Evaluating the Effect of a Heart Failure Cardiac Rehabilitation Intervention on Hospital Readmission Rates

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Abstract

Heart failure (HF) is one of the most common and costly conditions for hospital readmissions in the United States (Conway, 2015). Cardiac rehabilitation (CR) programs are effective in decreasing hospital readmission rates (Koukoui, Desmoulin, Lairy, Bleinc, Boursiquot, Galinier, & Koukoui, 2015). Medicare has established new requirements for qualification into a CR program; thus, patients are at risk for readmission in the six-weeks post discharge. To reduce HF hospital readmissions and to increase enrollment into the HF program, an infrastructure was implemented beginning in January 2016. This quality improvement project employed a patient chart audit reviewing overall hospital readmission rates for HF at a large hospital in Arizona. A comparison of readmission rates was made between the 6 months prior to, and the 6-months after the expanded utilization of the HF program. An independent-samples *t* test was calculated comparing the mean score of the readmission rates before and after a HF CR intervention. No significant difference was found ($t(358) = .721$, $p > .05$). The mean of the group before the intervention ($m = .15$, $sd = .36$) was not significantly different from mean in the intervention group ($m = .13$, $sd = .33$). Implications for practice cannot completely be concluded from this project findings. Continued studies focusing on the enrollment, attendance, and completion of the HF CR program could assist in determining the benefits of referring all patients with the diagnosis of HF to the HF CR program.

Key words: Heart failure, cardiac rehabilitation, congestive heart failure, cardiac rehab

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Effective management of patients with HF post discharge has been inconsistent in current practice. Despite efforts to reduce the number of readmissions, on the part of the health care facilities, unplanned heart failure readmissions cost Medicare $17.4 billion dollars a year. There has been a significant increase in the number of HF hospital discharges in the past 10 years, and 30% of those patients are readmitted within the first 30 days of discharge (Whittaker & Errico, 2015). Moreover, those patients who are hospitalized with acute HF are at three times greater risk of death than those who can be managed in an outpatient setting (Alspach, 2015).

HF exacerbations and progression may be reduced if blood pressure, diet and other risk factors are controlled. Many HF hospital readmissions can be prevented by offering education, counseling, ways to increase compliance, and enrollment into a CR program which can improve clinical stability and patient outcomes (Conway, 2015). CR is a cost-effective component of patient care following a cardiac even or a diagnosis of HF (Conway, 2015). Education at hospital discharge is a vital component of improving outcomes in HF and to ensure patients are prescribed the appropriate medical therapy, they must be provided opportunities that can contribute to well-being. However, new Medicare requirements for enrollment into CR state that the HF patient must meet the following criteria: 1) be stable on approved HF medications for six weeks, 2) have no major hospitalization within eight weeks of diagnosis, 3) be classified as a grade two or greater for HF using the New York Heart Association classification despite medication therapy for six weeks, and 4) have an ejection fraction of less than or equal to 35% (Legacy Health, 2014). Because patients must meet these qualifications and must wait 6 weeks for entry into a CR program, they are at risk of readmission during this 6-week interim.

At a large hospital in Arizona, a HF program was established within the CR facility in June of 2012. It is a program funded by a Foundation that receives funds strictly from donations. It was provided as a means for HF patients to benefit from the CR program within the first 30 days of discharge without cost to the patient or utilizing the patient's insurance benefits. This program, however, was poorly utilized. In November 2015, a HF coordinator position was established to provide education to patients prior to discharge, however, a standardized method to reduce HF readmission rates was not provided. In January 2016, an infrastructure was established within the HF coordinator's role which allowed all HF patients to be referred to the HF program immediately upon discharge. Increasing HF CR enrollment, was expected to assist in reducing the number of HF hospital readmissions. This inquiry therefore, has led to the clinically relevant PICOT question, "In HF patients recently discharged from the hospital, how does a four-week HF CR intervention, compared to no intervention, affect HF hospital readmission rates?"

