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Review Article

Understanding Cardiac Rehabilitation

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Abstract

Introduction: Cardiovascular disease remains the most frequent cause of death globally. Patients with coronary heart disease (CHD) who have experienced an acute myocardial infarction (AMI) or have undergone cardiac surgery are prime candidates for applying to cardiac rehabilitation programs. Cardiac rehabilitation is a multidisciplinary, systemic approach to implementing secondary prevention therapies of known beneficial effects.

Purpose: The purpose of this review study is to investigate the contribution of cardiac rehabilitation programs in improving patients' cardiovascular health and enhancing their quality of life after an incidence of acute myocardial infarction or after a cardiac surgery.

Methodology: An Extensive review of the relevant literature was performed via electronic databases (Medline, Scopus and Google Scholar) and international scientific journals, using the appropriate key words: cardiac rehabilitation program, myocardial infarction, cardiac surgery and a combination of them.

Results: All cardiac rehabilitation programs should contain specific key components aimed at optimizing cardiovascular risk reduction, encouraging healthy behaviors and compliance with these behaviors, reducing disability, and promoting an active lifestyle for patients with cardiovascular disease. The components of cardiac rehabilitation programs are staffed by a highly skilled team comprising a medical director, cardiac care registered nurses, exercise specialists, dietitian, and counselors. These programs include provision of comprehensive long-term services involving the following key elements: basic patient assessment, nutritional counseling, risk factor management (lipids, blood pressure, weight, diabetes mellitus, and smoking), psychosocial interventions, physical activity counseling and exercise training.

Conclusions: Cardiac rehabilitation is a complex intervention offered to patients after myocardial infarction or cardiac surgery to achieve professionally recommended cardiovascular prevention targets and thus good clinical status leading to improved patient's quality of life. Despite the beneficial effects of cardiac rehabilitation, the overall participation rates remain low due to absent or inadequate legislation, funding, professional guidelines and information systems in many countries, as well as patient related barriers.

Introduction

Cardiovascular disease remains the most frequent cause of death globally. Patients with coronary heart disease (CHD) who have experienced an acute myocardial infarction (AMI) or have undergone cardiac surgery are prime candidates for applying to cardiac rehabilitation programs [1]. All types of cardiac surgery almost include some steps before, during and mainly after the surgery. Interventions such as coronary bypass, valve replacement, congenital abnormality correction, and some interventions for cardiomyopathy and pericarditis have common features. Cardiac rehabilitation is an important part of the recovery process from all the pre-mentioned events. In 1967, the World Health Organization defined rehabilitation as the set of actions needed to enable persons with disabilities to attain and maintain their maximum independence, full physical, mental, social and vocational ability, and full inclusion and participation in all aspects of life [2]. Cardiac rehabilitation is a multidisciplinary, systemic approach to implementing secondary prevention therapies of known beneficial effects [3]. American College of Cardiology guidelines emphasize the importance of cardiac rehabilitation as a vehicle to achieve necessary lifestyle modifications after a cardiac event [4,5]. The rehabilitation process for cardiac patients begins with patients entering the hospital and continues for the rest of their lives.

Cardiac Rehabilitation Programs

Cardiac Rehabilitation programs are medically supervised programs designed to help the patients improve their cardiovascular health and enhance their quality of life after an incidence of acute myocardial infarction or after a cardiac surgery.

It is well established in the literature that they reduce mortality by 20–25%. These benefits are similar in magnitude to those resulting from the administration of major cardiac medications or from a cardiac surgery [6,7]. All cardiac rehabilitation programs should contain specific key components aimed at optimizing cardiovascular risk reduction, encouraging healthy behaviors and compliance with these behaviors, reducing disability, and promoting an active lifestyle for patients with cardiovascular disease [8]. The components of cardiac rehabilitation programs are staffed by a highly skilled team comprising a medical director, cardiac care registered nurses, exercise specialists, dietitian, and counselors. These programs include provision of comprehensive long-term services involving the following key elements [9,10]: basic patient assessment, nutritional counseling, risk factor management (lipids, blood pressure, weight, diabetes mellitus, and smoking), psychosocial interventions, physical activity counseling and exercise training [11].

