

Running head: HEART FAILURE FOLLOW-UP

Follow-Up after Heart Failure Hospitalization: Attendance and Effects of Timing and Provider

Type on Readmission Rates

Mark W. Smith, BSN, RN
Creighton University
Email: mws44530@creighton.edu

Amy A. Abbott, PhD, RN
Associate Professor, Creighton University College of Nursing

Abstract

Objective: The purposes of this study were to: a.) determine differences in demographic, socioeconomic, and clinical variables of adult patients with heart failure that attend follow-up and those who do not and to: b.) to explore the association of the post-discharge follow-up visit components (e.g. the timing of the visit and provider type) with 30-day readmission.

Background: Timely follow-up after heart failure hospitalization is an intervention associated with a reduction in 30-day readmission and can improve patient safety; however published studies have shown that the rate of follow-up is low. Research findings describing characteristics of patients at-risk for not attending follow-up and how components of the visit affect 30-day readmissions are limited.

Methods: A retrospective chart review of heart failure patients discharged between June 1, 2011 and February 1, 2013 was completed at an urban mid-western acute care hospital.

Results: Eighty-five percent of patients (n=68) attended the scheduled follow-up visit. Statistically significant differences were found between the number of outpatient visits in year previous to admission ($p=0.042$) and hemoglobin values at admission ($p=0.04$) between patients that attended follow-up and those that did not. No statistically significant differences were found between patients that attended follow-up within 3 days, 4-7 days, or 8 or more days and 30-day readmission ($p=1.000$) or between patients who attended follow-up and were treated by a cardiologist vs. those treated by a primary care provider ($p=0.103$).

Conclusion: Follow-up after heart failure hospitalization remains an important component of care. Interventional studies that facilitate post-discharge follow-up and employ strategies to reduce 30-day readmission need to continue.

Key Words: Heart Failure, Readmission, patient discharge, Post-hospital follow-up

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Heart failure is a chronic, progressive condition experienced by millions of Americans¹ that is marked by symptoms of dyspnea and fatigue that occurs when the heart can no longer pump efficiently enough to keep up with the bodies' oxygen requirements. These symptoms are often the trigger for patients to seek care and subsequently result in hospitalization. In America, heart failure is one of the leading causes of hospital admissions, constituting a substantial proportion of resource use and healthcare spending.¹⁻³

Once discharged following an acute event, patients are at a vulnerable time period in which they are often prescribed new medications or are undergoing dosing changes, making monitoring for adverse events and symptom exacerbation essential. In a study of 15,767 hospitalized patients, including heart failure patients, 11.9% of patients were found to have new or worsening symptoms within two to three days after discharge.⁴ Modifications in diet, self-dependence, demands for more physical activity, and social stresses all contribute to vulnerability.⁵ During this period, patients may not have received adequate information pertaining to their disease. These patients may also experience difficulty recalling or understanding self-care education and instruction received during hospitalization. Failure to understand these instructions is often a cause of subsequent hospital readmission.⁶

The formation and utilization of interventions to decrease readmissions has become a priority for health care systems and hospitals attempting to improve the quality of care delivered to heart failure patients while also avoiding financial penalties created by the Affordable Care Act. In October of 2012, the Centers for Medicare & Medicaid Services began to penalize hospitals who have higher heart failure readmission rates than the national average. Hospitals

that perform below the expected rate of readmissions could lose up to 3% percent of their regular Medicare payments. It is also predicted that private insurers will soon follow this reimbursement pattern which could further affect payment to hospitals.

