IMPROVING HEART FAILURE MANAGEMENT UTILIZING A CHRONIC DISEASE

MODEL

by

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Improving Heart Failure Management Utilizing a Chronic Disease Clinic Model

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AUTHOR DISCLOSURE STATEMENT

Regina Sawyer is employed by the hospital where this project was conducted.

ABSTRACT

Chronic diseases are currently the leading cause of preventable death and disability worldwide. Clinical prevention disease-specific interventions designed with a population health management approach offer solutions. The goal was to determine the impact of follow-up care provided at a nurse practitioner led chronic disease management clinic (CDMC) on 30-day post-acute outcomes of the systolic heart failure (HF) population as compared to those who received usual care (UC). The CDMC utilizes an interprofessional model of care with a self-care management approach. A retrospective chart review was conducted on 72 patients to obtain 30-day hospital readmission, mortality, and ED utilization rates for the HF population discharged from the project hospital. There were no acute readmissions, ED visits, or mortalities in the CDMC group. There was a statistically significant difference between the UC and the CDMC groups as determined by one-way ANOVA ($F(1,70) = 4.588$, $p = 0.036$). A Tukey post-hoc test revealed the number of 30 day readmissions were significantly lower by CDMC group ($MDiff = -.446$, $SE =. 208$, $p= 0.036$) as compared to the UC group. There was a strong trending difference between the UC and the CDMC groups as determined by one-way ANOVA ($F(1, 70) = 3.367$, $p = 0.071$). A Tukey post-hoc test revealed that the 30-day ED utilization rates were trending toward a significantly lower rate in the CDMC group compared to the UC group ($MDiff = -.304$, $SE = .165$, $p = 0.071$). Compared with UC, care at the CDMC prevented readmissions and ED utilization.

Keywords: Chronic Disease Management, Heart Failure Clinic, Population Health

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INTRODUCTION

Chronic disease is defined as not self-limiting in nature, characterized by persistent and recurring health problems that last months to years [1]. Chronic diseases are currently the leading cause of preventable death and disability worldwide [2]. Additionally, the costs associated with these conditions are increasing globally, making chronic illness the major noncommunicable (NCD) disease problem of this century [3]. Unfortunately, the estimated global impact of chronic disease will reach $47 trillion annually by the year 2030, claiming over 52 million lives a year [4]. Solutions for the growing chronic disease problem can be found through clinical prevention disease-specific interventions designed with a population health management approach. A chronic disease management clinic (CDMC) offers improvement in the care delivery for the chronic disease population offering holistic patient-centered care through an interprofessional self-care management approach. Empowering patients to manage their chronic illness more effectively increases the chances of success. Additionally, comprehensive disease management through this model will improve care coordination in this population to attempt to reduce acute readmission, mortality, and emergency department (ED) utilization rates.

EVIDENCE-BASED PROJECT

A prevalent chronic disease is systolic heart failure. The aim of this project is to evaluate the impact of a Nurse Practitioner (NP) led interprofessional CDMC on systolic heart failure (HF) patient outcomes post acute discharge as compared to those receiving usual care (UC). The outcomes studied were 30-day acute readmission, 30-day mortality, and 30-day emergency department (ED) utilization rates. Patients receiving care at the CDMC are considered the intervention group.

METHODS

Design and Setting

A retrospective chart review was conducted for all patient discharged with acute systolic heart failure between March 2016 and May 2016. Patients were followed for 30 days post discharge. The project hospital was a 581-bed regional teaching level III trauma center with a hospital-based CDMC, which opened in December 2015. The hospital has a population comprised of 43% Medicare, 42% Medi-Cal (Medicaid), 14% commercial insurance, and 1% uninsured/other. The hospital serves a primarily rural population of 500,000 people including its primary and secondary service areas. Additionally, the hospital serves a large under-insured population and operates a network of rural health clinics at capacity since the advent of the Patient Protection Affordable Care Act (PPACA). Permission was received from the hospital's institutional review board to conduct the retrospective chart review. The project received exempt status.

