THE ROLE OF THE NURSE PRACTITIONER IN REDUCING HEART FAILURE HOSPITAL READMISSIONS

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THE ROLE OF THE NURSE PRACTITIONER IN REDUCING HEART FAILURE HOSPITAL READMISSIONS

Abstract

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More than five million Americans are living with heart failure (HF), a chronic condition which impairs the heart’s ability to supply sufficient blood to meet the body’s oxygenation requirements (National Heart Lung and Blood Institute, 2010). There are more than one million HF related hospitalizations annually with a 1 in 4 readmission rate within 30 days of hospitalization (Joynt, 2011). There are a variety of techniques currently in practice in an attempt to decrease HF readmissions and therefore reduce the financial and clinical burden on the healthcare system.

Purpose: The purpose of this paper is to identify current strategies that reduce HF hospital readmissions and recommend key components for nurse practitioners to help reduce HF readmissions.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>3</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>5</td>
</tr>
<tr>
<td>LITERATURE REVIEW</td>
<td>7</td>
</tr>
<tr>
<td>HEART FAILURE MEDICATIONS</td>
<td>7</td>
</tr>
<tr>
<td>HEART FAILURE EDUCATION</td>
<td>9</td>
</tr>
<tr>
<td>SELF MANAGEMENT OF HEART FAILURE</td>
<td>10</td>
</tr>
<tr>
<td>DISEASE MANAGEMENT PROGRAMS</td>
<td>11</td>
</tr>
<tr>
<td>EVOLVING STRATEGIES FOR MANAGEMENT OF CARE</td>
<td>15</td>
</tr>
<tr>
<td>IMPLICATIONS FOR PRACTICE</td>
<td>17</td>
</tr>
<tr>
<td>CONCLUSION</td>
<td>18</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>20</td>
</tr>
</tbody>
</table>
THE ROLE OF THE NURSE PRACTITIONER IN REDUCING HEART FAILURE HOSPITAL READMISSIONS

An estimated 23 million individuals worldwide live with heart failure (HF) resulting in over one million hospitalizations per year (Dupree, 2010). HF is defined as the end stage of cardiac conditions such as high blood pressure, coronary artery disease, and diabetes in which the cardiac ventricles have the impaired ability to either adequately fill with blood or effectively pump blood to the body (National Heart Lung and Blood Institute, 2010). Although HF is a chronic condition, the majority of patients will experience one or more acute exacerbations that result in a visit to the emergency department, and of those individuals about 80% will be admitted into the hospital (Weintraub et al., 2011). The demographic characteristics of people with HF include an age greater than 65, being of male gender, and having diagnoses of diabetes and obesity (American Heart Association, 2008). The diagnosis of HF has drastically increased over the last 30 years with a 171% increase in the number of HF hospital discharges from 1979 to 2005 (American Heart Association, 2008). With the increase number of individuals living with the disease, there has been a substantial increase in HF readmissions. According to Hernandez et al. (2010), one fifth of Medicare beneficiaries are re-hospitalized within 30 days of their initial hospitalization and greater than 90% of these readmissions are unplanned and potentially preventable.

There is not a single factor responsible for HF readmissions, but rather there is a complex overlap of many variables. It is difficult for many providers to adequately manage the disease due to the complexity, especially when coupled with the effects of multiple conditions that often co-exist with it such as diabetes, renal failure, and cardiomyopathy (Lagoe, Noetscher &
Reducing Heart Failure Hospital Readmissions

Murphy, 2001; Polanczyk, Newton, Dec & DiSalvo, 2001). Many providers also lack HF knowledge which may result in patients not receiving optimal HF medications, taking adequate doses of the medications, or utilizing other modalities that may help to prevent the reoccurrence of HF (Akoshah, Schaper, Havlik, Barnhart & Devine, 2002). Several other factors responsible for HF readmissions include lack of understanding HF, poor medication and diet compliance, and inadequate discharge planning and follow-up. Many of these causes may be eliminated through proper patient education, medications, and follow-up. Implementing strategies to decrease HF readmissions will begin to decrease healthcare costs and improve patient quality of life (Palmer, Appleton & Rodrigues, 2003).

