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Improving Heart Failure Readmission Rates, Patient Education, and Nurse Confidence in the Hospital Setting

Jennifer Poston

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in the Hospital Setting

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Abstract

Title: Improving Heart Failure Readmission Rates, Patient Education, and Nurse Confidence in the Hospital Setting

Primary Investigator: Jennifer Poston, BSN, RN

Purpose: The purpose of this project was to evaluate the effectiveness of a heart failure nutrition education workshop for cardiac nurses that was implemented in 2018 by a previous nurse practitioner student.

Methods: The project used a quality improvement design on the cardiac floor and cardiac intensive care unit (ICU) in a hospital in northwest Florida. Participants were registered nurses who were working on these floors. A survey was emailed to participants which gathered demographic data and also tested their knowledge of heart failure. Readmission rates for 2018 and 2019 were also obtained and analyzed.

Results: It was found that there was not a statistically significant decrease in readmission rates between 2018 and 2019; however, the readmission rates were decreased. It was also found that nearly half of participants incorrectly answered questions about heart failure diet, fluid, and sodium intake. The majority of participants did answer that they provided heart failure discharge education with the hand-out supplementation toolkit every time.

Discussion: Because of hurricane damage at the hospital during this survey period, there was only one functioning medical-surgical floor and one ICU. For the first aim, there was no significant decrease in the heart failure readmission rates between 2018 and 2019. For the second aim, more nurses than expected incorrectly answered pertinent questions about fluid and sodium intake for CHF patients. This indicates a lack

of nursing confidence when educating patients at discharge and may be related to non-cardiac nurses working with cardiac patients. The expected outcome of the third aim was successfully met because most nurses used both verbal education and printed toolkit handouts during patient discharge education.

Conclusions: This study suggested that heart failure education workshops for nurses are beneficial and should be further studied to determine if they help reduce heart failure readmission rates.

Major Professor: Laurie Abbott, PhD, RN, PHNA-BC

Introduction

Problem Statement

Heart failure is a debilitating, costly, and complex chronic disease associated with poor prognosis and a high mortality rate. After the age of 65, the incidence of heart failure in the United States is 10 per 1,000 (Rice, Say, & Bethavas, 2018). Consequently, heart failure is among the main causes of hospitalization for patients over the age of 65. Half of these patients who are admitted will be re-hospitalized within six months of discharge (Hall et al., 2014). In the United States, the increasing population of older adults as well as the increased survival rates after cardiac events have been associated with the financial and economic burden impact on an already strained healthcare system (Lambrinou, et al., 2011; Son, Lee, & Song, 2011; Rice, Say, & Bethavas, 2018). Hospitalization and readmission are known to be the costliest factors in the management of heart failure (Rice et al., 2018).

The Centers for Disease Control and Prevention (2018) reports that about 5.7 million adults in the United States have been diagnosed with heart failure. Heart failure

costs the United States 30.7 billion dollars each year and accounts for over 1 million hospitalizations annually (CDC, 2018). In 2014, the United States healthcare costs totaled 17.5% of the gross domestic product (GDP) (Chamberlain, Sond, Mahendraraj, Lau, & Siracuse, 2016). This is an increase from the 9.18% reported in 1980. If current trends continue, heath care costs could reach up to 30% of the GDP by 2040 (Chamberlain, Sond, Mahendraraj, Lau, & Siracuse, 2016). In the United States, more than 25% of patients diagnosed with heart failure are readmitted within 30 days of hospital discharge (Bradley et al, 2013). Current statistics reveal that in Florida, the 30-day heart failure readmission rate is 78.6%, and in the Florida panhandle, where this project will be taking place, there is an even higher rate of 82.6% (Heath Services Advisory Group, 2017).

Heart failure is a chronic and progressive condition that is often difficult for patients to understand and manage. It places a demanding burden on people living with the disease, and management is often complex. Managing heart failure symptoms necessitates drastic changes in lifestyle. Patients must learn how to adjust their diets, daily activities, and manage their medications to enhance symptom control and prevent acute exacerbations. The majority of patients with heart failure have inadequate knowledge of their disease and do not possess the skills to proficiently manage their chronic condition. In addition, daily weighing is an essential piece of heart failure management, yet less than 40% of patients weigh themselves on a daily basis (Hall et al., 2014).

