subjects met the eligibility criteria of (1) aged 18 years or older, (2) diagnosis of Heart Failure, (3) readmitted to study hospital within 30 days of previous discharge, and (4) admitted with a diagnosis related to heart failure. Participants were excluded if admitted for any symptom not including heart failure symptom exacerbation, if visit within last 30 days was to the emergency department, or if the patient was being cared for in the coronary care unit. Of the 125 subjects reviewed, only 6 met the inclusion criteria. Subjects who met the inclusion criteria were asked to participate in the study. The patient sample for this study consisted of 3 subjects re-admitted to the study hospital's cardiology unit with the primary diagnosis of congestive heart failure who consented to participate in the study. Two of the three subjects attended the CHF discharge class. One subject did not attend the CHF discharge class. Data collection for the study was performed between October 2014 and February 2015.

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Once a subject was determined to meet the above criteria, an initial chart review was performed to obtain demographic data including age, race, sex, New York Heart Association (NYHA) stage of CHF, length of current hospitalization, comorbidities, education documentation and medications at discharge. Additionally, subjects completed the Patient Knowledge of Self-care Activities in Congestive Heart Failure (PaKSAC) survey, which was used to evaluate the patient's retention of discharge instructions.

The Patient Knowledge of Self-Care Activities in Congestive Heart Failure (PaKSAC) survey, originally developed by Lockwood et al. (2004), is a 38-question survey (Appendix A). The PaKSAC survey has been tested and found to be both reliable and valid (Gatta, 2006; Lockwood et al, 2004) The PaKSAC survey has been used to examine ACE Inhibitor usage and patient education in the Review of Education on ACE Inhibitors trial in Canada (Gatta, 2006; Tsuyuki et al., 2004) and in the Congestive Heart Failure Outreach Program trial in Canada (Gatta, 2006).

The goal of the PaKSAC survey is to look at the relationship between knowledge and compliance. Items the instrument measures include signs and symptoms, self-care, pathophysiology, and self-care confidence (Gatta, 2006). Questions 1-12 and 31-38 address knowledge about CHF, symptoms, and medications. Questions 20-30 focus on fluid restriction and daily weights. Questions 13-19 focus on sodium restrictions. Most of the questions are set up in a 4-point Likert scale format. A few questions require a yes or no answer and a few questions require an open response.

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For subjects willing to participate in the study, a consent form was signed. All patient data was de-identified to protect patient identity. Because no physical interventions were performed on the patients, ethical issues of the patient's physical well being remained a nonissue.

Data Analysis

Due to the low number of participants in this study, qualitative analysis of data was not appropriate. Therefore, each patient survey and chart review was individually assessed for themes emerging from the data.

Results

A total of 3 subjects were enrolled in this study and completed the survey in its entirety. All subjects were female, Caucasian and were between 66 and 84 years of age. Subject 1 and 2 had four comorbidities while subject number 3 had three comorbidities including atrial fibrillation (n=2), coronary artery disease (n=2), hypertension (n=2), diabetes mellitus (n=2) and chronic kidney disease (n=2). The ejection fraction, obtained from an echocardiogram of the subjects ranged from 40-69% (mean= 51%) as noted in Table 1.

Table 1: Demographic Data of Congestive Heart Failure Participants

Demographic Data	Patient 1	Patient 2	Patient 3
Age	66	70	82
Sex	Female	Female	Female
Ethnicity	Caucasian	Caucasian	Caucasian
Discharge CHF Education Class attendance	Yes	Yes	No
Readmission stay at survey completion.	2 days	1 day	1 day
Number of days since previous discharge	12 days	23 days	26 days

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Readmission admitting diagnosis	Fluid Retention	Fluid Overload, Dyspnea	Chest Pain
Ejection Fraction	45-50%	40%	69%
Number of comorbidities	4	4	3

The documented heart education for the subjects is presented in Table 2. Education was documented for every subject. A registered nurse documented education given to all 3 subjects, however the Heart Failure nurse educated one subject. All subjects' records reflected that the subjects understood their discharge instructions. No learning barriers were noted in any of the three subjects' medical records. Subject No 2 also had a spouse and daughter present at the time of the CHF discharge education instructions. The CHF nurse educator who provided this subject's discharge teaching also noted that there needed to be further follow-up on the patient's medications.

