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# Multidisciplinary Team Approach to Prevent HF Readmissions in Rural Areas

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**A DNP PROJECT**

# Multidisciplinary Team Approach to Prevent CHF Readmissions in Rural Areas

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**Contents**

## Abstract

**Background**: Despite the national efforts to decrease 30-days hospital readmissions, readmission remains a challenge for healthcare organizations across the continuum of care. The aim of this quality improve project was to develop and implement a multidisciplinary team approach to provide education to patients hospitalized with congestive heart failure (CHF) to improve 30-day hospital readmissions.

**Method**: This project was conducted in a critical access hospital in Northeast Washington. Using a pre-post design, we evaluated the 30-day readmission before and after implementing the multidisciplinary education program for patients hospitalized with CHF. The education focused on disease management, discharge education, pharmacy consult and medication education, and follow up discharge call within 14 days post discharge. Data were collected from chart reviews.

**Results**: There were 42 patients in the pretest and 52 in the posttest. Patients in the posttest were significantly older (75.77 years) than those in the pretest (66.81 years), $p<0.001$. There were two readmissions in the pretest group (4.8%) and zero (0%) in the posttest group. Statistical test was not performed due to the low incidence. We found that the length of hospital stay was significantly longer in the posttest than in the pretest (1.5 days vs. 4.08 days, $p<0.001$).

**Conclusion**: This project provided a comprehensive educational approach to decrease 30-days readmission. Although the multidisciplinary approach showed improvement in practice standardization, it was not possible to perform a statistical test due to low incident. Continue the current process and extend data collection should be done to determine the impact of the intervention.


*Keywords:* Heart failure, readmission, multidisciplinary, rural

## Background

Patients discharged from the hospital after hospitalization expect to see health improvements; sadly, this is not always the case. Sometimes, the patient's health remains compromised, so they must come back to the hospital. That process is called hospital readmission, regardless of the reason for the visit. Heart failure (HF) is the leading cause of 30-day readmissions in the United States, with 23.0 percent from 2009 to 2012 (McIlvennan et al., 2015). Readmission is a challenge for health care providers across the continuum of care, and it remains a problematic clinical and economic concern in the United States.

In October 2012, the Centers for Medicare and Medicaid Services (CMS) initiated the Hospital Readmissions Reduction Program (HRRP) to reduce payments to hospitals with excess in readmissions (Anderegg et al., 2014), intending to improve quality of care and minimizing the patient length of stay and readmissions. Medicare penalizes hospitals that incur 30-day readmission for CHF (Moore, 2016). HF affects over 6.5 million people annually in the United States (Benjamin et al., 2019, as cited on CDC, n.d.), with a cost of roughly $34.4 billion per year (Chen-Scarabelli et al., 2015).

The literature reviewed highlighted the importance of creating programs that focus on reducing 30-day readmission after hospital discharge for a patient with CHF and the steps that hospitals are taking to avoid negative financial implications. Rural areas encounter a significant challenge, as they do not have many resources outside the hospital ward. It is essential for the leadership in a rural hospital to address the problem of readmission for CHF. Inpatient education during the hospital stay from admission to discharge, and care transitions programs from hospital to home (Vesterlund et al., 2015) are two strategies that could positively impact this issue.

**Problem Statement**

HF is a chronic condition affecting millions of American adults, and the projection is that more patients will have HF, about 8 million increase from 2012 to 2030 (Ziaeian, & Fonarow, 2015). Due to the complexity of the illness, HF is one of the leading causes of hospitalizations and 30-day readmissions to the hospital. For this reason, decreasing readmission due to HF and meeting the national standard determined by CMS became a priority.

**Purpose Statement**

The purpose of this project was to develop a multidisciplinary education strategy for patients with HF who were admitted to a rural hospital, to reduce preventable readmissions after hospital discharge.

**Aims**

This QI project aimed to decrease 30-days readmissions post-hospital discharge using multidisciplinary team education for patients hospitalized with CHF/HF at a rural hospital in Northeast Washington. The aim aligns with the national trend of healthcare organizations' focus on the development and use of measures that matter to decrease readmissions (Burstin, Leatherman & Goldmann, 2016).