An intervention that has been shown to be associated with reduction in 30-day readmissions in heart failure patients is timely follow-up.⁷⁻⁹ The American Heart Association (AHA) states that early post-discharge follow-up care can help heart failure patients avoid exacerbation and can reduce the incidence of preventable readmissions.¹⁰ This intervention affords providers an opportunity to monitor for adverse events, reinforce teaching, and continue or adapt the hospital-initiated treatment plan. Along with the AHA, numerous organizations also include timely follow-up in their guidelines and/or national performance measures for heart failure patients including the Institute for Healthcare Improvement, the Heart Failure Association of America, and the American College of Cardiology Foundation/AHA/American Medical Association- Performance Consortium for Performance Improvement.¹¹⁻¹³ In line with these recommendations, health systems and hospitals also include scheduling a timely post-discharge follow-up visit in heart failure guidelines and protocols.

While it is accepted that timely follow-up visits decrease 30-day readmission rates and can improve patient safety, studies indicate that follow-up visit rates for heart failure patients are low, ranging between 38%^{7,14} and 50%.³ There is a dearth of data on characteristics that are associated with attendance at these follow-up visits, how many days following discharge that the follow-up visit should take place, and with what type of provider. Therefore, the purposes of this study are to: a) explore and describe the characteristics of patients who attend the post-discharge follow-up visit after heart failure hospitalization; and b) explore components of the follow-up

visit (e.g. number of days post-discharge and provider type) and the association of these components with 30-day readmission. Specific aims of this study include:

1. To identify the differences in demographic variables (i.e.. age, gender, race, and residence proximity to scheduled visit); socioeconomic variables (i.e. insurance status, employment status, marital status, and residence type); and clinical variables (i.e. admit source, length of stay, smoking status, alcohol use, comorbidities, resource utilization, laboratory results and functional status) between adult heart failure patients that attend a scheduled post-discharge follow-up visit and those who do not.
2. Determine if a difference exists in 30-day readmission rates between patients that attend the post-discharge follow-up within 3 days; 4-7 days; or 8 days or more.
3. Determine if a difference exists in 30-day readmission rates between patients that attend the post-discharge visit with cardiology vs. those who follow-up with a primary care provider.

Methods

Approval for this study was obtained through the University's Institutional Review Board and the health system's Research Council prior to initiation of the study.

Sample and Setting

This study was a retrospective chart review of a purposive sample of adult patients with a discharge diagnosis of heart failure from a Midwestern, 284-bed, level 3 trauma, acute-care hospital between June 1, 2011 and February 1, 2013. Criteria for inclusion into the study were: over the age of 19 and scheduled for a post-discharge follow-up visit with a primary care provider or with the cardiology group within the health system prior to discharge.

Data Collection Procedure

A list of patients discharged from the study site with a diagnosis of heart failure between June 1, 2011 and February 1, 2013 was obtained from a single database. This time period was chosen as it corresponded with the initiation of the study site's recommendation for the follow-up visit to occur within 7 days of discharge and included the change of this recommendation in which follow-up was to be scheduled within 3 days. This time period also allowed for all potential participants to be evaluated for a 30-day readmission.

Patient characteristics including demographic, socioeconomic, and clinical variables were collected from history and physicals, consultations, clinical information sheets, physician's orders/progress notes, laboratory results, and discharge summaries. Specific data were collected for number of hospitalizations that occurred within the year prior to admission, number of Emergency Department (ED) visits that occurred within the previous 6 months, and if readmission of any cause occurred after 30 days after discharge. If a patient was admitted more than once within 30-days, only the first admission was used. Information collected that pertained to the post-discharge follow-up visit included: the timing of the follow-up visit, provider-type encountered during the visit, number of previous outpatient visits that occurred within 30 days of the admission, and the number of outpatient visits that occurred within the previous year of admission.

Statistical Analysis

To determine significance between demographic, socioeconomic, and clinical variables, categorical data were analyzed using chi square statistics and continuous data were analyzed using the student t-test. Where appropriate contingency tables were constructed and significance reported using Fisher's exact statistics. Chi square statistics were also used to determine

significance in timing of follow-up and between provider types. SPSS v.20 software was used in analyzing study data.