The Hospital Readmission Reduction Program was enacted by Patient Protection and Affordable Care Act of 2010. The goal of this program was to reduce hospital

readmissions by penalizing hospitals with above average readmission rates. Despite

this, there has been limited success in the policy accomplishing its goal of reducing

readmissions. The achieved decrease in heart failure readmissions was considerably

less significant than anticipated (McIlvennan, Eapen, & Allen, 2015).

Patient education is essential to survival for patients living with heart failure.

Nurses have an integral role in educating the patient and helping them learn how to

properly manage their disease. It is crucial that nurses feel comfortable with, and

confident in, delivering patient education materials. Heart failure patient education is a

low-cost intervention that could possibly help improve patient readmission rates and

decrease the financial burden on the health care system.

Purpose

In an effort to recognize if a heart failure education workshop for nurses could be

beneficial to heart failure patient outcomes, cardiac nurses at a local hospital were

surveyed a year after receiving an educational workshop, and readmission rates were

analyzed. The purpose of this project was to explore the benefits of a heart failure

nutrition education workshop for cardiac nurses. The specific aims of this study are to:

1) Identify if there has been a decrease in heart failure readmission rates since the

   implementation of the nursing education workshop and patient toolkit.

2) Identify if there has been an increase in the confidence level of the nurses' heart

   failure discharge education.

3) Identify if the nurses have been utilizing heart failure discharge education.

4) Identify if a heart failure education workshop would be a beneficial annual

   education intervention for cardiac nurses.

Clinical Question

The clinical question that is: Can the implementation of a heart failure nutrition education workshop for cardiac nurses' decrease readmission rates and improve the confidence of discharge education knowledge for the nursing staff?

Review of the Literature

The Need for Patient Education

Education has been deemed one of the most influential interventions that takes place in the healthcare arena, and it goes further than just instructing patients on what they should be doing to manage their disease. It is the process of enhancing disease knowledge, vital skills, and motivating mindsets and behavior with the goal of improving health (Boren, Wakefield, Gunlock, & Wakefield, 2009; Rice, Say, & Betihavas, 2018). Heart failure is a life-changing diagnosis and patient lifestyle and behavioral changes are vital to their survival. It was found that when lacking specific education, most patients did not possess the knowledge to follow a sodium-restricted diet. However, this could be improved with patient education provided by the nurse. Diet and nutrition are key factors to patient survival and quality of life. Patients with heart failure who did not abide by the sodium-limited diet guideline of less than three grams of sodium intake per day had increased heart failure symptoms and had double the chance of incurring cardiac events during the follow-up period (Koelling, Johnson, Cody, & Aaronson, 2005; Son, Lee, & Song, 2011).

The American Nurses Association (ANA) Scope and Standards of Cardiovascular Nursing recognize patient education as a vital nursing duty. With the implementation of the Hospital Readmission Reduction Program, heart failure patient

education has intensified its efforts to provide complete and thorough discharge education, but this type of education has been executed utilizing various methods with uncertain efficiency. Even with widespread support from the Affordable Care Act, thorough heart failure patient education is not always incorporated into practice (Ramussun, Flattery, & Baas, 2015; Prasun et al., 2017).

It is imperative that the nurses recognize their vital role as educator and consistently assess their patient for educational needs (Schell, 2014). Within five years of being diagnosed with heart failure, more than 50% of patients die. The American Heart Association (2019) advises that heart failure patients should partake in education and advanced care planning conversations annually. However, a current study revealed that 52% of cardiology providers (comprising physicians, physician assistants, and nurse practitioners) felt hesitant about participating in care planning conversations, and 30% reported insufficient confidence in their capability to discuss or deliver education and care planning (Chandar et al., 2016). When surveyed, a mere 15% of cardiologists saw it as their duty to perform advanced care planning conversations, and 57% reported rarely or never participating in advanced care planning at all (Chandar et al., 2016).