**Objectives**

1- To develop a multidisciplinary team education for patients hospitalized with CHF/HF at a rural hospital in Northeast Washington to decrease 30-days readmissions post-hospital discharge.

2- To compare the 30-day readmission before and after the implementation

**Research Question**

For patients with CHF/HF at two Critical Access Hospitals (CAH) **(P**), how does a multidisciplinary education prior discharge_ (**I**) compared to traditional education _(**C**) affect hospital readmission _(**O**) within 30 days post-hospital discharge.

## Significance

Congestive Heart Failure (CHF) is an end-stage clinical syndrome that occurs secondary to severe cardiac disease (Cox, 2017). CHF causes frequent hospital readmissions, which is a significant concern in the healthcare system in the United States (Anderegg et al., 2014; Moore, 2016). Among the factors that relate to readmissions, education to patients and families is gaining the most popular for its positive results (Ziaeian, & Fonarow, 2016). Several studies indicate that using strong multidisciplinary teams to educate patients and provide care can improve patient outcomes and ensure seamless care after hospital discharge (Riley & Masters, 2016). However, this evidence has not been adopted as standard care in practice. Riley and Masters (2016) discusses that it seems like healthcare professionals are working independently, lacking a comprehensive approach and open communication among caregivers and patients.

Due to the challenges that 30-readmission caused to many hospitals, including CAH, a QI project was imperative to develop an evidence-based practice initiative, using a multidisciplinary team to provide education, from admission to discharge, for patients admitted with HF to prevent 30-days readmissions.

## Review of Literature

Multiple toolkits, programs, interventions, and solutions have been developed to address the readmission challenge. A systematic review was conducted to examine the impact of multidisciplinary education for patients with CHF during their hospitalization on decreasing ER initialization and readmission within 30 days post-discharge. The articles were searched from

CINHAL, MEDLINE, PubMed, and Himmelfarb Library general search. The search process was facilitated by an analysis from titles and abstracts of the articles retrieved from each database. The Appraisal of articles was conducted using the John Hopkins University (JHU) Research Evidence Appraisal Tool guide. The JHU Research Evidence Appraisal Tool assists with the evaluation of the research and non-research studies. The use of a rating hierarchy is a structured approach to differentiate the different strengths and qualities of each study. The hierarchy consists of level I, II, and III (Gugiu & Gugiu, 2010, depending on the kind of study, and the quality rating A- High, B- Good, C- Low.

Thirty-six studies were identified through the search; twenty-three were removed as they were duplicate. Then, thirteen studies were screened, out of those, five were removed for meeting exclusion criteria, leaving eight studies to use for synthesis analysis. Three of the five studies identified through the literature search evaluated a clinical model to decrease readmissions for patients with CHF. There are four articles with level I evidence, two with level II evidence, and two with level III evidence. Articles with level I evidence indicate that a multidisciplinary team intervention to patients with CHF reduces hospital readmission. However, one study did not have a clear answer to which intervention was the most useful. Articles with Level II evidence showed that pharmacy involvement in educating the patient on medication during admission and discharge has a positive effect on a patient with high-risk comorbidities. Additionally, the study supports that a multidisciplinary education program for patients with CHF improves the quality of care with the great potential to decrease readmission to the hospital. Level III evidence showed that NP involvement in the discharge process for a patient with CHF and the use of an interdisciplinary team has a positive impact on the reduction of 30-day readmission rates.

In conclusion, the evidence is relatively consistent to support that multidisciplinary education has positive effects on decreasing readmission for a patient with CHF.

## EBP Translation Model

The Iowa Model (Dang & Dearholt, 2017) was used to guide the implementation process of this project. There were seven steps in the Iowa model:

### *1- Problem and knowledge focused triggers*

During 2028, our CAH had challenges with hospital readmissions per data from our internal Performance Improvement (PI) reports. The report is presented monthly on the PI Committee and senior leadership meetings.