Results

A total of 202 patients that represented 253 heart failure discharges between June 1, 2011 and February 1, 2013 were included in the sample. From those 202 encounters, 80 patients met the inclusion criteria and were eligible for the study. Eighty-five percent (n=68) of the patients attended the scheduled follow-up visit. Patients that attended the follow-up visit were readmitted within 30 days in 24% of the cases, where as 42% of those who did not attend follow-up were readmitted within 30 days. The study sample had equal number of males and females, a mean age of 71 years, were predominately white, married, retired, and were Medicare beneficiaries.

Demographic variables

No statistically significant differences were detected for any of the demographic variables between those who attended the follow-up visit and those patients who did not. See Table 1. Younger patients tended to have higher rates of follow-up. Further categorization of patients showed that patients in the age range of 29-39 years followed up 100% the time, those aged 40-64 had an 88% follow-up rate and those who were 65 years or older followed up 83% of the time. Male patients tended to have had higher rates of attendance at follow-up, as did Caucasian patients, and patients who lived in a different town than where their scheduled follow-up visit occurred.

Socioeconomic variables

No statistically significant differences were found for any of the socioeconomic variables studied between patients who attended follow-up and those who did not. See Table 1. Patients that had private insurance, married patients and patients who were employed tended to have

higher rates of follow-up. Follow-up rates were similar for those who lived at home/independently and those who did not.

Clinical Variables

No statistically significant differences were found for any of the clinical variables between those who attended the post-discharge follow-up visit and those who did not except for the number of outpatient visits in the year prior to admission and with hemoglobin values at admission. See Table 2. Patients that had 0-4 outpatient visits in the year previous to admission attended follow-up significantly more often than did patients with 5-10 visits and then those with 11 or more visits ($p=0.042$). Hemoglobin values were significantly lower in patients that did not attend the post-discharge follow-up visit ($p=0.04$) than those that attended follow-up visits.

Patients that tended to have lower rates of follow-up were tobacco users, and had the following: higher left ventricular ejection fraction (LVEF), a history of depression, multiple comorbidities as measured by the Charlson Comorbidity Index (CCI), a longer length of stay. Patients with an outpatient visit within 30 days of the admission, those with multiple ED visits in the 6 months prior to admission, and those with fewer consults tended to have lower rates of follow-up. Documentation of New York Heart Association functional class was not available on over 90% of charts reviewed; therefore, was not included in the data analysis.

Timing of Follow-up

Of the 68 patients that attended a scheduled post-discharge follow-up visit, 28% attended follow-up within 3 days of discharge ($n=19$); 51% attended between 4 and 7 days ($n=35$); and 21% attended 8 days or more after discharge ($n=14$). Of those patients that attended follow-up within 3 days, 32% were readmitted within 30 days as-compared to 20% who followed-up between 4 and 7 days and 21% who followed-up 8 or more days after discharge. No statistically

significant differences were found when comparing timing of follow-up in these groups and readmissions occurring within 30 days ($p=0.619$). Figure 1 shows the distribution of when patients attended the post-discharge follow-up visit.

Provider type

No statistically significant difference was found in comparing 30-day readmission rates between patients that attended follow-up with a primary care provider versus those patients who followed up with a cardiologist. Less than half of the patients who followed up did so with a cardiologist from the site's cardiology group ($n=29$). However, of those patients seen by cardiology, 13.8% were readmitted versus 30.8% patients that followed-up with their primary care provider ($p=0.103$).

Discussion

Notably, this study demonstrated a higher rate of follow-up than previously discussed in the literature. The post-discharge follow-up visit was attended by 85% of the patients, a number that exceeds previous reports of 38%^{7,14} and 50%.³ This may be attributable to the attention now garnered in avoiding readmissions and the emphasis placed on attendance at the post-discharge follow-up visit. External cues to action may have taken place to facilitate attendance which was not a focus in this study. During the study time frame, a readmission prevention care path was initiated at the site for patients deemed to be at high risk of readmission; thereby influencing the results of this study.