Search Strategy

To answer the PICOT question, an exhaustive literary search was conducted utilizing three databases to obtain current literature regarding heart failure, cardiac rehabilitation, and interventions to reduce hospital readmission rates; CINAHL, PubMed, and the Cochrane Library. Thirty-two articles were obtained during the exhaustive literature search. Although the articles produced were all peer reviewed and full text, several studies were eliminated from the qualifying selections as they did not meet inclusion criteria. Exclusion criterion included studies written in a foreign language, studies that were older than 10 years, those that involved comorbidities other than congestive heart failure alone, those that involved children, and those that simply did not list substantial data supporting the stated PICOT question. Inclusion criterion

included studies that provided data that involved heart failure, readmission, and the effects of cardiac rehabilitation on readmission rates. Ten studies ranging from 2011 – 2016 were retained for this project. Keywords included in the search were: *congestive heart failure, heart failure, cardiac rehabilitation, cardiac rehab, and readmission.*

Evidence Synthesis

Of the ten studies retained, three were randomized control trials, two systematic reviews, one pilot study, one retrospective cohort study, one literature review, one mixed methods study, and one meta-analysis study. The level of evidence in the studies ranged from level II through level V. Five of the studies were a level II which represent high quality and strength of evidence (Melnyk & Fineout-Overholt, 2011). All the studies represented participants older than eighteen years of age. Three studies involved prevention of hospital readmission in heart failure patients. Six studies researched the effects of cardiac rehabilitation and exercise on patients discharged from the hospital with heart failure, and one study specifically investigated the effects of nurse follow up phone calls post hospital discharge. All the studies involved both male and female participants. Only one study listed the participants by race. Most of the studies were completed in the U.S.; there were two studies performed in the U.K., one in France and one in Denmark.

Purpose Statement

The purpose of this quality improvement project was to compare HF readmission rates during two distinct time frames. The first, beginning July 2015 – December 2015, when there was no protocol of sending HF patients to the HF CR program post discharge. The second timeframe ranged from January 2016 - June 2016 which was after the hospital incorporated a HF coordinator to implement a procedure of referring all qualifying patients to the HF CR program. The overall project purpose was to identify if a reduction in HF readmission rates was achieved

during the 6-month time period after the implementation of an infrastructure to more aggressively utilize the HF program.

Conceptual Framework and EBP Model

The Goal Attainment Theory defines a framework in which a patient develops and grows to achieve goals ("Nursing Theory," 2016). This theory describes factors which inhibit one from attaining life goals such as roles, stress, space, and time. Once patients with HF are discharged from the hospital, they are left to establish a lifestyle without the guidance from the nurse each day. They no longer receive direction regarding activity, medication, or diet adherence. With this framework, patients can begin to recognize obstacles and realize that to attain and sustain health, they must adhere to a healthful lifestyle. With applying goals and direction, patients can be freed from stress, and apply the time for a structured educational HF program.

The Ace Star Model facilitated this proposed intervention (Stevens, 2004). This framework provides five points of direction to guide the application of the synthesized evidence. The first point of the star, is the discovery of the problem. Here is where knowledge is developed and initial research is gained. Two, is to synthesize the evidence that yields credible and reproducible results. Large amounts of information can then be condensed to make sense of data and to find inconsistencies or consistencies where they may exist. Three, is the transformation stage. The evidence must first be translated into practice and then integrated into practice. Four, is implementation of the innovations, and lastly the fifth point of the star represents the process outcome evaluations. This model provides guidance in each step of the intervention process. It allows for the initial research to be evaluated, condensed, transformed, implemented and then lastly evaluated for possible alterations or improvements if necessary.

Methods

This quality improvement project is a chart audit review of all patients admitted to the hospital with the diagnosis of HF within two, 6 month periods of time. An evaluation of the HF readmission rates 6-months before (group 1) and 6-months after (group 2) the implementation of an infrastructure to more aggressively utilize the HF program was performed. Dates included July 2015 to December 2015, the period before increasing enrollment into the HF program versus January 2016 to June 2016, the period after increasing enrollment into the HF program.

Patients were identified by Quality and Risk Management and a list of patients with a BNP above 400 and ICD-10 code for heart failure was directed to the heart failure coordinator via email daily.

Demographic data to include age, gender, and race were collected. Data collection for measurable outcomes include the 30-day all cause hospital readmission rates for HF that are tracked utilizing the MIDAS quality tracking system. The IBM SPSS statistical package 23 was utilized to perform data analysis and was compared using an independent-samples *t* test.

Instruments

Chart audit is a method in which healthcare disciplines may gather data to direct subsequent prospective studies. It may include quality assessment, epidemiology, professional education, or clinical research (Matt & Matthew, 2013). IRB approval or validation of exclusion from oversight of chart audit review must be obtained as each IRB may have unique interpretation of its scope (Matt & Matthew, 2013). A letter of validation of exclusion was acquired from the hospital facilty for this quality improvement project. Legal and ethical responsibilities were maintained and standards regarding the confidentiality of personal information and the HIPAA Privacy Rules were upheld. All information obtained during the

study was strictly confidential. The results of this study may be used in reports, presentations, and publications, but identifiable information was not collected or reported.