Previous research has indicated that patient discharge heart failure education provided face-to-face by a nurse educator decreases hospital readmissions in comparison to patients who received only written instructions during discharge (Kommuri, Johnson, & Koelling, 2012). Furthermore, patients who received discharge education face-to-face via the nurse were more apt in adhering to correct self-care management recommendations (Yehle, Sands, Rhynders, & Newton, 2009). This patient-focused education program enhanced overall heart failure disease management

and knowledge. Studies also revealed that disease-specific education is correlated with increased knowledge scores when compared with patients who experienced adverse events in the six-month follow-up period (Koelling et al., 2005). Patients who received the educational intervention were found to be twice more likely to have increased scores at three months compared with the group who received standard written discharge instructions (Koelling et al., 2005; Yehle, Sands, Rhynders, & Newton, 2009; Kommuri, Johnson, & Koelling, 2012).

The Impact of Nursing Education on Readmission Rates

Many heart failure hospital admissions are preventable. Deficient heart failure-related education has been associated with patient adherence issues such as medication non-compliance (Kommuri et al., 2012). These issues highlight the significance of patient education. The ideal solution is to enhance the patients' knowledge of heart failure management, which would result in improved patient self-care skills and reduce adverse outcomes such as hospital readmissions and healthcare costs (Stromberg, 2005; Kommuri et al., 2012; van der Waal et al., 2012).

Nurse-led patient education interventions are low-cost and effective strategies to reduce heart failure readmissions and increase quality of life, and studies reveal that missed nursing education increases the likelihood of repeat hospitalizations (Baptiste et al., 2016). Studies have also revealed that patients who have received nursing education experience reduced rates of hospital readmission, death, and multiple readmissions, resulting in a reduction in total number of admissions and considerably lower costs in the first year after discharge (Krumholz et al., 2002; Lambrinou, et al.,

2011; White, et al., 2013; Brooks et al, 2015; Baptiste et al., 2016; Sherer, Crane, Abel, & Efrid, 2016; Rice et al., 2018).

Previous studies reveal that utilization of education programs led by nursing staff that were concentrated on developing self-care behaviors resulted in a decrease in 30-day readmissions by at least 2% amongst patients with heart failure (Baptiste, Davidson, Groff, Becker, Magloire, & Taylor, 2016). The routine implementation of heart failure education programs led by nurses that begin before discharge and incorporate simple follow-up demonstrate potential in reducing 30-day readmissions rates. (Baptiste, Davidson, Groff, Becker, Magloire, & Taylor, 2016; Cheng et al., 2016; Mathew & Thukha, 2017).

Nurse Confidence in and Need for Heart Failure Education

The Joint Commission, National Quality Forum, Agency for Healthcare Research and Quality, and Centers for Medicare & Medicaid Services have recognized hospital discharge instructions as a crucial facet of quality care for the patient (Edwardson, 2007; Lainscak et al., 2011; Sterne, Grossman, Migliardi, & Swallow, 2014). In the hospital setting, nurses are the main source of delivering discharge education to the patient and teaching them essential information, such as disease self-management (Washburn & Hornberger, 2008; Lacker, 2011). It is crucial that nurses are educated about heart failure management so that they can confidently convey the information to the patient. Nurses have reported that they would find it beneficial to receive more heart failure education themselves (Gilmour, Strong, Chan, Hanna, & Huntington, 2014). It was found that nurses need adequate education and support to develop appropriate

content and material resources (Sterne, Grossman, Migliardi, & Swallow, 2014). Additionally, it has also been shown that nurses learn from educational programs, and their proficiency in knowledge has a positive influence on patient outcomes (Gilmour, Strong, Chan, Hanna, & Huntington, 2014). Nurses' knowledge of evidence-based practice positively impacted patient outcomes as demonstrated by the reduction in 30-day heart failure readmission rates for the three months that followed a nursing education intervention (Gilmour, Strong, Chan, Hanna, & Huntington, 2014; Sterne, Grossman, Migliardi, & Swallow, 2014).

Nurses who work in the hospital setting have an important part in supplying heart failure education to patients. The level of confidence and comfort the nurse possesses along with the frequency of presenting education on heart failure self-care content should be studied to detect whether optimum nursing practices are evident (Albert, Cohen, & Liu, 2014). Providing standardized, evidenced-based education to nurses on self-management of heart failure in inpatient and outpatient settings is a critical aspect of facilitating the consistency of information delivered during patient education and to fill knowledge gaps. Studies have shown that nurses lack confidence and are uncomfortable in delivering heart failure education and have shown deficits in all five heart failure self-management principles (Mahramus et al., 2013; Albert et al., 2014). In studies that focused on patient education, researchers determined that nursing staff who were proficient in heart failure education may have more confidence in delivering education and in facilitating a more engaging learning atmosphere for patients (Boyd, Turner, & Thompson, 2011; Prasun et al., 2012; Albert et al., 2014).