The financial implications of hospitalizations among HF patients placed a large burden on the healthcare system, with close to 35 billion dollars being spent on HF treatment alone in 2010 (Britz & Dunn, 2010; Dupree, 2010). Due to the fact that HF is one of the most common causes of hospital readmissions, the Centers for Medicare and Medicaid Services (CMS) implemented a plan to reduce health care spending on chronic conditions by categorizing hospital readmission rates as a measure for value-based hospital payments (DeFlice et al., 2010). Beginning in 2013, the CMS will implement a 1% total reimbursement reduction for hospitals with the highest readmission rates followed by a 2% reduction in 2014. Finally, a 3% reduction in 2015 and beyond will occur with the goal savings of 7.1 billion dollars over 10 years (DeFlice et al., 2010). Therefore, implementing strategies to reduce HF readmissions through successful treatment and management will be paramount for the healthcare industry.

Reductions in HF hospital readmissions may occur through an effective medication regimen, implementation of educational interventions, self-management of the disease, and the implementation of disease management programs (Akosh et al., 2002; Krumholz et al., 2002).
Reducing Heart Failure Hospital Readmissions

The purpose of this paper is to review current strategies being used to reduce HF hospital readmissions and recommend key components for nurse practitioners to help reduce HF readmissions.

**Literature Review**

**Literature Search Methods**

Using the Cumulative Index to Nursing and Allied Health (CINAHL) as a database, a “heart failure hospital readmissions” search was done. Over 300 results were produced, refining the search to include only academic journals between the years 2002-2010 narrowed the results to 186. Several articles from this search were chosen for this literature review. An additional search using CINAHL using “heart failure education” and “heart failure disease management” as search terms were used. The literature review also includes articles selected from searches from PubMed, PsycInfo, and Google scholar databases from using search word “heart failure” in combination with words/phrases such as: education; self-management; chronic disease management; medical home; medications; and treatment guidelines

The literature review is organized according to current strategies being used to reduce heart failure hospital readmissions. The strategies discussed are heart failure medications, education, self-management, and disease management programs

**Heart Failure Medications**

The American Heart Association recommends the use of a diuretic, an angiotensin-converting enzyme (ACE) inhibitor or angiotensin receptor blocker (ARB), a beta-adrenergic blocker, and digoxin for the general treatment of HF patients (Jessup et al., 2009) In a study to evaluate aggressive medication interventions provided by a group of cardiologists, nurse practitioners, and nurse educators compared to that of primary care providers, Akosah et al.
(2002) found that patients who were managed by nurse practitioners in conjunction with cardiologists were adequately prescribed the recommended HF medications at proper doses to effectively treat symptoms and reduce exacerbations. One year after hospital discharge, 84% of the individuals in the group being managed by the nurse practitioner/cardiologist team were on adequate doses of medications compared to 38% of the individuals managed solely by primary care providers. Patients were only managed by the HF specialized team until symptoms and medications were stable, at which time their primary care provider became responsible for managing the HF. Also noted at the one year mark was that 16% of those patients who were taking optimal doses of HF medications upon discharge from the HF specialized team had a dose reduction implemented by their primary care provider. Adequate dosing of HF medications is related to a reduction in HF hospital readmissions; therefore, it is essential for all providers caring for HF patients to evaluate for proper HF medication dosing and barriers that may lead to non-adherence of medications (Gee et al., 2010; Li, Morrow-Howell & Proctor, 2004).

Patient adherence to HF medications is just as important as prescribing the proper medications and dosing. The most common reasons cited for medication noncompliance include: misunderstanding of instructions; polypharmacy; patient perceptions; forgetfulness; and cost of the medication (Akosah et al., 2002; Palmer, Appleton & Rodrigues, 2003). To avoid non-compliance, an evaluation of patients' financial status with implementation of any needed referrals to assist patients in obtaining proper medications may be necessary (Li, Morrow-Howell & Proctor, 2004; Palmer et al., 2003).