Population

All patients discharged with a primary diagnosis of acute systolic HF were reviewed for this project. Acute systolic HF was determined by echocardiogram findings of a reduced left ventricular systolic function or left ventricular ejection fraction (LVEF) $\leq 50\%$ in the last year. A common practice by the cardiologists in this facility is to report ranges for the LVEF, therefore $\leq 50\%$ was utilized for inclusion instead of $\leq 45\%$ to capture patients with LVEF 45-50%. The exclusion criteria for this project included diagnosis of dementia or psychiatric illness, planned discharge to skilled nursing facility, acute rehabilitation setting, hospice, home health, participation in a research trial, left the hospital against medical advice (AMA), or expired during the initial acute hospitalization. Eligible patients were placed in the intervention group if seen at

the CDMC or the usual care group if seen by their primary care provider post acute care HF

hospitalization.

Over the 3-month inclusion period 134 patient charts were reviewed and 62 were

excluded. The primary reasons for exclusion in the project were discharges to a skilled nursing

facility or home health. A total of 72 patients were included in the project, of which 16 received

post-acute care at the CDMC and 56 received usual care.

Intervention

Implementation of a Chronic Disease Management Clinic (CDMC) was initiated to

address the need to deliver effective disease-specific patient-centered care for the chronic disease

population. Care at the CDMC provides a comprehensive interprofessional approach to chronic

disease management. An interprofessional model to HF management has been shown to be the

most effective approach to achieving the best results for the patient [5]. The CDMC model guides

the development of strategies to improve the health condition and management of chronic

disease specific to the disease and the individual. Heart failure is a difficult illness to manage,

which places significant demands on the self-care abilities of those it inflicts. Failure to adhere

with self-care recommendations is prevalent in this population and is associated with increased

acute hospital readmissions [6]. According to Siabani et al [6], it is important to understand the

dynamics that enable or inhibit self-care in order to develop effective healthcare interventions.

Employing a self-care management education approach is a best practice to employ to address

the increasing prevalence of chronic diseases [7]. For those at high-risk, such as minorities or

socioeconomically disadvantage groups, self-care management education can be ethnically

designed to encourage effective behavioral change [7]. Considering the dynamics, there must be a

theory to guide and drive the care provided in a culturally competent way. The Theory of Self-

Care of Chronic Illness is a middle-range theory used to guide the care in the CDMC. It was

developed from caring for patients with HF and adapted from the Situation-Specific Theory of

Heart Failure [8]. Self-care involves health maintenance through health promotion and illness

management [8]. According to Riegel et al [8], the main concepts of this theory are self-care

maintenance, self-care monitoring, and self-care management. Self-care maintenance describes

behaviors used to maintain physical and emotional stability, self-care monitoring is the process

of observing for changes in health state, and self-care management characterizes the response to

various health state changes by the individual [8]. The process of self-care is complex as it

involves the individual's ability to make decisions and reflect [8]. There are also numerous

potential barriers to overcome in the process including knowledge, ability, incentive, principles,

self-confidence, behaviors, both functional and cognitive abilities, social support, and availability

of care [8]. In evaluating these barriers, clinicians can develop realistic and accurate treatment

plans individualized to the patient. Developing individualized goals and addressing all potential

barriers can assist in preventing acute HF readmissions. All patients seen in the CDMC complete

the Self-Care of Heart Failure Index (SCHFI), which is a measure of self-care developed by

Riegel et al [9] with revision in 2009. Self-care is thought to improve outcomes in heart failure

patients [10]. The SCHFI uses a quantitative, ordinal, self-report, performance-rating scale to

measure self-care maintenance, self-care management, and self-care confidence [10]. Each scale

remains standardized to a total possible score of 100 and it is recommended to use all 3 scales to

determine a patient's self-care ability. Determining self-care ability will assist the clinician in

developing realistic and patient-centered goals of care. The SCHFI has been utilized in over 17

published studies and is open for public use without permission [10].

