1987

Exercise program for individuals with coronary artery disease : a behavior modification and motivational emphasis

Joyce M. Foddy
The University of Montana

AN EXERCISE PROGRAM FOR INDIVIDUALS WITH CORONARY ARTERY DISEASE-- A BEHAVIOR MODIFICATION AND MOTIVATIONAL EMPHASIS

BY

JOYCE M. FODDY

B. S. N., University of Iowa, 1974

Presented in partial fulfillment of the

requirements for the degree of

MASTER OF SCIENCE

UNIVERSITY OF MONTANA

1987

Approved by:

Donald H Harden
Chairman, Board of Examiners

Dean, Graduate School

Date June 8, 1987

UMI Number: EP38085

Acknowledgments

The author wishes to express her gratitude and appreciation to Dr. Donald Hardin, Dr. Thomas Whiddon, and Dr. Balfour Jeffrey for their guidance and assistance during the completion of this manuscript.

Appreciation is also expressed to those in the St. Patrick Hospital Outpatient Cardiac Rehabilitation Program for their sharing and active participation, and to my family, friends, and co-workers who gave generously of their support and encouragement.

The impetus for behavior change may be self-initiated, be stimulated by family, friend, or peer pressure, result from advice or direction by a physician or health care professional, but those elements that determine the motive for initiating and continuing a behavior change are those perceived by the individual. These motives are not permanent, but will change with time.

Neil B. Oldridge

TABLE OF CONTENTS

LIST OF DIAGRAMS:

CHAPTER I

INTRODUCTION

Significant progress in modern medicine has endowed us with artificial hearts, lungs, joints and kidneys. Organ transplants of hearts, lungs, kidneys, and livers are increasingly more common. Human life can now be sustained long past its biological demise. This progress is not without great cost. In 1984, the United States spent an estimated 387.4 billion dollars on health care, an estimated 1,580 dollars for each person (Levit et al., 1985). This large investment in medicine does not appear to have yielded a corresponding improvement in community health (Shephard, 1985a). There has been a shift of illnesses from infectious diseases in the early 1900's--which attack the person from the outside--to internal disease like heart attacks, hypertension, and strokes. These are the greatest killers of our day (May, 1981). No other organ has had more symbolic significance to an individual than the heart. For centuries, it was believed that the soul resided there. The heart is the vital force that we feel within us (Steinhart, 1984).

Diseases of the heart and blood vessels currently affect 63.4 million Americans. A major underlying condition of cardiovascular disease is atherosclerosis. Deposits in arterial walls may occur any place in the body, but frequently occur in arteries supplying the heart. This creates a condition called coronary artery disease (American Heart Association, 1987). Coronary artery disease is a chronic degenerative disease that affects 6 million living Americans (Rinke, 1986) and is the leading cause of death (American Heart Association, 1987). The American Heart Association estimates, 1.5 million Americans will have a heart attack and almost one-third will die (American Heart Association, 1987).

Coronary artery disease is an insidious process that begins in early life and progresses steadily until it is manifested by angina pectoris, myocardial infarction, congestive heart failure and/or sudden death (Naughton, 1985). To date, no definable cause of coronary artery disease has been identified. Rather, it is viewed as multifactorial in origin (Naughton, 1985). Extensive clinical and statistical studies have identified several factors as contributing to an increased risk of coronary artery disease. These factors include heredity, sex, age, race, cigarette smoking, high blood pressure, elevated blood cholesterol, diabetes, obesity, stress and lack of exercise (American Heart Association, 1987).

Coronary artery disease occurs most often in men during their fourth, fifth, and sixth decades of their life. For women, coronary artery disease occurs more frequently after menopause, in the fifth and sixth decades of their life. This period is considered to be one's most productive and effective years. An individual makes his most effective contribution to politics, diplomacy and philosophy during this time. Many work in managerial, consultative, and teaching positions to integrate theorectical work and set new directions for the upcoming generation. These roles have great personal and social value (Levinson, 1978).

Any physical limitation placed upon a person during this time has a significant impact on the person, family, and society. Financially, the estimated annual economic burden of coronary heart disease in the United States, including both direct and indirect costs, is well in excess of 100 billion dollars (Weinstein, 1985). Treatments for coronary artery disease in the United States cost an estimated 85.2 billion dollars (American Heart Association, 1987). Fardy (1980) suggested a loss of manpower of approximately 62 million man-days per year. An estimated loss of 14.2 billion dollars in the United States occurs annually from inability to work (American Heart Association, 1987). These estimated costs of cardiovascular disease in this country do not even take into account time invested in job training, reinvestment in training replacements, and in lost capital from those who are affected by coronary artery disease (including family members who take time from their jobs) (Fardy, 1980).

When coronary artery disease is identified, treatment focuses on pharmacological, physiological, and surgical management. Techniques such as coronary artery bypass surgery, percutaneous transluminal coronary angioplasty, intracoronary thrombolysis, administering beta-blocking and calcium-channel-blocking medications, and even heart transplantations are available to individuals with coronary artery disease (Weinstein, 1985). Changing possible primary risk factors is also a focus of secondary intervention (Naughton, 1985).

Coronary heart disease remains America's most rapidly escalating area of health-care costs (Walker, 1983). Of all chronic diseases, cardiovascular disease (and obesity) are the main areas of possible direct savings (Shephard, 1985a).

Despite coronary artery disease being the leading cause of death in this country, there are 4.81 million individuals who have survived a heart attack or who have angina pectoris (American Heart Association, 1987). What happens to them? What kind of life do they live?