In a study to evaluate medication adherence in the transition period after discharge from the hospital Gee et al. (2010) found that 84% of HF patients were not taking their medications as prescribed. The study evaluated 25 HF patients recently discharged from the hospital who
attended a medication reconciliation clinic, staffed by a nurse practitioner and pharmacist who made proper medication adjustments and optimized the patients’ HF medications. The mean age of the patients attending this clinic was 67 with an average of 18 active prescriptions per patient. Although this study represented a small sample size, the results support previous evidence that links medication noncompliance to higher readmission rates (Akosah et al., 2002; Polanczyk, Newton, Dec & DiSalvo, 2001).

Heart Failure Education

HF education, including medication adherence, sodium and fluid restrictions, smoking cessation, and self-care should begin at entry into the emergency department and continue through the entire hospitalization. In an effort to deliver this education to HF patients, the Joint Commission, the American College of Cardiology, and the American Heart Association endorsed four components to be addressed for all hospitalized HF patients. The four components included: discharge instructions which address diet, exercise, medications, and follow-up instructions; assessment of left ventricular function; prescriptions of an ACE or ARB to patients with left ventricular systolic dysfunction; and smoking cessation counseling for patients who had smoked within one year of admission (Patterson et al., 2010). Hospitals that extend discharge teaching beyond the basics may provide a smoother transition into the outpatient setting and contribute to the reduction in readmissions (Manning, Wendler & Baur, 2010).

It remains unclear which educational strategies offer the most desirable HF outcomes. Boyde, Turner, Thompson & Stewart (2011) conducted a systematic review of HF educational strategies and found the most effective educational approach uses combined interventions such as written materials, videos, and regular mail-outs with a tailored message. Although verbal, one-to-one teaching is the most common style of providing HF education, it was found to be
ineffective when used as a single modality. There is limited research on evaluation tools to assess the effectiveness of HF education and few studies provided an initial assessment of the patient’s learning style (Boyde, Turner, Thompson & Stewart, 2011).

Krumholz et al. (2002) conducted a prospective, randomized trial of a formal education and support interventions on one-year hospital readmission for patients hospitalized with HF. The intervention consisted of an initial, nurse administered one hour face-to-face educational session followed by telephone or home visits to reinforce the initial education. Medication concerns and dose adjustments were managed by the patients’ primary care provider and not considered as part of the study. The findings demonstrated that education combined with support interventions, without medical management components, reduced HF hospital readmissions by 40%. This study gave evidence to the power of reinforced education as a strategy to reduce HF hospital readmissions. The strengths of the study include a randomized focused evaluation of the impact of education and support intervention without medication management. The weaknesses include a small sample size with limited ethnicity in patient selection.

**Self-management of Heart Failure**

HF self-management is the patients’ opportunity to apply the key educational components such as medication adherence, life-style changes, and close follow-up with primary healthcare providers. The American Heart Association (2011), recommends the following lifestyle changes: smoking cessation; daily weights every morning before eating breakfast; with notification of provider for greater than a three pound weight gain; reduction of dietary sodium to less than 2,000 milligrams per day; limit foods high in fats and cholesterol; maintain a healthy weight; participate in moderate exercise; avoid alcohol or limit of 1-2 drinks daily; minimize stress by having a 15-20 minutes of relaxation daily; monitor symptoms and report any changes
to provider; monitor blood pressure and report results; and remain current with flu and pneumonia vaccinations. As previously mentioned in the Krumholz et al. (2002) study, self-management is most successful when combined with educational support.

To better understand the effects of patient self-management, Powell et al. (2010) conducted a randomized controlled trial involving 902 patients to determine the effects of education and self-management in reducing death or HF hospitalizations. The findings were that self-management in itself did not offer any added benefit in reducing HF hospital readmissions. These findings are similar to previous HF self-management studies (Watts et al., 2009).

Strengths of the study include a randomized design with a large sample size (n=902) over a 3 year period serving a population of over 3 million in order to represent a heterogeneous group. Weaknesses include the education provided to the control group may have had a treatment effect that confounded the ability to determine statistically significant group differences.