### *2- Form a team*

The team was formed by the DNP student, who was the researcher, the Primary and secondary advisor, the project manager, and the acute care unit (ACU) team. The multidisciplinary team was formed by attending physician, primary nurse, pharmacy, case manager, and any other disciplines that provide patient care during that hospitalization, for example, respiratory therapy, physical therapy, and chaplain. The interdisciplinary team meets daily to discuss the patient's plan of care, the patient's needs, barriers for understanding the education, and the plan from the patient's admission to discharge. The team received training on disease management, approach, and desired outcome by the ACU nurse manager. The case manager follows a script to maintain the standardization of care. The multidisciplinary care plan was embedded in the hospital electronic health record.

During each interaction, the team involved the patient and the family member, when present. The team meets daily. Patient education focuses on disease management, blood pressure monitoring, daily weight monitoring, medication education, and diet. The case manager ensures

that a follow-up appointment with the primary physician or cardiologist is established. After discharge, one of the team members gives a follow-up phone call to the patient within 24 hours of discharge and at 14 days. The purpose of the follow-up phone call is to review the discharge planning, and patient needs to ensure there is adherence to the plan and to avoid remission.

***3- Assemble relevant research and related literature***

The articles were searched from CINHAL, MEDLINE, PubMed, and Himmelfarb Library general search. The search process was facilitated by an analysis from titles and abstracts of the articles retrieved from each database, guided by the Preferred Reporting Items for Systematic review and Meta-Analyses (PRISMA) (Moher et al., 2009). The search term included: “readmissions,” “CHF discharge,” “CHF readmissions,” “30-day readmission”, “Heart Failure,” “HF,” “Congestive Heart Failure,” “CHF,” “transition of care,” “multidisciplinary education,” “multidisciplinary,” “comprehensive discharge.” The studies were evaluated using the recommendation from JHU Research Evidence Appraisal Tool.

***4- Critique and synthesize research for use in practice***

In this systemic review report, the multidisciplinary education effects on readmission for a patient with CHF were given a ‘high’ rating. Anderegg et al. (2014), for example, used a pharmacy practice model approach, and their intervention includes medication reconciliation and education to patients, with high-risk CHF, during admission and discharge. The model resulted in decreasing 30-readmission from 17.8% to 12.3%. McAlister (2004) systematically reviewed 29 randomized clinical trials (RTC) that used multidisciplinary strategies to improve outcomes for patients with HF and found a 27% reduction in readmissions among HF patients. Moore (2016) evaluated the efficacy of a clinical pathway led by a nurse practitioner. Their intervention focused on home-based clinical visits to 22 patients with CHF discharged from the hospital.

Even though the program had a small sample, it achieved a 9% reduction in 30-day readmission to the hospital.

Linden & Butterworth (2014) examined the impact of transitional care intervention to reduce readmission for patients with CHF and Obstructive Pulmonary Disease (COPD). The intent was to evaluate the effectiveness of using volunteer, trained staff to provide a multidisciplinary education. The treatment group received education from the volunteers, while the other group received usual care. The study did not find significant evidence to support that a volunteer train program decreases the readmission rate. Likewise, Bradley et al. (2012) studied the impact of several practices implemented by hospitalists and a multidisciplinary team to reduce 30-days readmissions of patients with Acute myocardial infarction (AMI). Five hundred thirty-seven hospitals responded to the survey. Some of the hospitals indicated that they had implemented interdisciplinary teams, but there is no consistency in practice that supports the best evidence to reduce readmissions. Holland et al. (2005) also focused on examining the impact of a multidisciplinary team approach on hospital admissions and mortality for patients with HF. Through a systematic review of 30 RTC conducted in hospitals, the author found strong evidence that supports the benefits of a multidisciplinary team intervention to patients with HF to reduce hospital readmission post-discharge. The interventions included patient education and symptoms self-management.