Patients seen at the CDMC are referred by a case manager, physician, advanced practice

provider (APP), or by self-referral for follow-up after an acute systolic HF admission. Patients

are called within 72 hours of discharge and seen in the CDMC within one week of discharge. A

HF certified NP performs the patient's baseline evaluation consisting of a physical exam and

history. In addition, a cardiologist and chronic disease pharmacist may be consulted to review

the patient's initial treatment plan. If indicated, patients will be seen by a board certified

palliative care physician for symptom management and advanced care planning. All patients and

support persons receive individualized disease management education from a NP, registered

nurse (RN) health educator, dietitian, and pharmacist, with access to social work and case

management services as needed. Education is adjusted based on previous knowledge and

includes an emphasis on improving self-care behavior with a culturally sensitive approach.

Removing barriers to self-care helps patients better manage their chronic illness [6]. Patients at the

CDMC have the availability of an on-site pharmacy delivery service, infusion therapy, laboratory

and radiographic studies, and complete cardiac testing. In addition to these services, a RN will

call each patient within 72 hours of the first visit and then weekly or more often as needed to

prevent acute hospitalization as long as they are a CDMC patient. Patients are offered and

scheduled for as many clinic visits as needed to assist them with managing their illness in an

outpatient setting to prevent inappropriate ED utilization and inpatient admission. If patients

cannot be reached by telephone, a patient advocate is sent to the home to contact the patient and

investigate. Finally, transportation is provided to clinic appointments as needed and patients

have the option to attend HF education classes and support groups. All patients have access to a

qualified tested interpreter for Spanish or the healthcare interpreter network (HCIN) video

interpretation device for other languages. The HCIN can also be utilized over the phone. The

CDMC intervention provides and integrated interprofessional approach to care, which includes

empowering patients to utilize strategies of self-care management of their disease process.

The usual care (UC) group is comprised of patients who received post discharge follow-

up care for acute systolic HF by their primary care provider or cardiologist in a medical office

setting. For the purposes of this project, it is assumed care was provided based on current HF

treatment guidelines.

Endpoints

Baseline clinical and demographic information was collected retrospectively for each

patient 30 days after acute systolic HF admission in order to capture 30-day readmissions,

mortality, and ED utilization. Age, gender, financial class, ethnicity, relevant co-morbidities,

length of stay, utilization of an angiotensin converting enzyme (ACE) inhibitor or an angiotensin

receptor blocker (ARB), beta blocker, and use of heart failure appropriate discharge instructions

were also captured.

Statistical Analysis

Baseline clinical and demographic information and the primary outcomes of 30-day

readmission rate, 30-day mortality, and 30-day ED utilization were compared across both the

intervention (CDMC) group and the control (usual care) group. The two groups were compared

using the chi-square test for discrete variables and a two tailed independent samples t-test will be

used to examine normally distributed continuous variables. If the data was not normally

distributed, a Wilcoxon-Mann-Whitney test rank-based nonparametric test was used to determine

if there are differences between two groups. Several one-way ANOVAs were conducted to

examine several different categorical variables such as UC group and CDMC group, ethnicity

groups, and different payer source groups. A one-way ANOVA was conducted to determine if

30-day readmissions differed by patients who received Usual Care compared to those receiving CDMC. A one-way ANOVA was conducted to determine if 30-day ED utilizations differed by patients who received Usual Care compared to those receiving CDMC. A one-way ANOVA was conducted to determine if 30-day readmissions differed by patients' ethnicity. A one-way ANOVA was conducted to determine if 30-day ED utilizations differed by patients who had different payer sources; Medicare, Medi-Cal, and Commercial. A one-way ANOVA was conducted to determine if 30-day readmissions differed by patients who had different payer sources; Medicare, Medi-Cal, and Commercial.

A power analysis was performed to calculate sample size in order to obtain .08 power and to estimate an effect size of .20. The total sample size of this project was sufficient to detect a statistical significant difference inclusive of the above analyses. The effect was selected as the smallest effect that would be important to detect substantive significance.

RESULTS

Demographics

There were 72 patients included in the project, 56 in the UC group and 16 in the CDMC group. The average age of the participants was 62 years, 74% were men, 47% of Hispanic descent, 55% were insured by Medi-Cal, and 22% by Medicare (Table 1). As far as comorbidities 39% had additional diagnoses of cardiovascular or peripheral vascular disease, 37% non-inulin or insulin dependent diabetes, and 40% with renal disease. There were no identified statistically significant differences between the two groups comparing baseline characteristics.