Furthermore, when knowledge of frequently communicated heart failure self-care

management education was assessed, knowledge insufficiencies were discovered in nursing staff (Mahramus et al., 2013). Numerous subject areas, such as low sodium diet, medications, activity, and worsening symptoms of heart failure were found to be insufficient amongst the nurses providing the patient education (Fowler, 2012; Prasun, 2012; Mahramus et al., 2013; Albert et al. 2014).

Knowledge Gaps

The review of the literature demonstrates that there have been improved clinical outcomes, decreased readmission rates, and reduced costs when nursing education is provided to patients. It is difficult to determine whether the improved clinical outcomes are a consequence of heart failure specific education provided by nurses, post-discharge programs, or a mixture of the two. Additionally, since these studies have not measured heart failure patient knowledge simultaneously with the educational interventions, determining a connection between knowledge improvement and readmission rates has not been achievable (Kommuri et al., 2012). While the correlation between nursing workloads and readmissions has been explored in previous studies, less is understood about the extent to which various nursing care interventions (including patient education) independently influence readmissions (Carthon et al., 2015). The level of confidence and comfort the nurse possesses as well as the frequency of delivering education about heart failure self-care content should to be studied.

The disproportionately higher percentage of 30-day heart failure readmissions in the Florida panhandle (82.6%) compared to the state rate (78.6%) (Heath Services

Advisory Group, 2017) suggests that the local area in the Florida panhandle can potentially benefit from high quality nursing education aimed toward improving heart failure hospital discharge education. Heart failure is a burdening disease for not only the financially strained healthcare system in the United States, but also for the nurses providing education to these patients, and the patients themselves. Despite attempts made by the Affordable Care Act to lower readmission rates, heart failure still remains the top reason for hospital readmissions, with the incidence and prevalence of this disease continuing to increase as the population ages (Mathew & Thunka, 2017).

To address knowledge gaps, this project measured heart failure readmission rates a year after the implementation of a heart failure education workshop for nurses. This project also measured nurse confidence and identified whether nurses had increased confidence when providing heart failure discharge education. The project also identified whether nurses used heart failure discharge educational toolkit in practice and whether the heart failure education workshop would be a beneficial annual education intervention for cardiac nurses. Because chronic diseases such as heart failure require very involved treatments for the remainder of a patient's life, effective self-care education is essential to controlling this disease and optimizing quality of life, including in the prevention of acute exacerbations. Nurses who are proficient in delivering this vital education prior to hospital discharge can potentially decrease readmission rates and healthcare costs.

Conceptual and Theoretical Frameworks

The theoretical framework that guided the project is Kurt Lewin's Change Theory of nursing. This theory consists of three phases of planned change, which are: unfreezing the status quo, moving to a new state, and refreezing the change. Driving and restraining forces are the two forces that Lewin describes as being involved in change (McEwen & Wills, 2011). In the stage of this project, the educational interventions and policy change instituted by the previous project will be the driving force to change the behavior of cardiac nurses. The status quo of the current way of doing things and unfamiliarity with the new policy are restraining forces. In order for the unfreezing stage to begin, educational interventions were provided to cardiac nurses to educate on Joint Commission requirements for nutrition discharge teaching for heart failure patients. Nurses were familiarized with the easily accessible patient toolkit during the in-services provided during the previous project intervention. As more nurses utilize the toolkits and discharge teaching, the hope is that the status quo will have moved to a new state in which it is routine to provide nutritional discharge education to CHF patients. The driving forces to refreeze the change will be the hospital policy change, the accessibility of the patient toolkit, and having a high percentage of nurses receive the educational in-service so that the status quo shifts.

Methodology

The project had a quality improvement design with the purpose of determining whether a heart failure education workshop would be a beneficial annual education intervention for cardiac nurses, increase their confidence levels in providing heart health discharge education, and influence decreased heart failure readmission rates since the implementation of the nursing education workshop and patient toolkit.