Most people react to illness with passiveness, that is, they place themselves in the hands of the doctor and new miracle drugs (May, 1953). The term cardiac invalidism is used to describe this passiveness of individuals with coronary artery disease. These individuals after a myocardial infarction or coronary artery bypass graft surgery unnecessarily restrict their activity, frequently are anxious, lack self-confidence, and have poor knowledge of their disease (Soloff, 1978-79; Haskell, 1984). They are slow to resume vocational, personal, and social activities because of their belief that they will overburden their debilitated cardiac capacity (Bandura, 1982). The sick role comes equipped with a host of built-in myths. As paraphrased from Hackett (1979):

> I had an experience in the service when I was a prison doctor. Three inmates went over the wall. As they were running across a field, rifle shots rang out, and one of them fell. I thought he must have been shot in the chest. When I approached him, he was lying there, and although there was a great deal of blood, the bullet had barely nipped his shoulder. As he lay there panting, I reassured him that he was alright, and asked him why he had fallen down. He replied, Oh, you're supposed to fall down when you're hit. So he took on the role of the escapee who had been shot and fallen down, not because of the bullet's impact, but because he thought he should. I see a lot of people doing the same with heart disease. Many myocardial infarction patients feel they ought to be invalids

because they are told heart attack victims are invalids. They believe they should be over the hill following an myocardial infarction and assume the sick role.

> "The sense of being locked into a body that is inadequate for its needs, the sense of living under a lowering ceiling, the sense of having to separate oneself from vital prospects, the sense of coming to terms with bleakness--all these are the stuff of invalidism. The person who is put on notice by physician that he or she has a 'bad heart' tends to live a life of reduced expectation, to take slower and fewer steps, and to move more tentatively in the outside world (Cousins, 1983)."

This sick-role behavior and disability is related more to psychological than to physiological problems (Wenger, 1979). For individuals suffering a myocardial infarction, this event threatens one's self-concept as a person strong, successful, and invulnerable (Goff & Dimsdale, 1985), thought of as an "ego infarction" (Steinhart, 1984).

Psychological management of coronary artery disease is another important focus in secondary intervention of coronary artery disease. Medical treatment should seek not just to repair damage and restore vital balances. Treatment of illnesses need to also enhance the quality of life and help the person overcome their feelings of hopelessness and helplessness (Cousins, 1983). Encouraging the patient to believe they have the personal capacity, power, and responsibility (respond ability) to change their lives is essential to self-motivation and successful long-term behavior changes (Lamkin, 1983).

No treatment, however valuable, will be efficacious unless the individual assumes responsibility for maintaining his own health and well-being (May, 1981; Oldridge, 1984a). No medication will help unless it is taken as directed. None of the risk factors identified as leading to one's coronary artery disease will disappear unless the individual is willing to change these factors. To be fully effective, the individual with a disease must be a responsive and appreciative partner (Cousins, 1983); the patient is the final determinant of his behavioral changes (Wenger, 1979).

> Improving patient's participation in the care of chronic disease can have significant rewards for patients and the health-care system. For the patients, active participation can reduce disease symptoms and side effects of medications, lower

the risk of or damage of disease, and increase quality of life. The health-care system benefits from active participation through lower utilization, reduced costs, and improved services to those who need medical care (Given et al., 1984).

> Health education programs need to focus less on indoctrination and exhortation, and focus more on patient participation in his own treatment. Commitment, which transforms the patient from a passive recipient to a participant, is the enemy of indifference and noncompliance (Vaisrub, 1975).

As Lamkin (1983) described, one of the greater challenges is to encourage patients to take this active and responsible role in their own care. Achieving and maintaining this active participation of patients in the management of their chronic diseases represent a considerable challenge to health-care providers (Given et al., 1984).

Hackett (1979) described cardiac rehabilitation exercise and activity as probably the best available treatment for patients. Cardiac rehabilitation programs have been developed to reduce the high social, emotional and economic cost of psychogenic cardiac invalidism (Soloff, 1978-79) and to aid patients in renouncing the sick-role behavior (Wenger, 1979). Cardiac rehabilitation programs aid persons with coronary artery disease attain their optimal medical, physiological, psychological, social, vocational and recreational status (Naughton, 1977). The goals include returning the person to an optimum life-style, enhancing psychologic recovery, such as developing confidence and improved well-being, and encouraging a wide variety of behavior changes (Newton et al., 1985). For most, cure is not the focus, rather improvement in their function as a result of decreased symptoms or severity of the illness, and limit the disease progression (Wenger et al., 1984; Kannel, 1981).

Cardiac rehabilitation programs help initiate this change process in a patient's life-style (Hoskins & Habasevich, 1978). Cardiac rehabilitation programs focus on recommended behavior changes of dietary modifications, weight loss, smoking cessation, stress management, and developing regular exercise as a habit (Newton et al., 1985). These modifications are encouraged with the belief that by doing so, persons may alter the future course of the coronary artery disease process (Newton et al., 1985; Kannel, 1981).

Exercise is an important component of cardiac rehabilitation (Erb et al., 1979; Council on Scientific Affairs, 1981; Rigotti et al.,1983; Franklin et al.,1986; Shaw, 1981; Hammond, 1985; Smith, 1986; Naughton, 1985).

> Potential benefits of a carefully prescribed and supervise exercise program in coronary heart disease patients include the following: psychological improvements in self-image and reversal of mental depression; increased maximal oxygen uptake (aerobic capacity); lower serum catecholamines levels; reduction of adipose tissue and increase in percent of lean-body mass; favorable alterations in concentrations of serum insulin, glucagon, triglycerides, and possibly coagulation factors; and increased ratio of serum high-density to low-density lipoproteins (Council on Scientific Affairs, 1981).
>
> Fox (1979b) identified five potential areas of benefit from cardiac rehabilitation exercise, as summarized: increased physiological capacity; more favorable biochemical status; psychological support of more positive thinking, less anxiety, depression, and dependency, better sleep quality and muscular relaxation, less subjective fatigue, increased tolerance to stress; socio-economic benefits of less hospitalization length of stay and medical services, sooner return to work with more physical and mental stamina; reduced morbidity and mortality of fewer complication and recurrences; and lesser mortality.