Heart Failure and Hospitalization

The New York Heart Association (NYHA) Classification was not utilized for this project, as it was noted upon chart review that patients in the inpatient setting were rarely classified. All of the patients treated at the CDMC received HF classification at their first visit at the CDMC. All patients had an echocardiogram completed within the last 6 months to evaluate left ventricular dysfunction. There were 23 patients in the project comprising 32% who had a LVEF of <20% (Table1). In review of HF specific medications and discharge instructions 87% of the patients were discharged on a beta blocker, 76% on an ACE or ARB, and 89% had HF specific discharge instructions. All patients were placed on the appropriate medications and received HF education after their first outpatient visit if treated at the CDMC. It was not possible to determine if the UC group received the same. In addition, the average length of stay for all patients was 4.33 days. There were no statistically significant findings between the two groups comparing these indicators.

Acute Readmissions

There were no acute readmissions for the CDMC group. There were 25 acute readmissions in the UC group resulting from 17 (36%) patients. All readmissions were related to HF symptoms. Therefore, there was a statistically significant difference between the UC and the CDMC groups as determined by one-way ANOVA $(F(1,70) = 4.588, p = 0.036)$. A Tukey post-hoc test revealed the number of 30-day readmissions were significantly lower by CDMC group (MDiff = -.446, SE =. 208, p= 0.036) compared to the UC group.

There was also a statistically significant difference by Ethnicity as determined by one-way ANOVA $(F(1,70) = 3.742, p = 0.009)$. A Tukey post-hoc test revealed that the number of 30-day readmissions were significantly lower for non-Hispanic patients (MDiff = -.457, SE =. 171, p= 0.009) compared to Hispanic patients.

There was a strong trending difference by payer source groups as determined by one-way ANOVA (F(2, 69) = 2.831, p = 0.066). A Tukey post-hoc test revealed that the number of 30-day readmissions was trending toward a significantly lower rate in the Medicare population (MDiff = -.440, SE = .185, p = 0.020) compared to the Medi-Cal population. There were no trending differences between payer source Medi-Cal and Commercial, or between Commercial and Medicare.

Emergency Department Utilization

There were no ED visits 30 days post acute care discharge in the CDMC group. The UC group had 17 ED visits from 13 (23%) patients. All ED visits were related to HF symptoms. Therefore, there was a strong trending difference between the UC and the CDMC groups as determined by one-way ANOVA ($F(1, 70) = 3.367$, $p = 0.071$). A Tukey post-hoc test revealed that the 30-day ED utilization rates were trending toward a significantly lower rate in the CDMC group compared to the Usual Care group (MDiff = -.304, SE = .165, $p = 0.071$).

There was a statistically significant difference between payer source groups as determined by one-way ANOVA ($F(2,69) = 4.505$, $p = 0.014$). A Tukey post-hoc test revealed that the 30-day ED utilization rates were significantly lower in patients with the Medicare population as compared to Medi-Cal (MDiff = -.400, SE = .143, p = 0.007). There were no statistical significant differences between the patients who had either payer source Medi-Cal and Commercial, or between Commercial and Medicare.

Mortality

There were no significant findings for 30-day mortality. There was only one death in the UC group and no deaths in the CDMC group for the project period. Mortality could only be

captured if the patient returned to the project hospital and expired of if he or she was a CDMC patient.

Chronic Disease Management Clinic

All patients receiving care at the CDMC were called within 72 hours of acute care discharge and had their first visit within one week. The 16 patients received a total of 45 calls and 27 visits within the 30-day project period post acute care discharge to keep them out of the ED or inpatient setting. All patients completed a SCHFI on admission to determine their level of self-care deficit. All patients received HF specific education with a facility written HF guide, HF home care instructions, and were placed on the appropriate HF medications.