Table 2: Comparison of teaching events

	Patient 1	Patient 2	Patient 3
HF education documented	Yes	Yes	Yes
Documentation of understanding of teaching	Yes	Yes	Yes
Methods used for teaching	Verbal, explanation	Verbal, explanation	Verbal, explanation
Documented Barriers to learning	None	None	None
Other persons present for teaching besides subject	None	Spouse, daughter	None
Any areas documented as	None	Medication,	None

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“needs further teaching”		follow-up care	
Who performed/ documented teaching	RN	Nurse Educator	RN

The subjects completed the Patient Knowledge of Self-Care Activities in Congestive Heart Failure (PaKSAC) to evaluate their current knowledge about CHF (Table 3). Summary results of the survey are displayed in the Appendix.

Table 3: Knowledge of Heart Failure

Knowledge of Heart Failure	Class (n=2)	No class (n=1)
What is the definition of Heart Failure (correct answer)	0	1
Symptoms of Heart Failure:		
Dyspnea	2	1
Edema	1	0
Fatigue	0	0
Chest Pain	0	0
Other	1	0
Is it safe for someone with HF to do light exercise like walking (true)	2	1
Rest Is good for your heart (true)	2	1
Drinking Alcohol can weaken the hearts pumping ability (true)	1	1
Smoking can weaken the hearts pumping ability (true)	1	1

Subject 1. Subject No. 1 was a 66-year-old Caucasian woman diagnosed with CHF. She was last discharged 12 days prior to the current admission. She was readmitted under the diagnosis of “fluid retention.” Other comorbidities included diabetes mellitus, chronic kidney disease, coronary artery disease, and atrial fibrillation. The subject attended both the HF education class and had been to the Congestive Heart Failure Clinic for follow up visits. Subject 1 identified HF

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as “the same as a heart attack or myocardial infarction.” The subject agreed to “I know how to monitor my heart failure and detect any problems...” and also “sometimes I get short of breath and I don’t know why.” When unprompted, Subject 1 could identify one symptom of HF, dyspnea. When asked if particular symptoms were signs of worsening HF, the subject could identify dyspnea, swelling of legs/ankles, paroxysmal nocturnal dyspnea, fatigue, and weight gain as signs of worsening HF. When unprompted, Subject 1 was the only subject able to identify more than one measure of non-pharmalogical intervention in HF, daily exercise. All 3 subjects identified some form of “reduce salt intake” or “watch diet.” She rated reducing salt intake and daily weight as more important than taking medications and fluid restrictions as less important than taking medications. She had taken steps to limit both fluid and salt and found both difficult. She identified the correct recommended fluid intake for HF patients (4-8 cups). Although Subject No 1 recognized a patient with HF should weigh daily, the subject weighs several times a week. She agreed that without HF medications, she would be very ill. However she also agreed “my drugs are a mystery to me.” Subject 1 was the only subject who did not recognize smoking as harmful to heart health.

Subject 2. Subject 2 was a 70-year-old Caucasian female. She was readmitted to the hospital 23 days after her previous discharge. The admitting diagnosis was “cough, fluid overload, and dyspnea.” The subject’s other comorbidities included peripheral vascular disease, coronary artery disease, hypertension, and type II diabetes. When asked, this subject denied attending the

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specialized CHF education class; however, attendance was documented in the chart. She was the only subject to receive a specialized education session from the Nurse Educator during the current admission. She defined HF as a condition in which the “heart might stop beating soon.” Subject 2 followed the same pattern as Subject 1 of choosing “agree” when asked if she knew how to monitor HF but also chose “agree” to not knowing why shortness of breath occurred. Subject 2 identified most symptoms of HF unprompted including dyspnea, edema, and pain. When prompted, she was also able to identify paroxysmal nocturnal dyspnea, fatigue, and weight gain. Subject 2 rated salt restrictions, fluid restrictions, and daily weight as more important than taking medications and had taken steps to limit salt and fluid intake finding both difficult to maintain. The subject not only recognized that a HF patient should perform daily weights but also stated that she performed this self-care measure. She recognized the importance of taking HF medications but strongly agreed, “My drugs are a mystery to me.”