Cardiac Rehabilitation Phases

Cardiac Rehabilitation has been conventionally divided into four phases [12].

i. **Phase I** known as the hospital phase, aims to minimize the negative effects of restriction to bed and ends with the patient leaving the hospital [13]. The recommendations of American College of Sports Medicine (ACSM) for the intensity in phase-1 CR among post MI patients include, training the patient up to a heart rate of 120 beats/minute, guided by symptoms of chest pain and interval training with bouts of exercises lasting from three to five minutes or as tolerated, interspersed with adequate rest periods in order to achieve an exercise/rest ratio of 2:1. After an acute coronary event, Phase 1 Cardiac Rehabilitation is important to help the patient's recovering. It consists of medical assessment, assurance and training on CAD, correction of cardiac misconceptions, assessment of risk factors and early mobilization of the patient [14].

ii. **Phase II** (up to 12 wk) is the phase immediately following discharge from hospital and involves continued monitoring of patient's cardiac responses to exercise and activity. It is known as the early out-patient phase and aims to gradually increasing exercise tolerance [13]. As such, it may include, treadmill exercise testing, exercise training, inspiratory muscle training, as well as education about proper exercise procedures for the patient to return safely to functional mobility while monitoring of his heart rate. The main benefits of Phase II are that it decreases the chance of another cardiac event, stops or reverse blood vessels damage, improves patient's stamina, confidence and wellbeing. It also controls heart disease symptoms such as chest pain or shortness of air [15,16]. It has been well demonstrated in the literature that short-term inspiratory muscle training (IMT) programs combined with aerobic and resistance training in patients undergoing phase II, after CABG or other cardiac surgery, lead to large increments in respiratory muscle strength, functional capacity, and quality of life [17].

iii. **Phase III** of Cardiac rehabilitation, known as the late out-patient phase (variable duration) typically includes an outpatient program aiming at developing exercises with more intensity [13]. Key elements of phase III are exercise training, education, psychological support and risk factor modification. Most phase III programs involve supervised exercise training once or twice per week in a hospital setting or in community or home-based setting. The exercise training at this phase includes six-minutes' walk test, timed up and go test, biking, rowing, exercises to increase flexibility, upper body strength and lower body strength. The goal for the patient at this stage is to become independent enough to move safely to the last phase of his recovery program [18].

iv. The fourth and final phase is often referred as preventive or maintenance phase of cardiac rehabilitation, as it emphasizes long-term lifestyle changes, such as a regular exercise program, healthy diet, healthy weight, anti- smoking behavior and dealing with stress. It seems to improve cardiorespiratory fitness, hemodynamics at peak exercise and heart rate recovery, an indicator of cardiac autonomic function. This phase should have a starting date but not a finishing one, as it focuses on making lifestyle changes part of everyday life. Regular communication with the rehabilitation team for periodic reviews and assessments is an important part of phase IV [19]. Cardiac rehabilitation programs are based on long-established models involving residential or ambulatory programs and differ between them according to local and national guidelines [20].

Barriers to Cardiac Rehabilitation

Despite the documented evidence of the benefits of cardiac rehabilitation programs in enhancing recovery, improving survival, improving exercise capacity, reducing mortality following a myocardial infarction or a cardiac surgery and decreasing the risk of recurrent MI, only about one third of patients participate in such programs. Several clinical and psychosocial factors are associated with decreased participation in cardiac rehabilitation programs [21,22]. Many potential barriers to participation in cardiac rehabilitation have been assessed in the literature including patient-level factors, such as the lack of insurance coverage or multiple co-morbidities. Lack of physician recommendation, lack of awareness of cardiac rehabilitation indications among providers, and lower education are also main barriers to the participation to CR programs.

Psychosocial barriers have also been identified including depression, social deprivation and lower socioeconomic status. Furthermore, lack of transportation, lack of motivation, reduced self-efficacy, and perception that rehabilitation is inconvenient or unnecessary are also referred as main obstacles [23-26]. Women are significantly less likely to participate in and complete cardiac

rehabilitation programs. The reasons of why women are missing from CR programs are multi-factorial. Older women express a dissatisfaction regarding mixed sex exercise groups, and they are worried about inability to maintain their household obligations, while younger women are staying away from CR programs because they believe that rehabilitation is only for older adults [27].

Conclusions

Cardiac rehabilitation is a complex intervention offered to patients after myocardial infarction or cardiac surgery to achieve professionally recommended cardiovascular prevention targets and thus good clinical status leading to improved patient's quality of life. Cardiac rehabilitation includes health education, psychological counseling, risk factors modification, physical activity, dietary advice and stress management. Despite the beneficial effects of cardiac rehabilitation, through effective lifestyle and cardiac risk-factor management, the overall participation rates are low due to absent or inadequate legislation, funding, professional guidelines and information systems in many countries as well as patient related barriers.

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