DISCUSSION

To enhance the efficiency and effectiveness of public health's response to population health, the Centers for Disease Control and Prevention [CDC] [11] recommends focusing chronic disease management efforts in four major areas as follows: (1) epidemiology and surveillance to gage progress and trends, (2) environmental methods to support healthy behaviors, (3) hospital or acute care interventions to deliver effective preventative services and promote the delivery of healthcare, and (4) community programs to develop, promote, and sustain effective management of chronic conditions. The four domains help form and focus the work of public health to assist efforts to develop strong services to address care gaps[11]. Development of comprehensive disease management strategies and programs have demonstrated success and hospitals at a local level can institute interventions addressing domains three and four as outlined by the CDC to make an impact one community at a time.   The CDMC addresses domains three and four as recommended by the CDC and as a result demonstrated effectiveness in population health management in the HF patient.

Chronic Disease Management Clinic Model

Chronic disease can be debilitating and devastating for those inflicted. Fortunately the costly effects of chronic disease can often be prevented, deferred, or lessened [12]. For example, results of a recent systematic review and meta-analysis to determine the effectiveness of transitional care programs to improve HF patient outcomes determined a statistically significant reduction in HF readmissions and mortality with disease specific outpatient clinic programs [13]. The results from the systematic review, as it pertains to readmissions, are consistent with the results of this project. Additionally, another recent systematic review and meta-analysis evaluating the effectiveness of nurse-led and multidisciplinary HF clinics determined these interventions reduced HF readmissions and were more effective when there was a high intensity of clinic visits closer to the acute care discharge [14]. As discussed earlier, the CDMC applies this same philosophy for its patients.

The value of implementing evidence-based chronic disease interventions to improve patient outcomes is supported by research; however there are still barriers to implementation of these interventions. Two prevalent barriers to be immediately addressed to the implementation of chronic disease best practices are lack of resources and funding. If these programs are not implemented correctly and consistently with effective care coordination, there is no guarantee of success and unintended costs can occur [15]. Commitment of resources can be difficult for providers and hospitals to dedicate to the improvement of chronic disease management. In most cases, the addition of specialized staff, such as NPs or HF case managers are necessary to implement interventions. In some cases, there will also be a need to develop new care delivery systems such as opening a CDMC. These additions can be costly and some organizations may be hesitant to invest the financial resources to implement best practice. In reality, the literature

reports a positive return on investment. For example, Lehmann et al [16] found implementation of telehealth reduced acute hospital readmissions, unnecessary emergency department visits, and unnecessary office visits for HF patients in their project. The implementation of HF best practices demonstrate reduced cost overall by improving quality of life and disease self-management leading to prevention of acute hospital readmission and a reduction in overutilization of resources such as the emergency department (ED) for primary care. The CDMC is there to support the patient and their primary care physician, although some providers may fear the loss of their patients to the CDMC permanently.   In reality, the CDMC serves to teach the patient how to manage their chronic illness and develops a partnership with the primary care provider to achieve this goal. The CDMC philosophy is not to provide primary care, but rather to provide specialized care and treatment utilizing resources, which are not typically found in physician practices.

In support, CDMCs have demonstrated effectiveness in assisting patients in managing their chronic illness by delivering comprehensive care and promoting effective self-care. Implementation of such programs offers more pros than cons and in the end will save healthcare dollars and improve patient quality of life. For example, Tomcavage et al [17] found a nurse-led patient-centered primary care model not only improved nursing satisfaction, but also improved patient outcomes, enhanced patient satisfaction, and reduced healthcare costs. Nurses play a vital role in chronic illness management and are poised to augment the development and execution of healthcare resources in primary care [1]. In addition, acute hospital readmissions with heart failure patients may be the result of several factors, including lack of proper follow-up care, lack of adherence to the prescribed treatment plan leading to exacerbation of illness, and lack of

understanding of the discharge plan [18]. The CDMC demonstrated effectiveness in addressing

these factors and preventing recurrent hospital readmission and ED utilization.

LIMITATIONS

There were several limitations in this project. The sample size was small for this project.

In addition, the project was only over a 90-day period following patients for 30 days post acute

care discharge. Further information regarding the management of HF patients receiving care in

the CDMC over a longer period of time would be helpful. This project was also done

retrospectively with no contact with the patients other than chart review. A randomized trial for

this population would be helpful.