Subject 3. Subject 3 was an 82-year-old Caucasian female, readmitted to the hospital 26 days after her previous discharge. Her admitting diagnosis was “chest pain.” The subject’s other comorbidities included atrial fibrillation, chronic kidney disease, and hypertension. Subject No 3, the only subject to not attend a HF education class, was the only subject to correctly identify the definition of heart failure (“means heart is not pumping as well as it should”). She stated she knew how to “keep heart failure under control,” but conversely, did not “know how to monitor her heart failure,” or “know what she needed to do to make herself better.” Subject 3 spontaneously identified both dyspnea and chest pain as

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HF symptoms. Upon further prompting, she also identified dyspnea, edema, paroxysmal nocturnal dyspnea, fatigue and weight gain as symptoms. Subject 3 rated salt restriction and daily weights as more important than taking medications and fluid restrictions as just as important as taking medications. She was the only subject who noted that she took steps to limit salt intake without difficulty. The subject identified the correct fluid recommendations (4-8 cups) but did not take any steps to limit intake. Subject 3, like the other subjects, agreed her medications were “a mystery to me.”

Discussion

Several themes emerged from this small sample of subjects in the study. The first step in heart failure education is knowledge. Only one subject (who did not attend the education class) could identify the definition of heart failure. The literature supports the concept that outcomes improve when patients comply with a prescribed regimen, but the regimen is more effective if patients understand the rationale behind actions (Edwardson, 2007; Stromberg, 2005). Based on the results of this study, the subjects seemed to recognize information inconsistently. In addition, the subjects had more trouble identifying worsening symptoms when unprompted as opposed to being prompted. Every subject recognized that HF patients should have “less salt than usual,” but no subject could correctly identify the recommended daily intake amount. All of the information presented in the survey is present in discharge materials and included in the education interventions suggesting an emerging theme of a gap in receiving and retaining information consistent with the literature (Stromberg, 2005).

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The compliance level of the subjects was erratic and inconsistent as well. For example Subject 1 recognized the importance of daily weights; however, she noted that she only weighed several times a week. In contrast, Subject 2 recognized the importance of daily weights and followed that recommendation. This agrees with the literature that increased knowledge does not always mean increased compliance (Desai & Stevenson, 2012).

As the literature suggested, barriers can interfere with self-care. A barrier that was present in all subjects was anxiety. Every subject identified that when their HF gets worse, they “feel scared and want to call the doctor right away.” The literature identifies such barriers as getting in the way of education retention (Evangelista & Shinnick, 2008). That anxiety can transfer over into inpatient hospital visits implying that, like Rafii, Shahpoorian, and Azarbaad’s (2008) study, patients experience decreased concentration during hospital stays implying the inpatient atmosphere may not be the most effective place to perform patient education (Rafi, Shahpoorian, & Azarbaad, 2008). Just like Britz and Dunn (2010) found, all subjects found it difficult to follow a low sodium diet.

Both subjects who attended the education class were able to recognize that HF patients need a lower daily fluid intake and both took steps to limit fluid intake in the previous six months suggesting a correlation between knowledge and compliance consistent with the literature (Paul, 2008). However the same correlation was not evident in the category of sodium restriction.

The subject that took part in an education session with the nurse educator (Subject 2) showed some differences in knowledge level as compared to the

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subjects that were not educated by the nurse educator. Subject 2 identified more symptoms of worsening heart failure when unprompted and was the only subject to identify edema as a symptom when unprompted. The subject admitted, “my HF drugs are a mystery to me,” which was confirmed with documentation in the chart that the subject needed follow-up education about medications. The literature shows that interdisciplinary care and follow-up decreases readmission rates (Paul, 2008).

One area that every subject identified as a personal lack of knowledge was medications. Every subject either “agreed” or “strongly agreed” that her medications were a “mystery to me.” This suggests more targeted education regarding medication purposes, use, and side effects needs to be implemented. The only subject with any documentation in the chart about her lack of medication knowledge was Subject 2, whose education session was conducted by the nurse educator.

While both the class and the education sessions conducted by the nurse educator did show some differences in knowledge level, all subjects lacked a substantial amount of knowledge regarding heart failure. Patient literacy levels need to be taken into consideration in regards to creating effective patient education materials. The literature has shown that over 89 million Americans lack “sufficient health literacy to effectively understand and complete needed medical treatments and participate in preventative health care” (Tamura-Lis, 2013). Low health literacy has been continually linked to poorer health outcomes (Evangelista & Shinnick, 2008). While patient education is not the only method needed to fight

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the heart failure epidemic, it is necessary to give patients a foundation that will allow other interventions to potentially be successful.