It remains unclear if patients who are viewed as "sicker" follow-up with more frequency than those patients deemed to be less acutely ill during hospitalization and what factors are associated with this relationship. In this study, patients that did not attend post-discharge follow-up visits had statistically significant lower hemoglobin values, which may be indicative of

greater disease severity. This contrasts a previously published study that compared clinical variables and follow-up where no significant difference was found in hemoglobin levels between patients that attended follow-up and those who did not.¹⁴ The clinical variable of comorbidities, represented in this study by the CCI, has previously been reported as being associated with lower rates of follow-up^{7,14} however, in this study those with higher CCI tended to have higher rates of follow-up. Studies on the effects of length of stay on follow-up have been inconsistent in the literature. Similar to this study, some found that a longer length of stay was associated with a decreased likelihood of follow-up occurring^{8,14} whereas others reported that a shorter length of stay was associated with not following-up.¹⁵ Multiple factors contribute to determining a patient's length of stay. Patients may now be discharged “quicker and sicker” due to payment restrictions, whereas some patients with known difficulties in appropriating follow-up care may be kept longer to facilitate the treatment plan.

Another finding from this study that contradicts previously reported literature is that patients with lower LVEF tended to have higher rates of follow-up.^{7,14} In a study that found those with lower LVEF were less likely to follow-up, the authors discussed the possibility of sicker patients having more difficulty arranging physician visits or being referred to specialists with longer wait times.¹⁴ Since current study site guidelines recommend that the follow-up appointment be scheduled before the patient leaves the hospital, neither of these suggestions now seem plausible. Further exploration into the health status of patients and its association with attending the post-discharge follow-up visit is warranted.

In this study, a statistically significant difference was found in the number of outpatient visits occurring in the year prior to admission in relation to follow-up. Those who had fewer visits had higher rates of attendance at the post-discharge follow-up visit. Patients in this study

with one or more outpatient visits within 30 days prior to admission and those with 2 or more ED visits in the past 6 months also tended to have lower rates of follow-up. The cause of this association is uncertain and to our knowledge has not been previously explored. This finding could represent a need to deliver enhanced teaching or reassessment of home management skills and knowledge to patients that frequently utilize these healthcare resources. This could also signify the importance of exploring additional modifiable patient-related barriers to follow-up including health belief, illness perception, or health literacy.

It also remains unclear what role demographic and socioeconomic variables play in predicting follow-up. Women and non-white patients tended to follow-up less than their counterparts in this study which is consistent with previously published studies.^{7-8,14} This may also explain why studies have shown black patients with heart failure have higher rates readmissions rates.¹⁶⁻¹⁷ Patients of lower socioeconomic status have also been implicated in the literature as having lower rates of follow-up.^{8,14,18} This study found that patients with Medicaid tended to have lower rates of follow-up, as did those patients who were unemployed or disabled than compared to those who had private insurance or who were employed.

Social support may also play a role in attending follow-up visits. As reported in a previous study, married patients had higher rates of follow-up than those who were single, divorced, or widowed, a finding consistent with this study.¹⁹ Other factors associated with lower rates of follow-up in this and other studies include a documented history of depression. Depression has been shown to be more prevalent in those with lower rates of follow-up, a strong predictor of non-adherence to treatment plans, to increase risk for hospitalization, and is a common finding in heart failure patients.^{7,20}

Similar to published studies, this study found that readmission within 30-days tended to occur more frequently in patients who did not attend follow-up.⁷⁻⁸ Data from the Hospital Compare website shows that the national average for heart failure readmission is 24.7%²¹ which is substantially lower than the 42% of patients readmitted within 30-days who did not follow-up found in this study. This finding signifies an opportunity for improvement as patients who did attend follow-up had a lower rate than the national average. In those patients that attended follow-up, those who returned within 3 days of discharge had higher rates of readmission than those who followed up at 4-7 days and then those who attended at 8 days or longer. Although unexpected, this finding could represent the importance of post-discharge follow-up visits in assessing for clinical deterioration of patients or treatment plan failure while representing quality care. Current opinions suggest that readmission may not reflect suboptimal care, may not be a suitable outcome measure, and may be associated with lower mortality rates.²²⁻²³ In a recent study, readmission was found to have an inverse relationship with mortality in heart failure patients.²⁴ The appropriateness of readmission rates as an acceptable outcome measure should also receive further study and discussion.