Exercise therapy in cardiac rehabilitation programs has been related to lower fatal (Hedback et al., 1985; Rechnitzer, 1972; Shephard et al., 1981) and non-fatal recurrences of myocardial infarctions (Hedback et al., 1985; Kallio et al., 1979; Rechnitzer et al., 1972; Shephard et al., 1981; Vedin et al., 1976), and has been related to a lower overall cardiac mortality rate (Bruce et al., 1976; Kallio et al., 1979; Naughton, 1985, Rechnitzer et al., 1972; Shaw, 1981; Shephard, 1983; Vermuelen et al., 1983). These differences could not be explained by other health habits or disease severity (Shephard et al., 1981). Individuals, after participating in an exercise program for myocardial infarction patients, experienced fewer sudden deaths, especially in the first six months (Kallio & Hamalainen, 1979; Kallio et al., 1979), and had less total coronary and non-coronary heart disease mortality in a three-year follow-up (Kallio & Hamalainen, 1979). Shaw (1981) and Rechnitzer et al., (1972) suggested cardiac rehabilitation exercise programs may have favorably affected the prognosis following recovery from myocardial infarction as compared to non-exercisers, but these results should be interpreted cautiously.

Studies examining the effect of exercise training on recurrent myocardial infarction and death in persons who have survived a first heart attack are inconclusive. Although no study has demonstrated that chronic dynamic exercise increases survival after myocardial infarction, most have shown a trend toward increase survival (Hammond, 1985; Blessey, 1985). Others have been unable to suggest cardiac rehabilitation exercise programs affect mortality (Wilhelmsen et al., 1975; Soloff, 1978-79, Oldridge, 1984a; Roman, 1985) or reinfarction rates (Wilhelmsen et al., 1975; Soloff, 1978-79; Naughton, 1985; Roman, 1985).

There is always a risk of another myocardial infarction or sudden death occurring in individuals with coronary artery disease, especially during exercise (Haskell, 1984; Haskell, 1978; Naughton, 1985; Thompson, 1985). Cardiac rehabilitation exercise training with on-site medical supervision trained in cardiopulmonary resuscitation measures has been found to be relatively safe (Bruce, 1976; Haskell, 1984; Naughton, 1985) and at least do not appear to increase morbidity or mortality (Thompson, 1985; Fox, 1979a). Bruce et al. (1976) suggested the supervision by trained personnel may actually reduce the mortality rate associated with exercise. In this study, all instances of cardiac arrests were successfully treated during cardiac rehabilitation exercise. If this supervision had not been present, the mortality rate would have been similar for both active and dropout participants (Bruce et al., 1976).

Cardiac rehabilitation programs have been associated with a higher return to work rate (Garrity, 1973; Fletcher, 1984).

> Medical and sociodemographic factors have been related to this rate, but the primary determinant of returning to work was one's perceived health status after hospital discharge. The more favorable the patient perceives his health to be, the more likely he returned to work and continued working after hospital discharge (Garrity, 1973).

Despite these inconclusive results of cardiac exercise therapy, the value of cardiac rehabilitation programs has been associated with improved psychological and social quality of life (Wilhelmsen, 1975; Mayou, 1981; Rigotti, 1983; Hoskins & Habasevich, 1978), even potentially independent of physiologic improvement (Soloff, 1978-79; Shephard et al., 1985c; Martin & Dubbert, 1982). Continuing advances in medical care have resulted in shorter hospitalization stays for the acute myocardial infarction and coronary artery bypass graft surgery patient. Individuals undergoing percutaneous transluminal coronary angioplasties are hospitalized for an even shorter period of time. These individuals likely experience similar chest pains and anxieties associated with coronary artery disease, but may be discharged from the hospital after only two or three days.

> Emotional distress is normal short-term, but chronic distress may be evidence of maladjustment. Early adjustment to one's coronary artery disease has even been related to a lower mortality rate than those rated as having less unresolved emotional upset, especially in the first six months following hospitalization (Garrity & Klein, 1975).
>
> During their hospitalization, many of these patients and their families are not able to focus on their future because their energies are totally absorbed in the event itself. As a result patients are often discharged without adequate or effective teaching and counselling, and in many cases experience grief, anxiety, depression, and anger as a result of these conditions (Berra, 1979).

A cardiac rehabilitation program had pervasive and beneficial effects (Roviaro et al., 1984). Attending a cardiac rehabilitation program was the best predictor of total compliance of life-style behavioral changes postmyocardial infarction (Hilbert, 1985). Cardiac rehabilitation programs have the potential to provide the individual with coronary artery disease psychological and emotional support. These programs provide access to and professional services for individuals to cope with difficulties. Comprehensive rehabilitation programs exert a positive influence on negative psychic attitudes and encourage emotional stabilization, especially in fear and frustration reduction (Konig, 1978). Significant improvements in mood tension, anxiety, depression, dejection, anger, hostility, and confusion has been found in a year of cardiac rehabilitation (Shephard et al., 1985).

> Compared to routine care for those after a myocardial infarction or coronary bypass surgery, a three-month cardiac rehabilitation program and a four-month follow-up yielded more positive self-perceptions with regard to health, body concept, self-concept, and progress and compliance toward personal health goals (Roviaro et al., 1984).

The majority of patients do not admit to particular worries over longevity, rather their concerns focus on their quality of their remaining years and attitudes toward life (Shephard, 1979). Williams (1985) described components of quality of life as the physical mobility and freedom from pain, the capacity to perform the activities of daily living and to engage in normal social interaction. Wenger et al. (1984) described components of quality of life as the ability to perform activities of daily life, social, intellectual and emotional function, economic status, one's perceptions of general health and well-being, and their satisfaction with life, symptoms of the disease and related consequences.

