A multidimensional evaluation of two cardiac rehabilitation programs in patients with coronary artery disase

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Cardiac rehabilitation is an important component of current multidisciplinary approach for management of the patients with various presentations of coronary heart disease. Cardiac rehabilitation involves exercise training, education, counseling regarding risk reduction and lifestyle modification, and, frequently, behavior interventions.The goals of cardiac rehabilitation services are to improve both the physiologic and psychosocial condition of the patients. Physiologic benefits include improvement of exercise capacity and reduction of risk factors (eg, cessation of smoking, lowering of lipid levels, body weight, blood pressure, blood glucose), where the exercise component provided through rehabilitation may cause reduction in the progression of atherosclerosis. Psychological improvements include reduction of depression, anxiety, and stress. All these improvements enable acquisition and maintenance of functional independence and return to satisfactory and appropriate activity that benefits both the patient and society.Cardiovascular disorders are the leading cause of mortality and morbidity in the industrialized world, accounting for almost 50% of all deaths annually. The survivors constitute an additional reservoir of cardiovascular disease morbidity. In the United States alone, over 14 million persons suffer from some form of coronary artery disease (CAD) or its complications including congestive heart failure (CHF), angina, and arrhythmias. Of this number, approximately 1 million survivors of acute myocardial infarction (MI), and 309,000 patients who have undergone coronary bypass surgery annually, are candidates for cardiac rehabilitation.Aim of the study: to compare between high and low frequency exercise program for cardiac rehabilitation of patients with stable ischemic heart disease (Myocardial infarction, unstable angina, post coronary intervention, post coronary artery bypass grafting).Patients and Methods: Fifty patients who had been hospitalized with manifestations of documented coronary artery disease (myocardial infarction, angina pectoris, bypass surgery or angioplasty) were referred to our cardiac rehabilitation center in the National Heart Institute.They were eligible for the study if their ages were between 30 and 70 years with a mean age of 53 ± 15.5 years. All patients had major coronary artery disease; these diseases are:• Myocardial infarction 14 patients• Angina pectoris 10 patients• Coronary Artery Bypass Graft 20 patients• Percutaneous Coronary Intervention 6 patientsExclusion criteria: Unstable angina, Clinically unstable heart failure, Unstable arrhythmias (e.g., sustained ventricular tachycardias or exercise

induced polymorf ventricular tachycardias), Contraindications for exercise training (e.g., endocarditis or other systemic infectious diseases), Other exercise limiting concurrent condition (e.g., chronic obstructive pulmonary disease, skeletal or muscular disorders), Psychosocial contraindications for inpatient cardiac rehabilitation (severe depression or panic disorder).Patients were randomized into two groups:Group I: Included 25 patients subjected to high-frequency exercise training during a six-week outpatient (phase II) cardiac rehabilitation program.Group II: Included 25 patients subjected to low-frequency exercise training during a six-week outpatient (phase II) cardiac rehabilitation program.All patients included in the study were subjected to Complete history taking, Thorough general and local examination of the heart, 12 leads resting ECG, M-mode, 2D and Doppler echocardiographic study for assessment of the presence of resting wall motion abnormalities, and valvular lesions, LV systolic and diastolic function, Clinical exercise testing using Bruce protocol before and the end of follow-up period.Outline of the rehabilitation programs:• Duration of the rehabilitation stage was six weeks.• The high-frequency program consisted of two training sessions each day, five days a week.• The low-frequency program consisted of one training session a day, twice a week, without advice or prescription of additional exercise outside the program.Assessment of the quality of life:For assessing quality of life (QOL) the EuroQol questionnaire was used (Goldberg et al., 1990). The EuroQol questionnaire is a standardized, non-disease-specific instrument for describing and valuing health related quality of life. The EuroQol instrument measures five domains of quality of life. For each modality there are three options as is shown in the following table.Statistical analysis: Statistics were obtained using SPSS (PC+, version 10.01, -2001; SPSS Inc., Chicago, Illinois). Differences between groups (high- vs. low frequency and improvement vs. no improvement) were analyzed using unpaired t test; differences of program-effect were analyzed with multivariate analysis of variance for repeated measures. Differences in individual improvement between both programs were tested with chi-square test. Significance was expected to occur when (two-tailed) p values were below 0.05. Group data for each variable are expressed as mean value ± SD.Results:There was no significant difference between the two groups regarding the different clinical and demographic parameters measured ($P > 0.05$).There was no significant difference between the two groups regarding the different echocardiographic parameters studied ($P > 0.05$).There was no significant difference between the two groups before the cardiac rehabilitation program regarding all the studied parameters of the clinical exercise stress testing ($P > 0.05$).There was significant difference between the before the cardiac rehabilitation program and after the cardiac rehabilitation program regarding all the exercise test characteristics studied. There was significant decrease in the resting 0.05). There was significant heart rate and peak diastolic blood pressure (P 0.05). There decrease in the resting heart rate and peak diastolic blood pressure (P was significant difference between the two groups after the cardiac rehabilitation program regarding the peak heart rate, peak systolic blood pressure, exercise capacity, exercise duration and proportion of the predicted heart rate 0.05).Conclusion• Both high frequency and low frequency exercise training (P program showed beneficial effect in patients with coronary artery disease (post MI,

CABG, and PCI) in the form of improvement in exercise capacity, exercise tolerance, hemodynamic parameters of the exercise stress testing.• Quality of life improved significantly in both high frequency and low frequency exercise training program groups.• High frequency exercise training program showed significant improvement than the low frequency exercise training program in the form of better improvement in exercise capacity, exercise tolerance, hemodynamic parameters of the exercise stress testing.• High frequency exercise training program showed significant improvement than the low frequency exercise training program regarding the different domains of quality of life.Recommendations• Other studies have to be done for evaluation of the multifactorial cardiac rehabilitation program in patients with stable ischemic heart disease as well as on patients with heart failure.• Other studies have to be done for evaluation of the cost effectiveness of the low frequency versus high frequency exercise training in patients with chronic ischemic heart disease.• Larger clinical trials with longer follow-up periods have to be done for evaluation of the different exercise programs on the mortality and morbidity of patients with chronic ischemic heart disease.• Awareness of the cardiologists and cardio-surgeons about the importance of exercise training program in patients with heart diseases not only after cardiac surgery.