Britz and Dunn (2010) conducted a cross-sectional descriptive study guided by Orem’s self-care deficit theory to determine if self-care deficits exist among patients with HF when discharged from the hospital. The findings supported significant associations between HF patients’ perceived health and their self-care confidence suggesting that each encounter with HF patients should be an opportunity for the provider to enhance patient confidence in HF self-care (Britz & Dunn, 2010). Study strengths include the identified need to address self-care and knowledge deficits at the beginning of each HF education session. The weaknesses include a small sample size of 30 individuals and the cross-sectional design prevents knowledge of self-care abilities being measured over time.

**Disease Management Programs**

"Disease management programs offer intensive outpatient management to improve health
status, prevent clinical deterioration, and avert acute crisis” (Akosah et al., 2002, p. 907). The programs are designed to standardize HF treatments and function in the belief that HF is an active disease process that must be treated even if the patient is without symptoms (Akosah et al., 2002). Through education, close follow-up, and promotion of self-management these programs have proven success through consistent reduction in HF hospital readmissions. (Dunagan et al., 2005; Polanczyk, Newton, Dec & DiSalvo, 2001). The following studies support this conclusion.

Manning, Wendler & Baur (2010) described the development of a NP lead HF management clinic that included all patients with a history of HF who were admitted into a 534 bed hospital in Springfield, Illinois. The purpose of the study was to evaluate patient outcomes after enrollment in a disease management program that strictly enforced the CMS care recommendations including: evaluation of left ventricle function; administration of an ACE inhibitor; performing smoking cessation counseling; and providing hospital discharge instructions. The findings highlighted the need for more intense education for certain individuals who continued to be readmitted despite the efforts of the HF management team. The program was noted to have favorable outcomes including increased quality of life, decreased hospital readmissions and decrease expenditures. The success may be attributed to the NP’s advanced knowledge in planning, evaluation, advanced assessment skills, research, and evidence-based practice that allowed for proper initiation, development, and evaluation of the program (Manning et al., 2010).

Ferrante et al. (2010) conducted a randomized, controlled, open-label, multicenter trial of nurse provided telephone interventions aimed at improved education and compliance in patients with HF. Patients in the intervention group received an educational booklet and telephone follow-up regarding diet and medication compliance, exercise, and symptom recognition to
promote early visits. The phone calls were tailored to the complexity of the disease and symptoms. Patients with more severe disease presentation received a higher volume of calls than those with lesser symptoms. Patients who received the telephone interventions, comprised of a specialized nurse making phone calls approximately every 14 days to monitor and provide HF education, had fewer hospital readmissions and improved functional capacity. There were also significantly more patients from the intervention group taking the recommended medications compared to the control group of patients who were monitored only by their attending cardiologist. The strengths of the study include the longevity in which outcomes were reported at 1 and 3 years after stopping the intervention which may be due in part to patient self-management of the disease. The weaknesses include a non-blinded research design which may have influenced physicians to intensify patient care during the trial.

Jain et al. (2010) conducted a retrospective analysis of data collected from a multidisciplinary outpatient HF clinic during the period of June 2005 through June 2006 and compared it to patients in a non-HF clinic during the same time frame. The HF clinic was staffed with a cardiologist, nurse practitioners, registered nurses, and a dietician with a focus of intense education and individualized patient pharmacologic therapy, including the use of evidence-based medications with therapeutic dosing. Patients in the HF clinic group had a significant reduction in hospital readmissions compared to the non-HF clinic group who were managed by their regular physician and/or cardiologist. Strengths of the study include a retrospective design to avoid bias in the allocation of treatment. Weaknesses include a small sample size and the inability to track hospital admissions outside of the research setting.

Not all studies, though, supported the reduction in readmissions utilizing a disease management program. For example, Dunagan et al. (2005) conducted a randomized study on the
Reducing Heart Failure Hospital Readmissions

efficacy of nurse-administered telephone follow-up for patients enrolled in a disease management program. The phone calls were used to promote self-management, appropriate diet, and medication adherence. The study found a reduction in hospital readmissions through the use of telephone follow-up, rescue diuretic therapy, and patient education regarding HF signs and symptoms. At the 1 year mark, there were no statistically significant differences in hospital readmissions between the control and intervention group. This raises the question to the differences in self-management techniques used in this study compared to the study by Ferrante et al. (2010), which found a continued reduction in hospital readmissions at one and three years after stopping the intervention which was attributed to successful implementation of HF self-management.