Limitations

This study faced multiple limitations. The main limitation was a small sample size. Recruitment of participants was limited to only two days per week, so recruitment opportunities for many potential participants were missed. The working list of CHF patients readmitted to the hospital was variable so that it was impossible to identify every possible participant from the months of October to February. The study only examined patients who were readmitted following 30 days. It may be more appropriate to include patients who are readmitted in 60-90 days in the study as educational deficits might be greater in those time frames. The sample size only allows for limited conclusions to be drawn. Another limitation was the severity of potential participants illness. Multiple participants that fit the criteria were being cared for in the coronary intensive care unit and were too ill to be included in the study.

Recommendations for Further Study

Areas for further study include analyzing the relationship between education and readmissions within 30, 60, 90, and greater than 90 days. Further study could be improved by replicating this study over a longer time period. Extending the readmission criteria to greater than the 30-days timeline might provide additional valuable information regarding the patient education needs in this population. Further studies should also take into consideration the subject's health literacy on readmission rates.

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Appendix

Results of Patient Knowledge of Self-care Activities (PaKSAC) in Congestive Heart Failure

Signs and Symptoms of Worsening Heart Failure	Class (n=2)	No class (n=1)
Shortness of Breath	2	1
Swelling of legs or ankles	1	1
Headaches	1	1
Waking up at night short of breath	2	1
Pain in Joints	0	0
Feeling more tired than usual	2	1
Weight Gain	2	1
Important Activities to keep HF from getting worse	Class (n=2)	No class (n=1)
Restrict Salt intake	2	0
Restrict Fluid Intake	0	0
Daily Weights	0	0
Medication Compliance	0	0
Daily Exercise	1	0
Daily rest	0	0
Stop smoking	0	0
Stop drinking alcohol	0	0
Other	1	1
Fluid Restriction	Class (n=2)	No class (n=1)
Taken Steps to limit fluid intake in last 6 months	2	0
Difficult to limit fluid intake	2	
Importance of Fluid Restriction		
Not important	0	0
Less important than medications	1	0
Just as important as medications	0	1
More important than medications	1	0
A person with heart failure should drink:		
More fluids than usual	0	0
About the same amount of fluids	0	1
Less fluids than usual	2	0
Don't know	0	0
Amount of recommended fluids for person with Heart Failure		
Less than 4 cups	0	0
4-8 cups	1	1
More than 8 cups	0	0
Other	0	0

Readmission rates of patients with Congestive Heart Failure

Sodium Restriction	Class (n=2)	No class (n=1)
Taken Steps to limit sodium intake in last 6 months	2	1
Difficult to limit sodium intake	2	0
Importance of sodium restriction		
not important	0	0
Less important than medications	0	0
Just as important as medications	0	0
More important than medications	2	1
Compared to someone without Heart Failure, a person with HF should have:		
More salt than usual	0	0
The same amount of salt	0	0
Less salt than usual	2	1
Don't know	0	0
How much salt should you be restricting salt in your diet		
Less than 2 grams	0	0
Less than 4 grams	0	0
Don't sprinkle any extra on	0	0
Other	0	0
Don't know	2	1
Daily Weights	Class (n=2)	No class (n=1)
Importance of weighing self regularly		
Not important	0	0
Less important than medication	0	0
Just as important as medications	0	0
More important than medications	2	1
Someone with HF should weigh himself/herself:		
Every day	2	1
Several times a week	0	0
Once a week	0	0
Once a month	0	0
Only if he/she feels badly	0	0
If weight goes up by 4 pounds over 2 days, what should you do?		
Cut back on salt	0	0
Take an extra water pill	0	0
Call heart doctor or nurse within 24 hours	2	1
Go to the ER	0	0
Wait until next visit to tell provider	0	0
Do you have a scale at home that works?	2	1

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How often do you weigh yourself		
Everyday	1	1
Several times a week	1	0
Once a week	0	0
Once a month	0	0
Never	0	0
Medications (agree/strongly agree)	Class (n=2)	No class (n=1)
Without my heart failure drugs I would be very ill	2	0
My health in the future will depend on my heart failure drugs	2	1
My drugs are a mystery to me	1	0
Confidence and Self-Care (agree/strongly agree)	Class (n=2)	No class (n=1)
I know what I need to do to keep my heart failure under control	2	1
I know how to monitor my heart failure and detect any problems early before they get really bad	2	0
Sometimes I get more short of breath or tired and I don't know why	2	1
If my heart failure gets worse, I know what I need to do to make myself feel better	2	0
If my heart failure gets worse, I feel scared and want to call my doctor or nurse right away	2	1