The chief psychological effect of the exercise program was to restore self-confidence and to reinstate a positive self-image through the use of physical conditioning (Prosser et al., 1981; Hackett & Cassem, 1979). These are perhaps the most crucial interventions available to help attain a renewed feeling of independence and combat frequent depression (Hackett & Cassem, 1979).

Traditionally, the main criteria used in evaluating cardiac rehabilitation programs have been the number of cardiac deaths and the number of recurrent infarctions (Shephard, 1979). It is this better quality of life that provides a central criterion for the success evaluation of rehabilitation (Konig, 1978). Cardiac rehabilitation programs have been a success and should be continued in an active role of patients with coronary artery disease (Fletcher, 1984).

Studies examining the effects of cardiac rehabilitation have been beset with problems (Rigotti et al., 1983; Stern & Cleary, 1982). In some instances, it may take a year or more before confidence becomes sufficient to permit serious endurance training (Shephard, 1979). Yet many studies are conducted with participants in the program less than this period of time. Even more difficult, is that many participants dropout of their prescribed exercise therapy program and/or do not participate even if recommended by their physician. The effects of physical activity is maximal for the first two years of rehabilitation (Shephard, 1983). Even in those who do participate, results are difficult to establish due to 'waning enthusiasm on the part of the exerciser and contamination of controls' (who do exercise) (Shephard, 1983). Noncompliance problems introduce significant bias and makes evaluation of cardiac rehabilitation programs very difficult (Bruce et al., 1976).

There are no miracle drugs or easy answers to obtain the beneficial effects of exercise therapy. Any positive benefits of exercise behavior for individuals with coronary artery disease depend primarily on those persons actually engaging and maintaining exercise behavior as prescribed. The effectiveness of exercise therapy is only effective as one's adherence or compliance to engage in the treatment, i.e. a commitment to a habitual exercise program (Oldridge, 1984b).

Despite recommended advice concerning their medical regimens, many individuals do not follow the advice given. Patient compliance is a major treatment problem, often contributing to treatment failure (Ulmer, 1982). Low compliance has been found in patients attempting recommended lifestyle changes, taking prescribed medications, and keeping scheduled appointments with medical professionals (Sackett & Snow, 1979). The noncompliant patient, compared to the compliant one, costs some four times or more to treat, and has double the number complicating episodes (Ulmer, 1982).

In exercise programs, noncompliance is particularly obvious (Haynes,1984). Of the 800,000 Americans who survive an acute myocardial infarction each year, at least 300,000 are at low risk of reinfarction or death and have no limiting medical or musculoskeletal conditions (DeBusk, 1986). Yet, current estimates indicate that no more than 15 percent of patients who have had an acute myocardial infarction currently participate in group training programs (DeBusk, 1986).

High participant dropout rates are typically observed in clinical exercise settings: these generally approach or exceed 50 percent within six months of initial involvement (Dishman, 1982). Oldridge (1982) reviewed cardiac rehabilitation programs and found participant dropout rates ranged from 15 percent to 85 percent. A majority of investigations reported 30 percent to 50 percent of the participants dropped out within 12 months, and 45 percent to 80 percent dropped out within 48 months (Oldridge, 1982). Dishman (1982) suggested participant dropout rates are typical in clinical exercise settings and these generally approach or exceed 50 percent.

Bruce et al. (1976) described 58 percent of men and women dropped out of the CAPRI program an average of 8.6 months for men and 5.7 months for women. There was a gradual decline in attendance and after three years less than 30 percent were active (Bruce et al., 1976). Oldridge et al. (1978) found only 57 percent of the men enrolled in a cardiac rehabilitation program complied with the protocol for at least 12 months and after 3 years, only an estimated 35 percent continued. Carmody et al. (1980) examined male cardiac patients enrolled in a physical exercise rehabilitation program for 40 months. Thirty percent of the participants left the program within the first 4 months and only 57 percent remained in the program at the end of 12 months. After the 40-month period, less than 20 percent of the original sample continued (Carmody et al., 1980).

A Canadian cardiac rehabilitation exercise facility indicated one of the higher compliance rates of 83 percent for an average of 36.5 months of follow-up (Shephard et al., 1981). Wilhelmsen et al. (1975) indicated that four years after their myocardial infarction only 12 percent were training at the hospital and 36 percent were training on their own. Not only did adherence lower by attendance rate, but those adherers participating at all was also lowered (Wilhelmsen et al., 1975).

Long-term maintenance of compliance of cardiac exercise programs has proven to be a major problem (Carmody et al., 1980). It appears that the likelihood of staying with exercise may be largely determined within the first months of involvement (Dishman, 1982). The majority of dropouts of cardiac rehabilitation exercise programs occur during the first three months (Carmody et al., 1980). This resembles the relapse curve found in addictive behaviors, such as, smoking, alcohol, and heroin addiction (Carmody et al., 1980; Dishman, 1982). However, Oldridge, (1982), cautioned health personnel not to interpret that dropping out of an exercise program means the individual has dropped out of exercise. Among the dropouts, 38 percent men and 40 percent women continue to be active with informal activities (Bruce et al., 1976). After a 6-month exercise program for individuals with coronary heart disease, 80 percent of compliers and 50 percent of the dropouts self-reported they were exercising 12 months later (Oldridge & Spencer, 1985).

Likewise, mere attendance at exercise sessions, or home participation, does not constitute adequate exercise adherence (Martin & Dubbert, 1985). During a cardiac rehabilitation program 90 percent of the men spent at least 1 minute above or below their assigned target range. Thirty-three percent exceeded their prescribed range of exercise heart rate and another 25 percent exercised below their prescribed range during at least half the entire aerobic session (Ewart et al.,1986).