Currently, there is insufficient evidence in the literature for recommendations about the most appropriate roles of primary care providers and cardiologists in the care of patients with heart failure.⁶ This study did not find statistically significant differences between the provider type encountered at the post-discharge follow-up visit and the occurrence of 30-day readmission although patients tended to be readmitted less often when initially seen by cardiology. Determination of which provider a patient should see initially should be based on various factors including severity of disease and provider preference. Ensuring appropriate care coordination and communication during care transitions should continue regardless of provider type.

Limitations

Limitations of this study include that there was a small sample gathered from a single institution which limits its generalizability. Due to its design, this study was also unable to track those patients that were referred to follow-up outside the health system, those that had established providers, those readmitted to another facility, and those who expired after discharge. The adoption of and/or innovations in electronic medical health records may facilitate richer and more complete data collection.

Future Research

Non-attendance with the post-discharge follow-up visit may be due to a combination of multiple complex variables or due to interactions among them. Future studies may benefit from a prospective design that could improve estimates of follow-up rates while further exploring and describing reasons for not attending follow-up that are not available through chart review. Larger studies may better illustrate study outcomes and utilize predictive models that could be developed and validated. These predictive models could assist in identifying high-risk patients early in the admission to guide decision making, intervention, and allow for efficient resource use.

Summary

The post-discharge follow-up visit is an important component of care for heart failure patients and evidence-based guidelines should be followed. Providers should promote and educate patients on the importance of this visit after hospitalization as this constitutes a crucial period that could lead to costly readmissions and negative patient outcomes. Further research is warranted as there is limited information available on characteristics associated with heart failure patients' lack of follow-up, the timing of the visit, and the provider type.

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Table 1. Demographic and Socioeconomic Variables

Characteristic	Full Sample	Attended Follow-up	No Attendance at Follow-up	P-Value
Age^a				
Mean (SD)		70 (\pm 13.6)	74 (\pm 16.8)	0.363
Median (range)		74.5 (29-90)	83 (43-90)	
Gender, n (%)				
Male	40 (50)	36 (90)	4 (10)	0.210
Female	40 (50)	32 (80)	8 (20)	
Race, n (%)				
White	70 (95)	60 (86)	10 (14)	0.121
Non-White	4 (5)	2 (50)	2 (50)	
Residence in town of follow-up, n (%)				
Yes	63 (80)	52 (82)	11 (18)	0.442
No	16 (20)	15 (94)	1 (6)	
Insurance, n (%)				
Medicare	52 (67)	43 (83)	9 (17)	0.214 ^b
Medicaid	5 (6)	3 (60)	2 (40)	
Private	13 (17)	13 (100)	0 (0)	
None	8 (10)	7 (88)	1 (12)	
Employment, n (%)				
Employed	10 (13)	10 (100)	0 (0)	0.444 ^b
Unemployed	5 (6)	4 (80)	1 (20)	
Retired	54 (68)	45 (83)	9 (17)	
Disabled	9 (11)	7 (78)	2 (22)	
Never worked	2 (2)	2 (100)	0 (0)	
Marital Status, n (%)				
Married	35 (44)	33 (94)	2 (6)	0.072 ^b
Divorced	12 (15)	10 (83)	2 (17)	
Widowed	26 (32)	19 (73)	7 (27)	
Single	7 (9)	6 (86)	1 (14)	
Residence Type				
Home/Independent	63 (80)	54 (86)	9 (14)	1.000
Other	16 (20)	14 (88)	2 (12)	