CONCLUSIONS

In conclusion, the management of chronic disease such as HF is a clinical and

administrative problem that is plaguing healthcare today. In review of the literature, adopting a

standardized approach to disease management optimizes care coordination and patient outcomes.

Chronic disease management clinics offer a standardized self-care management approach to

improve patient outcomes. The CDMC in this project demonstrated its effectiveness by

managing HF patients in an outpatient setting and preserving emergency department and

inpatient resources for those in need of that level of care. Further research should be completed

as a randomized trial following the CDMC patients for an entire year post acute hospitalization.

REFERENCES

1. Goodman RA, Posner SF, Huang ES, Parekh AK, Koh HK. Defining and measuring chronic conditions: Imperatives for research, policy, program, and practice. *Preventing Chronic Disease* 2013;10:E66.

2. Lukewich J, Edge DS, VanDenKerkhof E, Tranmer J. Nursing contributions to chronic disease management in primary care. *Journal of Nursing Administration* 2014;44(2):103-110.

3. Gilbert M, Staley C, Lydall-Smith S, Castle DJ. Use of collaboration to improve outcomes in chronic disease: An overview. *Disease Management & Health Outcomes* 2008;16(6):381-390.

4. Bloom DE, Cafiero ET, Jané-Llopis E, et al. *The global economic burden of noncommunicable diseases.* Geneva: World Economic Forum; 2011.

5. Jaarsma T. Inter-professional team approach to patients with heart failure. *Heart* 2005;91(6):832-838.

6. Siabani S, Leeder SR, Davidson PM. Barriers and facilitators to self-care in chronic heart failure: A meta-synthesis of qualitative studies. *SpringerPlus* 2013;2:320.

7. Sidhu MS, Gale NK, Gill P, Marshall T, Jolly K. A critique of the design, implementation, and delivery of a culturally-tailored self-management education intervention: A qualitative evaluation. *BMC Health Services Research* 2015;15(1):1-11.

8. Riegel B, Jaarsma T, Strömberg A. A middle-range theory of self-care of chronic illness. *ANS Adv Nurs Sci* 2012;35(3):194-204.

9. Riegel B, Carlson B, Moser DK, Sebern M, Hicks FD, Roland V. Psychometric testing of the self-care of heart failure index. *Journal of Cardiac Failure* 2004;10(4):350-360.

10.   Riegel B, Lee CS, Dickson VV, Carlson B. An update on the self-care of heart failure

index. *Journal of Cardiovascular Nursing* 2009;24(6):485-497.

11.   Centers for Disease Control and Prevention [CDC]. Four domains of chronic disease

prevention. In *Chronic Disease Prevention and Health Promotion* 2015;

http://www.cdc.gov/chronicdisease/resources/publications/four-domains.htm.

12.   Comlossy M. Chronic disease prevention and management: Health care safety-net toolkit

for legislators. *NCSL Legisbrief* 2013; 1-16. Available at:

http://www.ncsl.org/research/health/health-care-safety-net-toolkit.aspx.

13.   Feltner C, Jones CD, Cene CW, et al. Transitional care interventions to prevent

readmissions for persons with heart failure: A systematic review and meta-analysis.

Annals of Internal Medicine 2014;160(11):774-784.

14.   Thomas R, Huntley A, Mann M, et al. Specialist clinics for reducing emergency

admissions in patients with heart failure: A systematic review and meta-analysis of

randomised controlled trials. *Heart* 2013;99(4):233-239.

15.   Browdie R. Why is care coordination so difficult to implement? *Generations*

2013;37(2):62-67. http://www.asaging.org/blog/why-care-coordination-so-difficult-

implement.

16.   Lehmann CA, Mintz N, Giacini JM. Impact of telehealth on healthcare utilization by

congestive heart failure patients. *Disease Management & Health Outcomes*

2006;14(3):163-169.

17.   Tomcavage J, Littlewood D, Salek D, Sciandra J. Advancing the role of nursing in the

medical home model *Nursing Administration Quarterly.* 2012;36(3):194-202.

18.   Costantino ME, Frey B, Hall B, Painter P. The influence of a postdischarge intervention on reducing hospital readmissions in a medicare population. *Population Health Management* 2013;16(5):310-316.