Dracup et al. (2014), conducted the study to determine the impact of a CHF educational intervention at discharge on improving health management and decreasing rehospitalizations. They found that face to face nurse-led intervention for a patient with HF did not provide evidence to reduce cardiac death or hospital readmissions. In the Japanese study by Kinugasa et al. (2014), the author studied the impact of a multidisciplinary HF management program in a

rural area and found that a multidisciplinary education for a patient with HF during the patient admission and discharge from the hospital improved the quality of care.

In addition to the above studies, two organizations reported their experiences of using the multidisciplinary approach to reduce admissions. Both found a reduction of readmission after the implementation of their intervention. The intervention used by Covenant Health included a health transition program with a multidisciplinary team decreasing readmission from 11.2% to 5.4% for two years post-implementation. The intervention used by Healthcare Catalyst was a medication reconciliation in combination with a follow-up phone call after discharge. The program was able to reduce 30-day readmission for HF by 29%. These two EBP studies from the Health Catalyst and Covenant Plainview, although only provided level V evidence, are highly relevant to this QI project as they applied similar strategies to what was proposed in this study.

***5- Pilot the evidence-based practice change***

The pilot was conducted at a critical access hospital, located in Stevens County, Washington, which is a rural area.

***6- Implement the evidence-based practice change***

All the stakeholders who were part of the multidisciplinary team were educated on the process. The informatics team assisted in creating a flag that indicates the patient was at high risk for readmission as well as a flag if the patient was readmitted. The intervention consisted of providing comprehensive education to patients with CHF from admission to discharge. The education focused on disease management, discharge education, medication reconciliation, and follow up appointments. Additionally, before the patient was discharged, the case manager schedules the physician follow-up appointment, as well as provided a list of community resources that could be a great support to the patient. The study had an exclusion criterion,

patients with other commodities like stroke, and patients discharged to skill nurse facilities, long-term care facilities, behavioral units or jail were not part of the QI project.

***7- Monitor and Analyze the structure, process, and outcome data.***

Data were extracted from the EHR system EPIC. The unit manager reviewed the data weekly to evaluate the cases, intervention process, and issues. Then, they presented her findings to the PI committee. All re-admission cases are peer-reviewed by the physicians.

## Methodology

This was a QI project and a pretest-posttest design was used.

### *Setting*

The project was conducted at a CAH that provide healthcare services to approximately 50 miles radius. A CAH is a federal designation given to eligible rural hospitals by the CMS to ensure people enrolled in Medicare have access to healthcare services in rural areas, particularly hospital care. The hospital provides 24-hour emergency care, acute care services, outpatient services, surgical services, pediatric services for eight years old and older, and labor and delivery.

### *Design*

Using a pre-post design, we evaluated the 30-day readmission before and after implementing the multidisciplinary education program for patients hospitalized with CHF. The patient education focused on disease management, discharge education, pharmacy consult, and medication education, and follow up discharge call within 14 days post-discharge.

### *Study Population*

All patients admitted with a diagnosis of CHF or HF to the hospital were eligible. Pretest data were obtained by a retrospective chart review to extract data from all patients admitted with

a diagnosis of CHF, for five months. During the implementation phase, from June to November, all patients admitted with a diagnosis of HF were determined as the subject population. The physicians gave the diagnosis. The patients were admitted to ACU. When the patient was discharged, the information became part of the EHR. The EPIC system identified if the patient was readmitted as soon as the patient was registered. The exclusion criteria were other comorbidities, like stroke.

### *Subject Recruitment*

The data was obtained by a project manager, who was an employee of the organization, as it was the organization's policy. The project manager reviewed the charts and collected the retrospect data, decoded the data, and passed it to the DNP student investigator. The project manager was the hospital's Quality Manager. The same process was used for post implementation.

### *Risks/Harms*

The risk of participating in the study was minimal. The only risk for participants would be if personally identifiable data were collected and disclosed. However, in this study, personal information was not disclosed to the student. The project manager decoded the data to align with the organization's HIPPA requirements. This project was exempt from the site's Human Research Institutional Board as it was determined that the proposal was a QI study.