Participants

To be eligible to participate in this study, project participants were registered nurses with associate or bachelor's degrees working on the cardiac floor and cardiac intensive care unit at Bay Medical Center. Both day and night shift nurses were included in the study, and every nurse who provided direct patient care met inclusion criteria for participation in the project. A convenience sample of 30 currently employed nurses on the medical-surgical floor and intensive care unit (ICU) were recruited. The recruitment methods included sending e-mails to employees that informed potential participants about the CHF survey and the voluntary nature of study participation. The study participants were required to have basic computer skills in order to complete the online questionnaire. Heart failure readmission rates were also be reviewed for the year prior to and the year immediately following the previous project.

Setting and Resources

The study was conducted in a hospital located in a small city located in the southeastern United States. The hospital provides inpatient and outpatient services for seven surrounding counties and has been recognized for being a heart attack and stroke Center of Excellence. The hospital suffered severe damage in a hurricane before the implementation phase of this study, resulting in alterations in the expected number of participants and requiring the inclusions of non-cardiac specialty nurses. One 15-bed intensive care unit (ICU) and one 42-bed medical-surgical floor were open at the time of the study. Prior to the hurricane, the nurses in these departments had worked in departments including cardiovascular ICU, surgical ICU, medical ICU, general medical-surgical floor, neurosurgical floor, to cardiovascular floor.

Necessary resources for the project included an online survey (Qualtrics). After completion of the survey, participants were directed to online heart failure resources for patients. Other necessary resources include the nursing liaison who assisted in obtaining heart failure readmission rates for 2018 and 2019.

Instruments and Tools

This post-intervention survey used for this study was adapted from the study performed by Camilla Chacon, "Nurses' Knowledge of Heart Failure Self-Management Principles with Likert-type responses." The 17-item online survey included a cover page that explained the research study, a consent page explaining the risks and the benefits, followed by the survey itself. The questionnaire could be completed in approximately 10 minutes and included 11 questions about the socio-demographic characteristics of the participants. The remainder of the survey collected information about current practices for educating patients with CHF at discharge (10 questions) regarding sodium education, nutritional recommendations, and nutritional supplements.

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Intervention

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The project's aims were to Identify if there had been a decrease in heart failure readmission rates since the implementation of the nursing education workshop and patient toolkit and to determine if a heart failure education workshop would be a beneficial annual education intervention for cardiac nurses. In addition, this study also aimed to identify if there has been an increase in the confidence level of the nurses' heart failure discharge education and whether the nurses have been utilizing the heart failure discharge education tools in their daily practice. After obtaining informed consent,

data was collected via an online survey powered by Qualitrics. Heart failure readmission rates for 2018 and 2019 were obtained via a nurse liaison.

Data Collection

Data were collected through the use of an online survey. The surveys were collected, and the de-identified data was stored in a password-protected program on the PI's computer for up to 12 months following the study. Following the receipt of the surveys, the survey results were manually logged into a Microsoft Excel spreadsheet and stored on a password-protected computer. The de-identified data will be destroyed and deleted no more than one year following completion of the study.

Implementation

The major tasks of this study included administering and collecting surveys, and collecting heart failure readmission rate data. Recruitment of participants occurred via email sent by the cardiovascular nurse educator to potential participant's employee email addresses in October 2019. The survey was open for 4 weeks. Charge nurses on the floor verbally reminded nurses of the e-mail and survey link during the huddle at the beginning of the shift. Heart failure readmission rates from the previous year were obtained in January of 2020 via the Lead Quality and Patient Safety Coordinator at the hospital.

Human Subject and Informed Consent

Approval for this project was obtained through Florida State University's Institutional Review Board and Bay Medical's Review Board prior to data collection. A

request to waive consent was submitted as consent was indicated by the independent

choices made by the participants prior to completing the online questionnaire. There

was minimal risk associated with participation in this study. The primary risk was the

breach of confidentiality, and the researcher will maintain strict protocol to protect

against this potential risk. The primary benefits of participation in the study is that the

participant will be providing vital information that will allow the primary investigator to

better understand the importance and impact of nursing discharge education on heart

failure readmission rates. The results will remain anonymous as no identifying

information was collected from the participant. Questionnaires will be safely destroyed

within one year of study completion.

Statistical Analysis

Descriptive statistics were used to analyze the survey questions reflecting the

second and third aims of the project which were: identify if there has been an increase

in the confidence level of the nurses' heart failure discharge education and identify if the

nurses have been utilizing heart failure discharge education resources. For the first aim

of the project, descriptive statistics were also utilized to compare heart failure

readmission rates in 2018 and 2019.