The high percentage of noncompliers is a concern. Recidivism appears to preclude much of the health benefits which exercise can offer (Dishman, 1982). Those found at greatest risk of another myocardial infarction (Oldridge et al., 1978) or cardiac arrest (Hossack, 1982; Hossack & Hartwig, 1982) is the person most likely to be an early noncomplier (Oldridge et al., 1978) or a poor complier, particularly, to prescribed training heart rates (Hossack, 1982; Hossack & Hartwig, 1982). Seventy-one percent of those who suffered a cardiac arrest failed to comply with their training heart rates in 25 percent or more of all exercise sessions (Hossack & Hartwig, 1982).

To be in compliance of exercise, the exercise performance must meet the specific exercise prescription. Exercise is a continuum that includes measures of intensity, frequency, duration, and mode of exercise participation (Martin & Dubbert, 1985; Ice, 1985).

Many with coronary artery disease leave the hospital with a strong desire and intend to follow their prescriptions regarding life style behavior change (Leventhal, 1973; Miller et al., 1985; Martin & Dubbert, 1982; McMahon et al., 1986). Mayou et al., (1978b) suggested about one-third planned changes in their lives as a result of their heart attack.

> Newton et al. (1985) described: those individuals hospitalized with a myocardial infarction. Sixty-seven percent of those responding indicated a desire within the first year after their myocardial infarction to increase their exercise behavior after their hospitalization. These patients' had perceived lack of exercise as a contributing factor to their myocardial infarction, but one year later their behavior change did not relate to their attitude during their hospitalization (Newton, 1985).

The majority do not turn their beliefs into action (Oldridge, 1984c; McMahon et al., 1986; Newton, 1985).

> Oldridge (1979) suggested the prime motive after a heart attack was fear, personally perceived benefits, or recommendations by others. As time increases without complications, the person loses the immediacy of the fear motive and focus less on potential problems of recurrence. This likely accounts for the higher dropout rates for those after a heart attack than apparently healthy individuals. Those healthy, volunteer probably because of a general belief in the health value of regular physical activity (Oldridge, 1979).

In an era when efficacious therapies exist or are being developed at a rapid rate, it is truly discouraging that one-half of patients for whom appropriate therapy is prescribed fail to receive full benefit through inadequate adherence to treatment (Haynes, 1976). What happens to that desire? Health professionals ideally want to capitalize on the high degree of motivation and anticipated behavior change (Carleton, 1979). But, what methods can we employ to maintain that eagerness that was present during their hospitalization?

Participation in cardiac rehabilitation exercise programs has produced disappointingly few long-lasting changes in habitual physical activity or other health behaviors (Oldridge, 1982). All of the presently known risk factors for coronary heart disease have significant behavioral and habit pattern components. It is unlikely that treatment in coronary heart disease will be successful if psychological and behavioral aspects are ignored (Leventhal, 1973). Ultimately, this responsibility of behavior change must rest upon the individual himself. But, this does not exclude health professionals of their responsibility: to provide professional guidance. Failure of professionals to recognize the multiplicity of steps needed to alter an attitudinal-behavioral system undoubtedly causes the failure of many campaigns to change behavior (Leventhal, 1973).

Changing long-standing health-destructive behavior into anti-coronary health-promoting behavior is a difficult task (Ice, 1985). The critical time of exercise dropouts is within three to six-months of initial involvement (Dishman 1982; Martin & Dubbert, 1985). The dropout rate tends to plateau or stabilize at this point then, gradually decline with time. A critical question facing health care professionals no longer relates exclusively to the potential benefits of exercise, but, also encompasses the problem of ensuring that exercise behavior becomes habitual for those who might benefit (Dishman, 1982; Oldridge, 1982). Exercise modifications require multiple decisions during the day, continuous internal monitoring and commitment. Old beliefs and behaviors must be extinguished and these solutions are complex (Given, 1984).

Even with the cardiac rehabilitation staff's enthusiasm, one must remember it is the person's decision whether he will accept and comply with the therapeutic regimen (Haynes, 1984; Peck, 1980). Ethically, the person has a right to accept or reject medical recommendations. Even people who voluntarily seek advice, does not constitute an implied acceptance (Peck, 1980). This choice must be respected (Peck, 1980).

Compliances of behaviors is not all positive and always good for the "patient." Compliance strategies have potentially negative effects of increased in dose-related side effects, the strategies, inasmuch as they interfere with an individual's usual method of handling health problems, might themselves cause psychological or social damage, and the possible labeling of people who do comply as " a cardiac patient" (Haynes, 1979c).

People should not be induced to comply on the basis of false claims of efficacy of cardiac rehabilitation exercise therapy (Haynes, 1984). Cardiac disease can strike regardless of the protective habits adopted and future problems may lessen even though one engages in poor habits. People need to be prepared to interpret such events. Statements of what is known and what are limitations is still the best protector of credibility, failure do so may discredit all messages (Eraker, 1984; Leventhal, 1973).

Although it is obviously the responsibility of the patients themselves whether to exercise, the staff of the program is responsible for providing adequate surveillance and support, and for incorporating appropriate motivational strategies to stimulate the patient to initiate and maintain a healthy life-style. The major responsibility of those who organize and supervise exercise rehabilitation programs may be to motivate patients to adopt a healthy life-style that includes safe exercise habits (Oldridge, 1984b).

> Strategies are needed which aid the person to consider adopting habitual physical activity, to improve their likelihood of long-term participation in physical activity, and to determine the efficacy of increased compliance. Specifically, compliance-improving strategies as optimizing the referral system, providing more accurate identification of the potential dropout, determining suitable strategies for better patient instruction and education, incorporating appropriate behavior modification techniques, improvement of program design, and better staff preparation are needed (Oldridge, 1982).

Rather than focusing attention on the noncomplier individual, the focus needs to shift to the facilities, organizations, and the people who provide the services. There is evidence that organizational change can prevent or reduce noncompliance problems (Gibson, 1979). Cardiac rehabilitation exercise programs that base the exercise prescriptions strictly on standardized thresholds of energy demand or heart rate may optimize physiological adaptations, but they may also minimize compliance if other biological and psychological characteristics of the exerciser are ignored (Dishman, 1982).

