

Care Management to Improve Cardiac Rehabilitation Outcomes

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MILLER and BERRA: *Care Management to Improve Cardiac Rehabilitation Outcomes.* Cardiovascular disease (CVD) is associated with significant healthcare and economic costs. Moreover, the large number of individuals at risk for and with CVD requires numerous public health and clinical interventions to reduce the burden of this disease and improve overall survival. Care management in secondary prevention is one method of managing large populations of patients with CVD within clinical practice settings such as primary care clinics and cardiac rehabilitation programs. Research within numerous clinical trials suggests that care management is useful in improving overall patient adherence to lifestyle interventions and pharmacotherapies known to influence outcomes. While numerous models of care management exist, roles and responsibilities of care managers are similar within these programs. Cardiac rehabilitation personnel have a unique opportunity to extend their services by offering care management services during and following program participation. (J HK Coll Cardiol 2006;14(Suppl 2):B105-B110)

Care management, case management, CVD risk reduction, secondary prevention

摘要

心血管疾病往往佔據大量的衛生保健資源，並耗費大量的財力。不僅如此，數目眾多的心血管疾病患者需要大量的公共衛生和臨床干預措施，以減少疾病的負擔，提高總體的生存率。二級預防體系中悉心照料計劃是處理大批心血管疾病患者的一項措施，針對是那些經過臨床治療，如初級臨床治療和實施心臟病康復計劃的患者。多項臨床研究表明悉心照料計劃對於提高患者的總體治療水平有益，結合生活方式的改善和藥物治療有助於共同提高療效。悉心照料存在著多種模式，而這些模式中照料者的作用和責任基本類似。心臟病康復人員有著獨特的機會在下列項目實施中去拓展他們悉心照料的服務。

關鍵詞：健康管理 病例處理 心血管疾病風險下降 二級預防

Introduction

Diseases of the heart, malignant neoplasms, and cerebrovascular disease are the leading causes of death in China in adults 40 years and older. Together, these conditions account for approximately two-thirds of overall mortality.¹ This data suggests that like the Western world, chronic diseases now account for the largest number of deaths in China. It results in a

substantial economic burden and lost productivity as a result of death and disability. China lost 6.7 million years of productive life during the year 2000 at a cost of around \$30 billion U.S. dollars.² Moreover, a high proportion of deaths are in rural areas of China which poses a significant challenge for healthcare delivery systems. Overall, 79% of those in rural areas have no health insurance compared to 45% in urban areas. During the past decade, the prevalence of those who could not afford medical care increased substantially from 32% to 39% in rural areas.²

The relationship between cardiovascular (CVD) risk factors and morbidity and mortality is well established. Risk factors are common in the US adult population with high blood pressure affecting 47% of men and 56% of women ages 55-64, and 69% of men and 83% of women over 75. Elevated LDL cholesterol

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(>130 mg/dL) is present in 43% of men and 36% of women over the age of 20.³ Similar to the United States, the prevalence of risk factors in Chinese men and women is significant and is growing. For example, in China, the prevalence of hypertension increased from 11.3% in 1991 to 27.2% in 2000.⁴ Data from the International Collaborative Study of Cardiovascular Disease in Asia (InterAsia), a cross-sectional survey of 14,690 Chinese conducted from 2000-2001 indicates that more than 4 in 5 (80.5%) of Chinese adults aged 35-74 years had at least one of the following cardiovascular risk factors: dyslipidemia, hypertension, diabetes, current smoking, and overweight.⁴ While the clustering of risk factors is higher in those within the United States, it is also of importance for those within China. In the United States 93%, 73% and 36% of adults have ≥ 1 , ≥ 2 , and ≥ 3 risk factors, while in China the prevalence is 80.5%, 46%, and 17% for adults 35-74 years of age.⁴ While all risk factors carry significant risk for cardiovascular disease, the most important priorities in China are to control blood pressure in 160 million hypertensive adults and to help more than 300 million adult males to quit smoking.² Unfortunately, too many individuals with CVD risk factors are under diagnosed, under treated, or fail to achieve the goals recommended by national guidelines despite the evidence that prevention works.