Data were analyzed with the assistance of a statistician. Frequency and

descriptive statistics were used to describe the demographic characteristics of the

sample. Chi-square analysis was used to compare the rates of readmission from 2018

to 2019. The results of the knowledge questionnaire were analyzed and reported using

frequency and descriptive statistics. The 17-item knowledge questionnaire was scored

and a total score was calculated by adding the number of correct items together and dividing by 17. The average questionnaire score with standard deviation was calculated and reported. Statistical significance was assumed at an alpha value of 0.05 and all analyses were performed using SPSS Version 26 (Armonk, NY: IBM Corp.).

Results

Demographics

Of the 28 participants, the majority were female (83.3%). The majority of participants were Caucasian (86.7%), followed by African-American (5.5%) and Latino/Hispanic (5.5%). The most commonly reported age range was 20 to 30 (53.3%), followed 31 to 40 (20%), and then ages 41 to 50 (10%). The highest level of education completed was a Bachelor of Science in Nursing (50%). All of the participants held a Registered Nursing license. Of the participants, most reported 1 to 5 years of experience (46.7%), followed by those reporting 6 to 10 years of experience (16.7%), and 11 to 15 years (13.3%), while 7 percent reported less than 1 year. Of the participants, most worked on the medical-surgical floor (30%), with the rest specifying working in the intensive care unit (20%), or other (43.3%). Most of the participants reported working full-time (80%). The majority of participants worked dayshift (46.7%).

Table 1.

Demographic and Categorical Characteristics

Variable	Level	Frequency (%)
Gender		
	Female	25 (83.3%)

	Male	3 (10.0%)
	Missing	2 (6.7%)
Ethnicity		
	Caucasian	26 (86.7%)
	African American	1 (3.3%)
	Latino/Hispanic	1 (3.3%)
	Missing	2 (6.7%)
Age		
	20-30	16 (53.3%)
	31-40	6 (20.0%)
	41-50	3 (10.0%)
	51-60	2 (6.7%)
	61-70	1 (3.3%)
	Missing	2 (6.7%)
Education		
	Associate's	9 (30.0%)
	Bachelor's	15 (50.0%)
	Master's	4 (13.3%)
	Missing	2 (6.7%)
Nursing License		
	RN	27 (90.0%)
	ARNP	1 (3.3%)
	Missing	2 (6.7%)

Management Position		
	No	23 (76.7%)
	Yes	5 (16.7%)
	Missing	2 (6.7%)
Years of Nursing Experience		
	<1	2 (6.7%)
	1-5	14 (46.7%)
	6-10	5 (16.7%)
	11-15	4 (13.3%)
	31-35	2 (6.7%)
	>36	1 (3.3%)
	Missing	2 (6.7%)
Employment Status		
	Full-time	24 (80.0%)
	Part-time	1 (3.3%)
	Per diem	3 (10.0%)
	Missing	2 (6.7%)
Department		
	ICU	6 (20.0%)
	Med/Surg	9 (30.0%)
	Other	13 43.3%)
	Missing	2 (6.7%)

Employed in Cardiac Specialty Prior to Hurricane

Michael

	Cardiovascular	20 (66.7%)
	Cardiovascular ICU	7 (23.3%)
	Missing	3 (10.0%)

Shift

	7A-7P	14 (46.7%)
	7P-7A	12 (40.0%)
	Other	2 (6.7%)
	Missing	2 (6.7%)

Include Nutrition/Dietary Information with

Discharge Teaching

	Every time	14 (46.7%)
	Most of the time	10 (33.3%)
	Some of the time	1 (3.3%)
	Missing	5 (16.7%)

Provide Verbal and Written Information to

Discharge Patients with CHF

	Every time	20 (66.7%)

	Most of the time	4 (13.3%)
	Some of the time	1 (3.3%)
	Missing	5 (16.7%)
Present Information about Dietary Sodium Intake Recommendations		
	No verbal teaching, provide handout	2 (6.7%)
	Verbal teaching alone	4 (13.3%)
	Verbal teaching with handout	18 (60.0%)
	Verbal teaching with other resource	1 (3.3%)
	Missing	5 (16.7%)
Present Information about General Nutrition Recommendations		
	No verbal teaching, provide handout	2 (6.7%)
	No verbal teaching, provide other resources	1 (3.3%)