> Most rehabilitation efforts both underemphasize the psychosocial needs of persons with coronary heart disease, focusing more on the physical needs, and tend to exclusively stress increasing behavior that may have become less evident immediately after the coronary episode. More attention needs to be given to the impact of standard rehabilitation efforts on such psychosocial factors as self-image and depression, which in turn can dramatically affect levels of motivation and compliance (Gentry, 1979).

Noncompliance is a problem that must be addressed (Haynes, 1984). Knowledge of risk and motivation are important in initiating and maintaining behavior change aimed at risk-factor modification (Newton et al., 1985). Many of the most effective strategies for improving compliance utilize behavior modification principles (Haynes, 1979c). Behavioral strategies may be used to improve compliance at levels in the prevention stages of low compliance and include strategies to maintain high compliance (Dunbar et al., 1979). If health educators are to facilitate participant self-responsibility, it is important they have an understanding of important motivational factors and the skills to implement motivational training (Alderman, 1980).

The survivors with angina, post-myocardial infarction or coronary insufficiency due to coronary disease are in need of support, psychological and physical. They need training, education, and comprehensive risk factor reduction to return to an active and self-sufficient role (Fox, 1979a).

Noncompliance of cardiac rehabilitation exercise therapy is a problem shared by the individual needing the behavioral change, but also the responsibility of the medical profession. Thus far, a national program defining how to manage these patients appropriately has not been developed (Fox, 1979a).

Reference guidelines have been provided by the American Heart Association (1975) and the American College of Sports Medicine (1985).

> Little has been addressed in the areas regarding standardized guidelines for program certification, criteria in staffing, credentials, protocols and procedures, equipment use, quality control, and provision of information pertinent to the third-party carriers. Established national guidelines for cardiovascular rehabilitation programs are needed, with respect to personnel qualifications or licensing; facility qualifications and certification; administrative and organizational policies; patient education definition programming, quality assurance, design, and administration; and standardization of phases for inpatient, outpatient, and community rehabilitation. In addition, national guidelines are needed for patient-care policies regarding description of services for each phase, medical emergency responsibilities for staff and facility, criteria for patient admission for each phase, clinical record documentation and recall, progression of patient throughout all phases, and plan of treatment and its specific goals, including

amount, mode, frequency, and duration of services (Meyer, 1985).

CHAPTER II

SIGNIFICANCE OF THE PROBLEM

If the health professionals in cardiac rehabilitation promote the active responsibility of the participant, while accepting their own responsibility, is it acceptable for staff to be without specific guidelines? Poor compliance in exercise therapy may be due, at least in part, to ineffective guidance by the cardiac rehabilitation staff. Guidelines and motivational cardiac rehabilitation programs when present are inconsistent and many inadequate. How can health professionals expect individuals to be compliant when there is so much inconsistency in cardiac rehabilitation? Health professionals must know their direction before they may guide participants in the cardiac rehabilitation programs.

New therapies are increasing more frequent for coronary artery disease, but thus far long-term effectiveness are not conclusive. Coronary artery disease remains a progressive, degenerative disease, that kills thousands of individuals annually. It remains a very expensive disease. The research does not indicate cardiac rehabilitation has had much influence in life-style changes in its participants. The patient entering a cardiac rehabilitation program requires assessment, and a great deal of counseling and care. While this diminishes as the patient better understands the rehabilitation process, his symptoms and as his physical condition improves, these costs of entering a rehabilitation program are high (Pyfer & Doane, 1973). Most exercise rehabilitation programs are self-financing and for optimal financial and administrative organization, it would be valuable to identify the potential noncomplier and offer special advice to promote maintain long-term compliance (Oldridge et al., 1978). And what about the person with coronary artery disease? What happens to them when the majority of individuals dropout of cardiac rehabilitation within the first three months?

Third-party payers that reimburse for cardiac rehabilitation services are questioning the justification of such programs. The implementation of diagnosis-related groups (DRGs), health maintenance organizations (HMOs), and the general concern for the cost of health care are creating a necessity to provide socioeconomic answers that society is asking of health care, including cardiac rehabilitation (Meyer, 1985). For many, their attitude is cardiac rehabilitation is nice, but not necessary (Smith, 1986). How can such programs be justified when the majority of the participants dropout? If such programs are to exist and provide the services potentially available, then ways to affect compliance need to be identified.

The significance of this problem is for cardiac rehabilitation professionals to provide proper and effective guidance of exercise therapy motivation to individuals with coronary artery disease, they must utilize guidelines based on researched and evaluated theories. The first step in this process is a literature review and development of guidelines to be evaluated. The purpose of this paper is to research and develop a motivational exercise therapy program for individuals with coronary artery disease.

CHAPTER III

THE PROBLEM

Statement of the Problem

This paper proposes to identify and develop guidelines of an exercise program for individuals with coronary artery disease for future evaluation and review by cardiac rehabilitation professionals; and to base these guidelines on principles of behavior modification, motivation, compliance, cardiac rehabilitation patient psychology, existing cardiac rehabilitation programs, exercise physiology of cardiac rehabilitation participants, and legal concerns in cardiac rehabilitation exercise.

Statement of the Subproblems

1. The first subproblem. The first subproblem is to determine by literature review and professional experience the psychological aspects promoting motivation and compliance of exercise therapy in outpatient cardiac rehabilitation exercise programs. Professional experience will be supplemented by observations the researcher has observed in a cardiac rehabilitation program.

2. The second subproblem. The second subproblem is to examine by literature review and professional experience the principles of exercise as applied to the coronary artery disease patient in endurance, strengthening, and flexibility training. Professional experience will be supplemented by observations the researcher has observed in a cardiac rehabilitation program.