## Interventions

The intervention is defined under the IOWA model implementation. Before the implementation of this QI project, the nurse manager provided education to the team. The rationale for using a multidisciplinary approach was that the hospital was providing education to

the patients but on silos. Thus, in the intervention, the multidisciplinary team got together and discussed everything related to the patient care plan during the morning rounds.

The primary RN started collecting the patient's information during the admission assessment. During that interaction, the RN asked the patient for all medications that the patient was taking at home, and the patient's health history. The medications list was entered into the EHR, and the physician then completed the medication reconciliation. After that, the pharmacist visited the patient to establish the relationship and evaluated the patient knowledge about the current medications the patient was taking. Then, the RN and pharmacist educated the patient about new medications ordered during the patient stay.

Additionally, the patient was educated about the disease process and disease management by the physician and the RN. The dietician educated the patient about the diet. The case manager obtained data about the patient's support system and evaluated the patient's potential needs after discharge. During the multidisciplinary team meeting, all providers shared the plan of care, the education provided, and the barriers for discharge. Each discipline documented on the EHR. During the meeting, the team evaluated the patient's progress in understanding the education and the resources available after discharge, including the primary physician follow up appointment. The method of evaluating patients' understanding was the teach-back method, where the patient was able to verbalize their understanding of disease management, medication management and the expectation with the follow-up appointment.

**Measurements**

The 30-day readmission rate was measured. The pre-test was obtained from retrospective data for all patients admitted from June 1, 2018, to November 31, 2018, using EPIC, the electronic health record. The total number of patients admitted with the diagnosis of CHF/HF

each month, and the total number of patients discharged with the diagnosis of CHF/HF each month. The project manager de-identified the patient, then she conducted a chart review for each patient. From the chart review, the following data were collected: age, gender, marital status, medical diagnosis, length of stay, admission date, discharge date, and whenever or not there was a re-admission within 30-days. For post-test data, for all patients with the diagnosis of CHF/HF, the same information was be obtained. In efforts to capture the readmission, the organization instituted an EPIC upgrade, which consisted of automatically flagging a patient as "READMISSION" when the patient was readmitted to the hospital. The flagging made the process easy as all the multidisciplinary team was able to identify the patient on admissions. Concurrently, readmission reports were generated automatically every day by midnight.

**Post-test**

The data collection process was the same as the pre-intervention. The data was collected from Jun 1, 2019, to Nov 31, 2019. The monthly reports were reviewed during the Performance Improvement (PI) monthly meeting.

**Data Analysis**

Data were double-checked for accuracy by the project manager. The SPSS 25 (IBM, 2019) software was used to store and analyze the data. This program offers a plethora of essential statistical functions that assist the student investigator in creating and analyzing the frequencies, cross-tabulation, and bivariate statistics. Descriptive statistics were used to report the characteristics of the patients. Chi-square analysis was used to compare the re-admission rate before and after the intervention.

Additionally, it was confirmed that there was no missing data. From a demographic standpoint, most participants were in the range of 50-98 years and were equally distributed

between males and females. Most of the patients in the posttest were discharged home (78.8%), while only 42.9% of patients in the pretest were discharged home.

**Results**

There were 42 patients in the pretest, and 52 in the posttest that met the inclusion criteria, patients admitted to the CAH with congestive heart failure, an adult age 18 years old and older.

The characteristics of the sample are depicted in table 1. In the pretest group, 47.6% of patients were in the 49-65 years age group, 45.2 % in the 66-80 years age group, and 7.1% were greater than 80 years old. In the posttest group, 19.2 % of patients were in the 49-65 years group, 42.3% were in the 66-80 years group, and 38.5% were in the group of 80 years or greater. Patients in the posttest were significantly older (75.77 years) than those in the pretest (66.81 years), $p<0.001$.

As shown in table 2, there were two readmissions in the pretest group (4.8%) and zero (0%) in the posttest group. A statistical test was not performed due to the low incidence. We found that the length of hospital stay was significantly longer in the posttest than in the pretest (1.5 days vs. 4.08 days, $p<0.001$) (table 3).