	Verbal teaching alone	2 (6.7%)
	Verbal teaching using handout	19 (63.3%)
	Verbal teaching using other resource	1 (3.3%)
	Missing	5 (16.7%)
Present Information about Nutritional Supplementation		
	No verbal teaching, provide handout	3 (10.0%)
	No verbal teaching, provide other resources	3 (10.0%)
	Verbal teaching alone	4 (13.3%)
	Verbal teaching using handout	14 (46.7%)
	Verbal teaching using other resource	1 (3.3%)
	Missing	5 (16.7%)
Provide Nutrition Education to Newly Diagnosed or Chronic CHF		

		Equally between Newly and Chronic	16 (53.3%)
		Just Newly Diagnosed	9 (30.0%)
		Missing	5 (16.7%)
How Often Request Order for Multivitamin Supplementation from MD			
		Never	10 (33.3%)
		Very rarely	2 (6.7%)
		Rarely	9 (30.0%)
		Some of the time	3 (10.0%)
		Every time	1 (3.3%)
		Missing	5 (16.7%)
Adequate Time During Shift to Educate Patients Diagnosed With Heart Failure			
		Strongly Disagree	11 (36.7%)

	Disagree	9
		(30.0%)
	Neither Agree Nor	5
	Disagree	(16.7%)
	Missing	5
		(16.7%)
Hospital has Nurse Educator Dedicated to Educating Patients With Heart Failure		
	No	14
		(46.7%)
	Yes	1 (3.3%)
	Missing	15
		(50.0%)

Findings

For the first aim, the results of the chi-square analysis indicated that there was not a significant difference in the rates of readmission between the 2018 (pre-intervention) and 2019 (post-intervention) time periods, $\chi^2(1) = 3.69$, p = 0.06. There was a reduction in the rates of readmission from pre-intervention (n = 106, 18.1%) to post-intervention (n = 42, 13.1%).

For the first three knowledge questions, moderately low levels of correct answers were provided (Question 1, 26.7% correct answers; question 2, 26.7% correct answers; question 3, 33.3% correct answers). See Table 2 for all the values. The average score

for the 17-item knowledge assessment was 86.96% with a standard deviation of 8.86%. Only n = 23 participants completed all of the knowledge questions and had a final score.

When asked how often they include any nutrition or dietary information when providing discharge teaching to patients with CHF, 46.7% of participants (n=14) responded with "Every time". When asked how often they include information specific to CHF, 66.7% (n=20), responded "Every time".

When asked how information is usually presented when providing discharge information about dietary sodium intake and general nutrition recommendations, 60% (n=18) reported using verbal teaching in addition to the "Heart Healthy Diet" handout. 53.3% (n=16) reported that they were as equally as likely to provide nutrition education for a newly diagnosed or chronic CHF patient.

Half of the nurses participating in the survey (n=15) incorrectly responded to the question, "How much dietary sodium should a patient with CHF consume daily?" 46.7% of participants (n=14) also answered the question about how much fluid intake is best to give a patient with CHF incorrectly as well. 20% (n=6) did not respond to this question.

Table 2.

Knowledge Test Results

Question	Level	Frequency (%)
Vitamin Supplements NOT recommended for CHF patients		
	Incorrect	16 (53.3%)
	Correct	8 (26.7%)

	Missing	6 (20.0%)
Daily Consumption of Dietary Sodium Intake		
	Incorrect	15 (50.0%)
	Correct	8 (26.7%)
	Missing	7 (23.3%
Best Advice About Fluid Intake for CHF Patients		
	Incorrect	14 (46.7%)
	Correct	10 (33.3%)
	Missing	6 (20.0%)

			Outcome		
			Readmission	No Readmission	Total
Period	Post	Count	42	278	320
		% within VAR00002	13.1%	86.9%	100.0%
	Pre	Count	106	481	587
		% within VAR00002	18.1%	81.9%	100.0%
Total		Count	148	759	907
		% within VAR00002	16.3%	83.7%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.691[a]	1	.055		
Continuity Correction[b]	3.338	1	.068		
Likelihood Ratio	3.795	1	.051		
Fisher's Exact Test				.060	.033
Linear-by-Linear Association	3.687	1	.055		
N of Valid Cases	907				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 52.22.

b. Computed only for a 2x2 table

Discussion

The hospital at which this study took place had very recently experienced devastating hurricane damage. This damage resulted in temporary hospital closure and laying off about half of its employees. At the time of this survey, there was only one medical-surgical floor and one ICU functioning. These layoffs may have possibly affected the demographics in this study. More nurses reported working full-time, which may be a result of the part-time and per diem positions being laid off. Many medical-surgical nurses who were not trained in the cardiac specialty were taking care of cardiac patients.