^a An age of 90 was used as default value for all patients aged 89 and older

^b p-values based on consolidation of cells to obtain necessary cell size for validity

Table 2. Health Status

Characteristic	Full Sample	Attended Follow-up	No Attendance at Follow-up	P-Value
Admitted From, n (%)				
Direct Admit	19 (24)	16 (84)	3 (16)	1.000
ED	61 (76)	52 (85)	9 (15)	
Tobacco Use, n (%)				
Yes	15 (20)	11 (73)	4 (27)	0.101
No	61 (80)	55 (90)	6 (10)	
Alcohol Use, n (%)				
Yes	59 (79)	50 (85)	9 (15)	1.000
No	16 (21)	14 (88)	2 (12)	
LVEF, n (%)				
>50	44 (55)	36 (82)	8 (18)	0.378
<50	36 (45)	32 (89)	4 (11)	
Hemoglobin (mg/dl)				
Mean (SD)		12.51 (\pm 1.95)	11.25 (\pm 1.71)	0.040 ^a
Median (range)		12 (8-17)	12 (8-14)	
Creatinine (mg/dl)				
Mean (SD)		1.47 (\pm 0.89)	1.92 (2.58)	0.265
Median (range)		1 (1-6)	1 (1-10)	
Sodium (mEq/L)				
Mean (SD)		137.5 (\pm 4.14)	137.3 (\pm 3.77)	0.855
Median (range)		138 (123-146)	138 (128-142)	
BNP (ng/mL)				
Mean (SD)		4177 (\pm 4856)	6957 (\pm 7385)	0.108
Median (range)		3033 (53-30,000)	3411 (386-1,441)	
BMI				
Mean (SD)		33.97 (\pm 7.37)	29.91 (\pm 8.69)	0.103
Median (range)		34 (19-53)	28 (18-45)	
Atrial Fibrillation				
Yes	35 (44)	30 (86)	5 (14)	0.875
No	45 (56)	38 (84)	7 (16)	
Depression				
Yes	16 (20)	12 (75)	4 (25)	0.245
No	64 (80)	56 (88)	8 (12)	

CCI				
0-1	32 (40)	30 (94)	2 (6)	0.105
2-3	32 (40)	24 (75)	8 (25)	
4 or more	16 (20)	14 (88)	2 (12)	
Hospitalized within past year				
Yes	42 (52)	35 (83)	7 (17)	0.661
No	38 (48)	33 (87)	5 (13)	
Outpatient visit within 30 days				
Yes	44 (59)	38 (86)	6 (14)	0.228
No	31(41)	30 (97)	1 (3)	
Outpatient visits within past year				
0-4	29 (39)	29 (100)	0 (0)	0.042 ^a
5-10	21 (28)	19 (90)	2 (10)	
11 or more	25 (33)	20 (80)	5 (20)	
ED visits in past 6 months				
None	33 (41)	30 (91)	3 (9)	0.463
1	21 (26)	17 (80)	4 (20)	
2 or more	26 (33)	21 (81)	5 (19)	
Inpatient Consults				
None	12 (15)	9 (75)	3 (25)	0.288
1	28 (35)	26 (93)	2 (7)	
2 or more	40 (50)	33 (82)	7 (18)	
Length of stay				
1-5 days	60 (75)	53 (88)	7 (12)	0.163
6 or more	20 (25)	15 (75)	5 (25)	
Discharged to				
Home	64 (81)	54 (84)	10 (16)	1.000
Other	15 (19)	13 (87)	2 (13)	

^a p <0.05

ED=Emergency Department; LVEF=Left Ventricular Ejection Fraction; BNP=Brain Natriuretic Peptide; BMI=Body Mass Index; CCI=Charlson Comorbidity Index

Figure 1. Timing of Follow-up