Similarly, Phelan et al. (2009) conducted a retrospective chart review of HF patients enrolled in a disease management program who were readmitted into the hospital over a one year period. Findings concluded that disease management programs are effective in reducing HF hospital readmissions, but there remained a 35% preventable readmission rate among this particular cohort. This may be due to a lapse in patient self-management of HF which results in non-adherence to medications, diet, exercise, and monitoring for worsening symptoms. Strengths of the study include the examination of preventable readmissions among patients enrolled in a disease management program as a strategy to identify flaws within the program. Weaknesses include a retrospective design that may have limited pertinent information presented or recorded at the time of admission.

Chaudhry and investigators, (2010) completed a randomized study on the effects of automated telemonitoring in reducing HF readmission rates. Telemonitoring did not reduce hospital readmissions when compared to the control group. There were 1653 recently
hospitalized HF patients who received follow-up from a telephone-based interactive voice-
response system that collected daily information for clinician review such as symptoms and
weight and was reviewed by clinicians. There were actually a higher number of readmissions in
the telemonitoring group compared to the usual care group. These findings may be the result of
an automated telemonitoring program versus human interaction in previous studies. With an
automated system there is a lack of individualized care which is a key factor in management of
HF (Manning et al., 2010).

Finally, in attempt to promote cost savings recommendations, the Congressional Budget
Office examined the literature on disease management programs for HF. Their conclusion was
that disease management programs do not offer any cost savings benefit, and that when applied
to a larger population, may actually increase health care costs (Holtz-Eaton, 2004).

**Evolving Strategies for Management of Care**

As demonstrated in the review of literature, there has been varying levels of success in
reducing hospital HF readmissions through the use of medications, education, disease self-
management, and disease management programs. There still remains a fragmentation in
healthcare with a lack of coordination between primary care providers and specialists resulting in
poor health outcomes, including increased hospital readmissions (Schram, 2010). Two emerging
strategies, the chronic care model (CCM) and the medical home model, provide a framework to
adequately manage chronic conditions and eliminate overspecialization and fragmentation of
care through the use of evidence based practice and collaboration among providers (Schram,
2010).

The CCM has six components directed toward restructuring primary care practices to
Reducing Heart Failure Hospital Readmissions

improve clinical outcomes, quality, cost-effectiveness, and patient satisfaction (Schram, 2010 & Lipton, 2009). The six elements include “the health system, delivery system design, decision support, self-management support, clinical information systems, and community resources, with the overall emphasis on a proactive team productively interacting with an informed active patient” (Schram, 2010 p.135). As mentioned previously, HF self-management is best achieved when combined with educational strategies. Although there is limited research identifying this model as a successful strategy in reducing HF readmissions, there are two key components, self-management and informed active patient, that have demonstrated success in reducing HF readmissions.

The patient-centered medical home model is a team-based delivery of health care that concentrates on eliminating the fragmentation that currently exists in management of chronic conditions (Hollingsworth et al., 2011; Lipton, 2009). The foundation of this model places primary care providers in a role to assume responsibility for coordinating chronic care management across all settings. According to Hollingsworth (2011), a successful medical home model should engage the patients in decision making, enhance access to care, incorporate evidence-based processes into patient care, restructure the current reimbursement plan to include care delivery outside of the traditional office visit, and enhance primary care. These models offer basic care recommendations without providing concrete guidelines. This allows NPs and other providers the freedom to deliver care using the best possible approach in any setting to produce favorable outcomes.