Individuals with risk factors and already established cardiovascular disease are at heightened risk of suffering cardiovascular events. While many interventions are needed to manage the epidemic of CVD such as the community-based intervention projects located in communities throughout China,² secondary prevention programs that exist in clinical practice settings may also offer an important approach for managing the large number of individuals who already suffer cardiovascular disease. Moreover, a recent meta-analysis of secondary prevention programs in the United States and elsewhere revealed that these programs were effective in reducing acute myocardial infarction and all-cause mortality with many showing improvements in both quality of life and functional state.⁵ The use of care management programs within clinical settings including cardiac rehabilitation programs provides an opportunity for nurses and other health care professionals to address the growing needs of those with cardiovascular disease and other chronic conditions.

This paper will highlight the important research conducted in care management and will review the elements of the model that has gained wide-spread success in the United States and elsewhere. Application of this model to cardiac rehabilitation will be highlighted.

The Case for Case Management – The Research

Research has demonstrated a synergistic effect of multi-factorial risk factor reduction on both disease severity and clinical outcomes. For example, we now know that small non-critical coronary artery obstructions often lead to acute myocardial infarction. Altering the patho-physiology of these obstructions through multiple risk factor interventions improves endothelial function and can prevent lesion rupture, thus reducing the risk of acute myocardial infarction or stroke. Multiple clinical trials have demonstrated that in addition to reducing atherosclerotic plaque as demonstrated by angiography, cardiac and vascular events are greatly reduced through cardiovascular risk reduction.^{6,7} The challenge to health care professionals is implementing programs that not only identify those at greatest risk but that offer cost-effective interventions. Care management is a clinical model of care delivery shown to be effective in CVD risk reduction in both primary and secondary prevention that has been implemented in a wide variety of settings such as worksites, primary care and specialized clinics and hospital settings. It is linked with the 5 important elements of managing chronic diseases defined by Wagner: 1) use of guidelines and protocols; 2) development of a multidisciplinary team-based approach to care; 3) use of education and counseling; 4) referral to clinical specialists as needed; and 5) healthcare system support for the delivery and tracking of care.⁸

Various models in care management have been developed utilizing nurses and other health care professionals to manage cardiovascular risk factors, support patient's adherence to pharmacological interventions, and which offer surveillance of signs and symptoms that may indicate a change in a patient's

condition. Over the past three decades, care management interventions have been applied to manage single risk factors such as hypertension,⁹⁻¹¹ dyslipidemia,^{12,13} tobacco dependence,^{14,15} and diabetes.^{16,17} A recent trial in China showed that diabetic patients who were provided education and telephone follow-up following hospitalization by nurses showed greater reductions in HbA1c, (7.6 versus 8.1, $p=0.06$) greater blood glucose monitoring adherence, (5.3 versus 3.5, $p<0.001$) and a higher exercise adherence score (5.5 versus 3.2, $p<0.001$) at 24 months which also resulted in shorter hospital stays and lower costs when compared to usual care.¹⁸

Care management has been shown to be highly effective in patients with coronary artery disease (CAD) who have multiple risk factors. Two care management studies undertaken at Stanford University were among the first in the United States to show the value of this approach in managing patients with CAD. The Stanford Coronary Risk Intervention Project demonstrated by quantitative angiography that nurse-led multi-factorial care management for persons with known CAD resulted in less progression of CAD and significantly fewer clinical events after four years of follow-up.⁷ Within this trial of 300 patients, nurse care managers emphasized weight loss, physical activity, management of dyslipidemia, hypertension and diabetes through diet and pharmacotherapy, and smoking cessation. At the end of four years, a 45% reduction in total CVD events (death, hospitalizations for acute myocardial infarction, percutaneous transluminal coronary angioplasty, and coronary artery bypass graft) was found in the intervention group compared to usual care.⁷

