

heart disease in that year.¹ Because of improvements in medical treatment, such as percutaneous transluminal coronary angioplasty (PTCA), coronary artery bypass surgery (CABG), valve replacement surgery, heart transplantation, etc., survival rates from heart disease have increased. However, during the medical treatment process, most cardiac patients feel stressed and threatened in terms of their physical, mental, and social well-being. Not only should these patients' lives be prolonged, but their quality of life also needs to be improved.

Cardiac rehabilitation, particularly exercise training, can help patients restore their levels of physical, mental, and social functioning back to optimum states. The American College of Sports Medicine (ACSM)² has classified cardiac rehabilitation into 4 phases. Phase 1 is the hospitalization stage with intensive EKG surveillance and professional supervision. During this stage, the main goals are to reduce complications from being bedridden, such as pneumonia or deep vein thrombosis, to maintain muscle tension, to relieve postural hypotension, to restore physical activity, to eliminate feelings of weakness, and to strengthen the capability for self-care.³⁻⁴

According to a report released by the World Hygiene Organization (1993), while the idea of cardiac rehabilitation has been prevalent in developed countries, it is just recently begun to gain momentum in developing countries. It was recommended that cardiac rehabilitation should be promoted in developing countries through proper training programs.⁵ In Taiwan, the department of cardiac rehabilitation programs is just in the initial stages. It was not until the past few years that a hospital-based cardiac rehabilitation center was established. Hands et al.⁶ pointed out that improving one's functional capacity by exercise training is safe and workable, and that it should be started in patients with no complications during their early post-surgical stage. As recommended by the ACSM,² the best timing for patients to begin rehabilitation exercise training with a treadmill is within 3 to 5 days after cardiac surgery or acute myocardial infarction (AMI). Pollock and Wilmore³ also reported that if patients' conditions are stable and there are no severe complications during the hospitalization period, then patients can begin the exer-

cise program within 24 h after surgery and can even take a walk on the following day.

The exercise training program includes range of motion, daily activity, general walking, stair climbing, cycle ergometry, treadmill exercise, etc. Exercise intensity is designed to gradually increase. For the entire exercise program, there is a variety of 6-, 8-, 9-, and 12-day periods available.^{2,5,7-11}

Gulanick¹² found that when patients with AMI or after cardiac surgery accomplished phase 1 cardiac rehabilitation and continued with phase 2 cardiac rehabilitation exercise, their self-efficacy and daily activity capability were better than those who did not participate in phase I cardiac rehabilitation. Oldridge and Rogowski¹⁰ studied the influence of an inpatient cardiac rehabilitation exercise program on patient self-efficacy, and found out that on the 28th day after hospital discharge, patients using treadmill training had better performances on walking time and self-efficacy than did those undergoing traditional walking training. Kao⁸ implemented an inpatient rehabilitation program for AMI patients. The results demonstrated that those participating in a phase I cardiac rehabilitation program achieved over 5 metabolic equivalents (METs) of exercise capability at 1 month after hospital discharge and over 7 METs of exercise capability in the third month, which was much better than those who did not enter the program. Therefore, to sum up, execution of phase I cardiac rehabilitation can increase the activity tolerance of cardiac patients and enhance their capability to accomplish daily activities after hospital discharge.

In Western countries, treadmill exercise training has been included in phase I rehabilitation programs; however, in Taiwan, general walking training is still the main component of inpatient cardiac rehabilitation programs. Compared to treadmill exercise training, general walking training is more complicated, it is harder to quantify the intensity of every activity, and the maximal level of activities in the program can only reach 3.0 to 3.5 METs. Therefore, the purposes of this study were to assess the possibility of replacing the general walking program with a more-energetic treadmill exercise program, to examine how a treadmill exercise program can improve daily activity accomplish-