Chart audits of all patients admitted with a confirmed diagnosis of HF were identified. Patients were assigned a unique identifier code in the data collection process. Demographic data to include age, gender, and race were recorded as well as whether they were readmitted within a 30-day period of initial discharge. An independent-samples *t* test compares the means of the two samples. The samples are normally from randomly assigned groups (Cronk, 2012). Because the two groups of patients in this project were from two independent groups, the independent-samples *t* test was most appropriate for analysis.

Results

An independent samples *t* test was calculated comparing the mean score of the readmission rates before and after a HF CR intervention. No significant difference was found ($t(358) = .721$, $p > .05$). The mean of the group before the intervention ($m = .15$, $sd = .36$) was not significantly different from mean in the intervention group ($m = .13$, $sd = .33$). 163 patients were admitted to the hospital with a diagnosis of HF during the first six-month period from July 2015 to December 2015 and 197 patients were admitted to the hospital during the second six-month period from January 2016 to June 2016 (Table 1). Twenty-five patients were readmitted during both six-month time periods (Table 1). It was of interest that in both, the number of men and women readmitted was 15 males and 10 females (Table 2).

Among the races of the patients readmitted, the number of Caucasians was the highest with 19 patients from group 1 and 20 patients from group 2. Asians were not readmitted in either group. There was a reduction in the number of readmissions in the Hispanic population;

four Hispanic patients were readmitted in group 1, however, after the intervention, only 2 were readmitted (Table 3).

Discussion

Introduction of project interventions were discussed with the newly appointed HF coordinator early on in project planning. This allowed for immediate integration of procedures in which patients were enrolled into the HF CR program immediately post discharge. This posed problems with IRB approval and recognition of this project being proactive vs retroactive. Thus, IRB approval should be obtained before procedures are enforced.

Future prospective studies may include monitoring of patient enrollment, attendance, and completion of HF CR program to further assess program effectiveness. This would allow for a more accurate demonstration of HF CR program effectiveness and its true effect on hospital readmission rates.

Critical evaluation of newly developed programs assist in enhancing project outcomes as it allows for assessment of project procedures for improvements or alterations.

Although the findings in this project were found not significant, it cannot completely be concluded that the intervention was not effective. The average cost for each HF readmission is approximately $13,000, therefore it can then be estimated that the cost for each six-month period was $325,000. If the cost to enroll patients into the HF CR program is $0, due to it being funded by a Foundation, it would be beneficial to continue current procedures. Any readmission that can be prevented, is beneficial not only for the patient, but the facility as well.

Conclusion

HF hospital readmissions are costly, not only for the patient, but the hospital institution as well. It has been established that the risk of mortality is reduced if HF patients are managed in an outpatient setting rather than being hospitalized. In an effort to increase participation into the HF CR program, the HF coordinator's position was expanded to include enrolling all HF patients into the HF CR program immediately post discharge. Providing this intervention during the 30-day period post-discharge, when patients are most vulnerable, was expected to play a valuable role in improved patient outcomes which in turn would lead to a reduction in HF hospital readmission rates. The significance of immediately enrolling patients into the HF CR program after discharge was not demonstrated in this quality improvement project, however, with further studies that monitor enrollment, attendance and completion of the HF program, it is likely that the benefits will be determined.

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Table 1

Readmission Rates for Group 1 and Group 2.

Count

		Groups		
		Group 1	Group 2	Total
readmit	**no**	138	172	310
	yes	25	25	50
Total		163	197	360

Table 2

Gender Readmission Groups Crosstabulation.

Count

			readmit		
Groups			no	yes	Total
Group 1	Gender	Female	52	10	62
		Male	86	15	101
	Total		138	25	163
Group 2	Gender	Female	78	10	88
		Male	94	15	109
	Total		172	25	197
Total	Gender	Female	130	20	150
		Male	180	30	210
	Total		310	50	360

Table 3

Race Readmission Crosstabulations.

Count

Groups			readmit		Total
			no	yes	
Group 1	Race	caucasian	111	19	130
		african american	4	1	5
		hispanic	11	4	15
		native american	6	1	7
		other	6	0	6
	Total		138	25	163
Group 2	Race	caucasian	143	20	163
		african american	1	2	3
		asian	4	0	4
		hispanic	18	2	20
		native american	3	1	4
		other	3	0	3
	Total		172	25	197
Total	Race	caucasian	254	39	293
		african american	5	3	8
		asian	4	0	4
		hispanic	29	6	35
		native american	9	2	11
		other	9	0	9
	Total		310	50	360