A second study conducted by Debusk and colleagues, known as MULTIFIT, evaluated nurse care management with usual care in 585 men and women following an acute myocardial infarction in 5 Kaiser Permanente Medical Care Centers in Northern California.¹⁹ Care managers counseled on smoking cessation, exercise training, diet and drug management of dyslipidemia primarily through telephone and mail for 12 months following hospital discharge. Outcomes demonstrated that changes in functional capacity, smoking cessation, and LDL cholesterol were superior for those assigned to nurse case management compared with usual care. The MULTIFIT program was the first

to show the value of the telephone as a cost-effective method for managing risk factors and pharmacotherapy through care management.

Because the use of secondary prevention pharmacotherapies is critical to long-term patient outcomes another approach to care management in CAD patients is to ensure that all patients are receiving appropriate pharmacotherapies and adhering to them long-term. The Cardiac Hospitalization Atherosclerosis Management Program (CHAMP) is an example of a care management program undertaken at the University of California, Los Angeles, that later served as the model for the American Heart Association's "Get with the Guidelines" program, now used in over 1500 hospital sites across the United States.²⁰ Utilizing nurses as care managers, the CHAMP program focused on treatment guidelines, standardized admission and discharge orders, educational lectures plus tracking and reporting treatment rates as a result of the program. CHAMP emphasized that patients received appropriate pharmacotherapies in conjunction with education around diet, exercise and smoking cessation prior to hospital discharge. At discharge and 12 months, investigators found significant improvements in the use of aspirin, beta-blockers, angiotensin-converting enzyme inhibitors, and HMG Co-A reductase inhibitors in those patients followed by physicians and nurse managers.²⁰ This finding was associated with a reduction in deaths and hospitalizations due to cardiovascular disease.²⁰

Care Management in Large Populations

Care management for patients with CAD has most recently shown widespread success in Europe. EuroAction is a nurse-led multidisciplinary cardiovascular prevention and rehabilitation program which aims to achieve recommended lifestyle, risk factor and therapeutic targets for cardiovascular disease prevention.²¹ The program is a comprehensive hospital-based 16-week program for patients and their families aimed at helping all coronary patients and their families to achieve risk factor modification and therapeutic goals defined by the 1998 and updated 2003 Joint European Societies guidelines.²² The program is coordinated by a

nurse care manager who takes a lifestyle assessment and includes support from a dietician, physiologist and cardiologist. Based on Prochaska and DiClemente's stages of change²³ the multi-disciplinary team focuses on lifestyle interventions including dietary changes, habitual physical activity and smoking cessation. The intervention is provided through group visits, an eight-week program of rehabilitation, and close monitoring by the nurse care managers and cardiologist of targets for blood pressure, cholesterol and glucose. Like the CHAMP program, nurses are responsible for determining that appropriate cardio-protective medications are prescribed and work with the cardiologist to ensure titration of these medicines. At the end of 16 weeks information about a patient's success with the program is provided to the patient's personal physician. EuroAction has now been undertaken in both those with CAD and those at high-risk for CAD in eight countries in Europe including Denmark, France, Italy, the Netherlands, Poland, Spain, Sweden and the United Kingdom. Using a cluster-randomized trial investigators evaluated the program in more than 8500 patients, half of whom had CAD. At the end of 12 months, intervention patients achieved greater intake of fruits and vegetables, a higher reduction in saturated fat, and were more likely to achieve a physical activity target of 30-45 minutes of exercise, 4-5 times per week at 60-75% of maximum heart rate.²⁴ In addition, more patients in the intervention group met their targets for reducing weight, blood pressure goals and improved their use of cardio-protective agents when compared to usual care. While not statistically significant, there was a trend ($p=0.06$) for those in the intervention group to quit smoking.²⁴ If EuroAction is found to be cost-effective, it may serve as a model for hospital and clinic-based approaches to care management utilizing the unique expertise of a multi-disciplinary team.