Since the length of stay data were skewed to the right, we also performed the non-parametric test (Mann-Whitney U test), and the result was also statistically significant at $p<0.001$. Because this was an unexpected finding, we further analyzed the data using a generalized linear model to compare the pre and post-test on length of stay, controlling for patient age. The interaction between intervention and age was not statistically significant. After control for age, the difference in length of stay remained statistically significant (Table 4). Length of stay post the intervention was longer than during the pretest.

**Discussion**

The QI project focused on providing a multidisciplinary education approach to patients admitted with CHF/HF. The multidisciplinary team gave comprehensive education during the morning rounds and during individual visits to the patient from admission to discharge. The pharmacist provided education about medication, focusing on rational for taking the medication, the side effects, and monitoring. The primary RN and physician-focused on educating about the disease process and disease management. The dietician educated about the recommended diet. Physical Therapists focused on exercise and energy conservation recommendations. The team used the teach-back method to evaluate the patient or family's understanding and knowledge. During this process, the patient verbalized understanding by sharing back their knowledge and by asking questions when needed.

52 patients received the intervention, which was a small sample and a limitation for the study. Our goal was having no readmission, and that goal was met by having zero (0%) in the posttest group. The findings for this study align with the study by Kinugasa et al. (2014), who found that a multidisciplinary educational approach was the most effective intervention to prevent re-hospitalization for HF patients in a Japanese rural setting. In their study, the multidisciplinary education included nurse-led patient education, pharmacist's medication teaching, and dietitian's nutritional guidance. McAlister et al. (2004) also found that multidisciplinary management for a patient with HF is associated with a reduction of HF hospitalization rates. Our study demonstrates that a multi-disciplinary, comprehensive education could achieve low readmission rate among CHF/HF patients in a rural setting.

**Study Limitations**

There were a few limitations to this study. The main limitation was the small sample. In 2018, the quality indicators showed a high incident of re-admission due to CHF in this hospital.

Due to the low population in a rural area, a high readmission rate could be caused by just one or two cases. Another limitation was leadership changes during the pilot period. The pharmacy and ACU leadership changes that hindered compliance with the intervention for a short period. Luckily, the team was able to reconvene and overcame the challenges, getting back on track.

Another limitation was that data collection was done manually for about two months due to a reporting system failure during the study, and this challenge created a delay in data collection and reporting. However, when the organization reporting system was restored, the project manager was able to verify the data and confirm accuracy.

## Implications/Recommendations for Practice, Policy, Leadership and Quality/Safety

### *Implications for Practice.*

Improving patient's health and decreasing readmissions directly impact health care costs and decrease the burden to the healthcare system. The critical elements found are to provide education to the patients and their families throughout their hospital stay from admission to discharge using a multidisciplinary team. The education includes CHF management, medication, diet, rehab, follow-up appointment, and a structured discharge planning that empowers the patient to maintain self-care (Dunbar et al., 2013).

### *Implications for Healthcare Policy*

To make a policy change, we need data from a longer observation period. Therefore, we recommended to the leadership and multidisciplinary team to continue the intervention and data collection for a full year to analyze the impact on 30-day readmission. Hoffman & Yakusheva (2020) suggested that incentives from the HRRP have a strong relation with hospital readmissions improvements. However, CAHs are not part of the HRRP incentive method to improve readmissions because CAHs follows the reasonable costs method. The QI project

focused on improving the well-being of the community rather than looking for a financial incentive for performance.

### *Implications for Executive Leadership*

Leadership support is vital for a successful project. To expand the QI project to a longer term and to other diseases, it requires commitment and strong executive leadership support to keep readmission reduction as a top priority. Additionally, improving the understanding of this quality project is essential to guide quality improvement decisions related to overall readmissions for the hospital, to lower the cost of healthcare, and to promote quality of care delivery. Furthermore, executive leadership is vital to promote the culture of the organization that lives the mission, vision, and values.

### *Implications for Quality/Safety*

Improving performance refers to patient safety, quality of care delivered, and financial acumen. Expanding the multidisciplinary team approach to other commodities could improve readmission for COPD, MI, and HF.