The Medicare Medical Home Demonstration Project, commonly referred to as the medical home, is a 2007 initiative to improve quality of care and outcomes while reducing healthcare costs (CMS, 2011). The initial design and language was intended for primary care
Reducing Heart Failure Hospital Readmissions

physicians and did not include NPs and other non-physician providers. In 2008, as a result of the efforts by several nursing organizations, the congressional office changed the language to include NPs and other non-physician providers (Schram, 2010). The project is still evolving with several ongoing pilot trials at selected federally funded facilities throughout the US (CMS, 2011). Shortly after the project design was released, there was a similar design developed through combined efforts of several medical organizations:

The American Academy of Family Physicians, the American Academy of Pediatrics, the American College of Physicians, and the American Osteopathic Association developed the concept of a physician-led, medical home model in which primary care physicians assume the responsibility of coordinating chronic care management for adult patients across settings using a patient-centered, team-based approach. (Lipton, 2009, p. 1945)

There is obvious consensus among various organizations to improve patient outcomes and decrease costs. The medical home model initiative provides elements required for improving the current system, yet there are no defined guidelines or recommendations on what the restructure should entail. Although Kaiser Permanente and the Veterans Health Administration along with several other federally funded facilities have successfully implemented a few components of the model, there is limited research demonstrating success in cost reduction and improved quality of care (Lipton, 2009).

Implications for practice

HF readmissions pose a national healthcare concern that has brought about action to reduce reimbursement to the hospitals with the highest readmissions rates. There are many strategies in place to reduce readmissions, but there is not one solid method that is effective
Reducing Heart Failure Hospital Readmissions

across all settings. The key to success will encompass a balance of close follow-up, patient education, patient self-management, and cost containment. These attributes are contained within the medical home model and CCM. Nurse practitioners are in an ideal situation in these new models as they can provide individualized, holistic, evidenced based practice.

The review of the literature emphasizes the need for individualized education that promotes HF self-management. Disease management programs have demonstrated success in providing the tools to reduce hospital readmissions (Jain et al., 2010; Manning et al., 2010; Phelan et al., 2009). It is unrealistic to expect that every patient with HF will be enrolled in one of these successful programs. Nurse practitioners have the skills and knowledge to manage HF patients adequately to reduce HF readmissions separate from a specified disease management program. The following recommendations may guide NPs in delivering care to HF patients in attempt to avoid hospital readmissions.

To aide in reducing HF hospital readmissions, it is essential for NPs to remain current with the latest HF treatment guidelines and to provide education to patients regarding recommended life-style modifications (American Heart Association, 2011). For the treatment of HF, the American Heart Association recommends an ACE inhibitor, Beta-blocker, diuretic, and digoxin in conjunction with patient lifestyle changes including smoking cessation, monitoring daily weights, dietary reduction of sodium, fat, and cholesterol, maintaining a healthy weight, avoiding alcohol, and participating in moderate exercise (American Heart Association, 2011; Jessup et al., 2009). Patients should be educated to monitor for and report the following symptoms: Sudden weight gain (three or more pounds in one day); shortness of breath at rest; increased swelling of lower extremities or abdomen; difficulty sleeping or requiring more pillows to elevate head due to shortness of breath while lying flat; frequent dry hacking cough;
loss of appetite; increased fatigue or feeling tired all of the time (American Heart Association, 2011). Providing individualized patient care may create some variation in this treatment regimen. The goal should be to maximize symptom control, which may require variable dosing of these medications. NPs should be cognizant of decreasing the doses, as this has resulted in readmissions to the hospital.

Disease management programs have demonstrated success in many settings. Many key program factors may be implemented by the NP in the clinic setting. Providing individualized education to both patients and families, promoting self-management, and maintaining close follow-up are all successful strategies to reduce hospital readmissions.

Involving the patient as part of the treatment team and establishing patient directed goals in addition to provider goals may improve patient self-management. Every encounter with the patient should be an opportunity for the NP to educate and evaluate the need for any adjustments to the treatment plan. Maintaining close follow-up may be achieved through more frequent office visits and phone calls as needed. Although this type of care is not currently reimbursed through Medicare, there are suggestions that the current payment system needs to be restructured to include chronic care.

**Conclusion**

There are currently several strategies that have demonstrated success in reducing heart failure readmissions. Unfortunately, most of the research results are from studies with small sample sizes and with limited generalizability. Further research is needed to design a care delivery model that provides ongoing individualized HF care unlike the current model, in which care is delivered in a rapid, fragmented fashion. Possibly free-standing chronic care clinics that specialize in managing complex conditions like HF with the goal to improve patient quality of
life and decrease healthcare costs are what is needed. The future in caring for HF patients may include both home and office visits in a medical home type of environment.
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