Care management has also been implemented in low-income populations. Heart Disease on the Mend (HDOM), a randomized care management project in low-income free clinics in Santa Clara California, demonstrated that patients randomized to care management versus usual care achieved better CVD risk reduction after 12 months.²⁵ Other randomized trials are

underway to further evaluate the effectiveness of care management in low income populations.²⁶

Care Management Roles and Responsibilities

While many different models now exist in hospital settings, primary care, and within cardiac rehabilitation to provide care management, many of the responsibilities of care managers are similar inside the various programs. Most often administered by nurses, care managers are often supported by other healthcare disciplines such as nutritionists, exercise physiologists, pharmacists, and health educators. Care managers follow explicit guidelines and protocols for CVD risk reduction based on major policy-making organizations within their countries. Table 1 lists common responsibilities and challenges for care managers. The success of care management is most often seen through greater achievement of goals for cholesterol, blood pressure and blood glucose, physical activity, weight control, smoking cessation, enhanced quality of life, greater use of low-cost medicines and combination therapies, an improvement in adherence, and in some cases reductions in emergency room visits and hospitalizations.²⁷ Whether they are cost-effective continues to remain unanswered, and many investigators are exploring this question.

How Can Cardiac Rehabilitation Programs Capitalize on Care Management?

Cardiac rehabilitation programs are ideal settings where care management services can be offered. Programs include a multi-disciplinary team of nurses, exercise physiologists, dieticians and other health care professionals who focus on exercise training and risk factor education and who develop the unique bond with patients which is critical to support health behavior change. Much can be learned from the EuroAction program to better insure the success of care management. They found that success was related to:

Table 1. Common responsibilities and challenges for case managers

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- They use patient self-monitoring for lifestyle factors and physiologic monitoring such as blood pressure measures to support their counseling and titration of medications.
 - They use the multiple methods to contact and interact with patients such as the telephone and Internet.^{27,28}
 - They use education and behavioral counseling to help individuals achieve target goals, initiate and titrate pharmacotherapies known to improve CVD outcomes.
 - They collect data on the clinical management of individuals and populations.
 - They provide close liaison with the medical community, for screening and assessment of all CVD risk factors.
 - They provide integrated care for both CVD and non-CVD co-morbidities.
 - They address family, work and social needs.
 - They integrate technology into the care plan to improve outcomes.
 - They are innovative and creative in addressing risk reduction.
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- specification of roles and responsibilities for health care disciplines
- the use of educational tools to support CVD risk reduction
- setting personalized goals for patients over a 12-16 week period and
- allowing patients to modify multiple risk factors simultaneously

One example of how restructuring cardiac rehabilitation can support care management was undertaken in the United States by the Butterworth Health Care System in Michigan. Every patient entering cardiac rehabilitation was assigned a care manager. The number of educational and exercise sessions patients attended was based on individual need, averaging 8 sessions per patient. After formal exercise training ended, patients were followed by their care managers who initiated monthly to quarterly contacts. In comparing outcomes over an 18-month period following initiation of the change in structure, significant improvements were noted in quality of life scores, referral rates more than doubled (15% to 32%) and a cost savings of \$500.00 per patient was found.²⁹ Many opportunities exist to provide models like this and others such as those previously discussed in this article.

Conclusion

A large proportion of patients in China, the United

States and world-wide are faced with managing multiple lifestyle changes and adhering to CVD medications. Care management has been shown to be an effective approach for managing multiple risk factors in the large number of patients with CVD and those who are at risk for cardiovascular disease. Care management within a cardiac rehabilitation program offers an ideal format for implementing cardiovascular risk reduction and further expanding this approach to the delivery of chronic care for CVD.

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