3. The third subproblem. The third subproblem is to determine what are the legal responsibilities of the cardiac rehabilitation staff in preparing, conducting, and providing individual guidance in a cardiac rehabilitation post-hospitalization exercise program.

4. The fourth subproblem. The fourth subproblem is to develop guidelines of an exercise program for individuals with coronary artery disease utilizing the literature review and professional experience. Professional experience will be supplemented by observations the researcher has observed in a cardiac rehabilitation program.

Delimitations

The individuals examined in this project will be those men and women between the ages of 30 to 70 years of age and who have documented coronary artery disease, diagnosed by a physician within the previous ten years. This may be manifested as stable angina pectoris or myocardial infarction, or individuals receiving the treatment of coronary artery bypass graft surgery and/or percutaneous transluminal coronary angioplasty. This project will consider methods to enhance motivation and compliance during a period of one year following an individual's initial meeting with the cardiac rehabilitation staff in the outpatient cardiac rehabilitation program.

Limitations

1. This paper will be based on the available literature review and professional experience in existing cardiac rehabilitation and other exercise programs.
2. This paper will not attempt to evaluate by experimental research the effects or the effectiveness of the program developed.
3. This paper will be limited to an aerobic exercise program of walking or bicycling for individuals with coronary artery disease.
4. This paper will be limited to a strengthening program of circuit-weight training and will not attempt to compare this training with other strengthening programs.
5. This paper will be limited to examples of major muscle groups to aid increase flexibility.
6. This paper will not attempt to distinguish the different diagnoses possible in coronary artery disease and potential different exercises for the different diagnoses beyond basic safety considerations.

Assumptions

1. The first assumption. The first assumption is that the value of aerobic, flexibility and circuit-weight training exercise in cardiac rehabilitation programs is established.

2. The second assumption. The second assumption is that current practices and techniques to increase compliance to cardiac rehabilitation exercise of value are discussed in published literature.

3. The third assumption. The third assumption is that the published literature is representative of the current practices and techniques to increase compliance in cardiac rehabilitation programs.

4. The fourth assumption. The fourth assumption is that small communities and large metropolitan cardiac rehabilitation programs use similar theories and techniques to aid compliance.

Definition of Terms

Aerobic Exercise. Aerobic exercise is that exercise designed to promote optimal ability of the body to take in, transport, and utilize oxygen (Sharkey, 1979).

Behavior Modification. Behavior modification is the systematic application of behavioral principles to human problems (Redd, et. al., 1979), that will be applied to promoting compliance of exercise therapy in the individual with coronary artery disease.

Cardiac Rehabilitation. Cardiac rehabilitation is the process concerned with the full development of each cardiac patient's physical, mental, social and vocational potential. It is designed to restore the patient to an optimally productive, active and satisfying life as soon as possible after the recognition of coronary heart disease. Rehabilitation of the individual should include diagnosis, medical and surgical treatment, assessment of physical, social, emotional, educational and vocational resources of the patient and the provision of any services or training needed to provide optimal restoration. It should include measures to prevent progression of coronary artery disease (American Heart Association, 1977). Cardiac rehabilitation will be equated with the long-term care of survivors of myocardial infarction, angina pectoris, coronary artery bypass graft surgery, and percutaneous transluminal coronary angioplasty.

Cardiac Rehabilitation Exercise Program. Cardiac rehabilitation exercise program will be the aerobic, strengthening and flexibility components utilized in the cardiac rehabilitation program.

Circuit Weight Training Exercise Program. Circuit weight training exercise program refers to the performance of a series of weight-lifting exercise routines using a moderate load with frequent repetitions (Kelemen et al., 1986) that is designed to produce modest increases in maximal aerobic power and muscular strength and decreases in body fat (Gettman et al., 1982).

Compliance. The extent to which a person's behavior (in terms of executing lifestyle changes) coincides with medical or health advice. The term adherence may be used interchangeably with compliance (Haynes, 1979a). Compliance of exercise therapy will be considered appropriate for the cardiac patient if the type, frequency, intensity, and duration criteria are appropriate for the level of recovery and physical capabilities of that patient (Ice, 1985).

Coronary Artery Disease. The atherosclerotic process occurring in the coronary arterial blood vessel system. This process may be manifested by stable angina pectoris, myocardial infarction, or the treatment of coronary artery bypass graft surgery, and/or percutaneous transluminal coronary angioplasty as diagnosed and treated by a physician.

Exercise Program. An exercise program is a routine of participating in those exercises that will promote the primary components of muscular fitness: strength, endurance, and flexibility (Sharkey, 1979).

Flexibility Exercise Program. Flexibility is the range of motion about a joint as opposed or resisted by one's bones, muscles, ligaments, tendons and skin that limit this movement (Mathews & Fox, 1976). Flexibility is an exercise program designed to optimize this range of motion of an individual.

Motivation. Motivation determines one's selection and preference for an activity, the duration of training, the effort invested in an activity, and the performance in an activity by an individual (Suinn, 1980). It is the ability to initiate, sustain, and terminate the exercise behavior (Oldridge & Stoedefalke, 1984) and is inferred from observations of performance.

Organization of this Paper

The organization of this paper will include a review of the related literature and a method of evaluating the articles referred based on established criteria. An aerobic, circuit-weight training, and flexibility exercise program will be developed based on this research for those individuals described in the delimitations. The emphasis of this program will be motivational with suggested guidelines for the participants and program staff. The following objectives are to be met:

1. The first objective. The first objective of this project is to develop written, chronological guidelines for individuals with coronary artery disease as determined potential considerations to promote compliance and motivation of exercise therapy in outpatient cardiac rehabilitation programs.

2. The second objective. The second objective of this project is to develop written exercise guidelines for use in an outpatient cardiac rehabilitation program of walking, bicycling, flexibility, and circuit-weight training for individuals with coronary artery disease.