For the first project aim, there was no significant statistical decrease in the heart failure readmission rates between 2018 and 2019. However, there was a reduction from 18.1% (n=106) to 13.1% (n=42) even though these results did not reach significance from a statistical sense. There were far fewer admits in general due to the closure and then limited space of the hospital after the hurricane. Patients were also struggling to find fresh, healthy, low-sodium foods after the hurricane due to kitchens being destroyed and many patients were living on high sodium canned foods.

The expected outcome of the third aim, increasing the percentage of nurses who provide education through both verbal teaching and written material at discharge, was successfully met, with the majority of nurses responding that they indeed use both methods. More nurses than expected answered pertinent questions about fluid and sodium intake for CHF patients incorrectly. This may be the result of non-cardiac nurses

working with cardiac patients. This may also indicate a lack of nursing confidence when educating patients at discharge, the second aim and that an annual or biannual nursing education workshop on heart failure education may be beneficial, the fourth aim. Of note, when asked if nurses felt they had adequate time in their shift to properly educate patients on their disease state, the majority of nurses responded that they "Strongly disagree." Most nurses were also unsure if the hospital had a specialized nurse educator dedicated to heart failure education, or they responded "No", meaning that the hospital did not have a specialized nurse educator in this role.

Implications

This study contributed to the body of knowledge about nursing education by demonstrating that, although not statistically significant in this study, a heart failure education workshop for nurses may be beneficial to reduce heart failure readmission rates and should be further studied. The findings demonstrated that nurses were still utilizing the discharge toolkits a year later and that the heart failure education workshops may be more beneficial if done on a biannual basis. This study also suggests that nurses need more education about heart failure sodium and fluid intake recommendations for people diagnosed with heart failure, which is a critical part of CHF education. Further heart failure education workshops for nurses and follow-up studies may be beneficial for this hospital, especially once it opens to full capacity. It may also be beneficial for the hospital to have a specialized CHF nurse educator to assist patients when the primary nurse does not have adequate time in their shift to educate the patient on their complex disease state.

Limitations

Several aspects of this project, including setting and sample, were affected by a Category 5 hurricane because prior to the implementation of this project, the hospital and surrounding communities received significant structural damage by Hurricane Michael. The hospital closed all inpatient units for three months to begin the repair process, leaving only the Emergency Department open. Nearly half of all hospital employees were laid-off during this time. The hospital then reopened at one-fourth the usual capacity with only a medical-surgical floor and an ICU. Prior to the hurricane, this project was set to take place in a specialty cardiovascular ICU and cardiovascular floor with nurses specifically trained in cardiac care. Unfortunately, the hospital did not have these specialty units open at the time the research project was conducted. The hospital closure also contributed to the small sample size of this project as the number of actual participants was reduced by one-third the previously anticipated sample size, as a result of hospital-wide layoffs. In addition, all findings of the statistical analysis are limited by the small sample size.

Conclusion

Heart failure is a complex disease that is difficult for patients to understand and manage. Managing heart failure symptoms necessitates drastic changes in lifestyle that needs to be emphasized through high quality patient education. Patients must be properly educated about how to adjust their diets, daily activities, and manage their medications to enhance symptom control and prevent acute exacerbations. The majority of patients with heart failure have insufficient knowledge of their disease and do

not possess the skills to proficiently manage their chronic condition, leading to multiple

readmissions of acute congestive heart failure exacerbations.

Nurses are on the front line in patient care. They are responsible for educating

patients on their disease management. It is reasonable to state that patient education

can be improved through emphasis on higher quality nursing education and resources.

If hospital-wide initiative is taken to educate nurses on CHF discharge education and to

have a dedicated CHF nurse educator, readmission rates could be affected without any

high cost intervention.

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