## Conclusion

This QI project focused on creating and implementing a multidisciplinary education program to decrease 30-days readmission for CHF/HF at a CAH. We observed a reduction of readmission during the study period. However, due to the low incidence and limited sample size, we do not have enough power to demonstrate a statistical significance. Yet, the multidisciplinary approach showed improvement in practice standardization. Continuing the current process and extending data collection to a year should be done to determine the impact of the intervention.

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## Appendix A

**Table 1: Characteristics of the sample**

| | Before n=42 | After n=52 | Statistics, p value |
|---|---|---|---|
| Age (years) | 66.81 (SD=8.865) Range: 49 -89 | 75.77 (SD=12.29) Range: 50-98 | |
| AgeGroup | | | **$\chi^2$=15.23, p<0.001** Significant Phi=0.40 (moderate effect size) |
| • 49-65 years | 20 (47.6%) | 10 (19.2%) | |
| • 66-80 years | 19 (45.2%) | 22 (42.3%) | |
| • >80 years | 3 (7.1%) | 20 (38.5%) | |
| Gender | | | $\chi^2$=1.33, p=0.248 Not significant Phi=0.12 (small effect size) |
| • Female | 16 (38.1%) | 26 (50.0%) | |
| • Male | 26 (61.9%) | 26 (50.0%) | |
| Discharge disposition | | | Statistical test not performed due to small cell size |
| • Home | 18 (42.9%) | 41 (78.8%) | |
| • Hospital | 15 (35.7%) | 3 (5.8%) | |
| • SNF | 7 (16.7%) | 6 (11.5%) | |
| • AMA | 1 (2.4%) | 1 (1.9%) | |
| • Expired | 1 (2.4%) | 1 (1.9%) | |

**Table 2. Readmission within 30-days**

| | No readmission | Readmitted | Total |
|---|---|---|---|
| Pretest | 40 (95.2%) | 2 (4.8%) | 42 |
| Posttest | 52 (100.0%) | 0 | 52 |
| Total | 92 | 2 | 94 |

Statistical test is not performed due to the low incidence.

**Table 3. Length of Stay**

| | Intervention | N | Mean | Std. Deviation |
|---|---|---|---|---|
| LOS | PreTest | 42 | 1.50 | 2.49 |
| | PostTest | 52 | 4.08 | 2.62 |

t=4.86, df=92, p<0.001

**Table 4. Mean length of stay between pretest and posttest by age**

| | 49-65 years | 66-80 years | >80 years | Total |
|---|---|---|---|---|
| Pretest | 1.16 | 1.31 | 4.84 | 1.49 |
| Posttest | 4.75 | 3.72 | 4.14 | 4.08 |
| Total | 2.36 | 2.60 | 4.23 | 2.92 |

For intervention, $F_{1, 88} = 6.95$, p=0.01
For age, $F_{1, 88} = 2.54$, p=0.08
For Intervention x Age, $F_{2, 88} = 2.70$, p=0.073

## Appendix B

**Table 5: Data Definition Codes**

| | |
|---|---|
| **Patient ID Code** | Pre1…Pre52; Post1…Post 42 |
| **Discharge Date** | M/D/YYYY |
| **Intervention** | 1=PreTest 2= PosTest |
| **Gender** | 1=Male<br>2=Female |
| **Age** | 1=49-65<br>2=66-80<br>3=>80 |
| **Discharge Disposition** | H= home<br>Other= Hospital, SNF, AMA, Expired |
| **LOS** | Numeric Value |
| **Readmission occurrence** | Y=yes<br>N= No |

**Table 6: Data Collection Worksheet**

| Intervention: 1=Pretest 2=Posttest | Patient ID | Gender: 1-male, 2-female | Age: 1=49-65 2=66-80 3=>80 | Discharge disposition: H-home, O-other | LOS | Discharge Date | Readmissions within 30-days Y-yes N-no |
|---|---|---|---|---|---|---|---|
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