3. The third objective. The third objective of this project is to develop recommendations for program supervision to promote compliance and motivation of exercise therapy.

4. The fourth objective. The fourth objective of this project is to develop suggestions of assessment of individuals with coronary artery disease.

5. The fifth objective. The fifth objective of this project is to develop the above guidelines with the legal considerations important in a cardiac rehabilitation exercise therapy program.

CHAPTER IV

CRITERIA FOR EVALUATION OF LITERATURE REVIEW

In assessment and decision-making, adequate research and evaluation is the only way to make rational choices between alternative practices, to validate improvements, and to build a stable foundation of effective practices as a safeguard against faddish but inferior innovations (Isaac and Michael, 1980). An outpatient cardiac rehabilitation exercise program is a medically prescribed exercise therapy designed for individuals with documented coronary artery disease. These individuals are entitled to safe, effective medical-psychological treatment and care. To provide this care, it is important for professionals to base this treatment and care on acceptable theories and effective research. Much has been published of coronary artery disease and its related treatment. Professionals must be critical of theories and research published. This study will be based on previous research and theories from many authors. To evaluate the existing research, several criteria have been identified to distinguish those publications value by most professionals in the field of cardiac rehabilitation.

A. Journals and Publications:

Journals considered valuable in the professional areas of medicine, science, psychology, and law will have highest priority. These will include those publications supported by professional medical, science, legal, and psychological organizations. These journals generally provide a method of critical peer review and discussion via editorials. Many of these publications include journals sighted in abstracts such as the Cumulative Medicus Index, Psychological Abstracts, West's General Digest or Current Law Index. There are some journals not included in these abstracts, such as Journal of Cardiopulmonary Rehabilitation. Journals such as this, will be included as publications based on sound principles of research and theories as related to cardiac rehabilitation. Only primary sources of reference will be utilized.

Journals generally include the most recent theories and research. While books are important contributions, they generally take several years longer to study and publish the materials. Books written by noted authors will be considered, but a lesser priority.

Other journals not listed in the professional sciences and legal abstracts, but focusing on the health and fitness sciences will be considered next priority. Journals such as Journal of Health Physical Education Recreation or Physical Educator are included in this category.

Finally, all other journals for lay individuals will be considered, but of the lowest priority. These publications are generally included in the abstracts, such as Reader's Guide to Periodic Literature. Journals such as American Health or The Ladies Home Journal is included in this category.

B. Authors:

Authors considered reputable in one's field of expertise writing publications or belonging to professional organizations will be considered highest priority. This will be indicated by authors quoted as references in other journal and book publications. Authors less well-known, but with important contributions will be considered high, but slightly less priority. Important contributions are based on the criteria discussed.

C. Important Publications:

Publications based on research utilizing acceptable methodology and scientific research will be considered highest priority. This criteria will include:

1. Those articles describing an introduction based on acceptable research designs (Isaac and Michael, 1980) and a well-defined purpose
2. Those articles describing methodology such as random sampling, control/experimental groups (not volunteers), utilizing pre-post test experimental design, and with potential replicability
3. Those articles describing their population and methods of testing based on reliable and valid instruments
4. Those articles describing results and conclusions based on their

described hypothesis, and with important contributions and potential applicability to a cardiac rehabilitation population

5. Those articles examining behavior changes of a population over long-term research of, for example, greater than six months. Short-term research will consider those studies of examining behavior changes less than six months.

D. Subjects

Those publications based on studies of the subjects described in the delimitation section of this paper will be given highest priority. Criteria of these subjects will include:

1. Male and female subjects
2. Ages between 30 to 70 years
3. Those individuals with documented coronary artery disease based on a medical physician's diagnosis. Greater preference will be given to subjects based on this criteria rather than "healthy subjects"
4. Those individuals examined within the first ten years after the diagnosis of coronary artery disease was determined. Greater preference will be given to those researches in which examine individuals with a documented myocardial infarction or coronary artery bypass graft surgery within a eight-week period and continue intervention for a period of time at least six months.

CHAPTER V

REVIEW OF RELATED LITERATURE

Psychological Healing in Coronary Artery Disease

Cardiovascular disease is a frightening, chronic disease; a rude awakening of an awareness of one's mortality. There is no known cure, only treatment. The treatment depends not only on the physical consequences of coronary artery disease, but also on the individual and how well he can adjust to living with the implications of his disease (Cay, 1982). Fortunately, for many, they are able to return to a full normal life after a coronary event (Mayou, 1983) and long-lasting emotional distress, familial problems, and occupational maladjustment are present in a minority (Doerhman, 1977; Cay, 1982). But when these emotional difficulties are experienced as a result of a coronary artery disease event, they tend to persist and contribute to a poor recovery (Cay, 1982; Rosenman, 1982).

Recovery depends on the person's interpretation of his illness and the adequacy of his psychological coping mechanisms (Cay, 1982; Krantz, 1980; Rosenman, 1982). To cope and survive this illness, individuals and their families adapt and undergo an emotional healing process. When they attend a cardiac rehabilitation program individuals may be in different phases of their emotional recovery. This process and its implications for care of the person is important for professionals working in cardiac rehabilitation programs to understand.

A review of the literature related to the psychological healing in coronary artery disease and its related manifestations will be examined. During a literature search, the author was unable to locate information relating to emotional and psychological healing for individuals undergoing a percutaneous transluminal angioplasty. Much of the information was related to individuals with a myocardial infarction as compared to literature written on the emotional adaptation of persons treated by coronary artery bypass surgery (Soloff, 1978-1979). When specific literature was identified, a notation will be made.

In general, overall mortality is related to the severity of the underlying coronary artery disease and the extent of myocardial damage (Kannel, 1981; DeBusk, 1986). Mortality rates after a myocardial infarction (including sudden deaths) are high. Without warning, sudden death, usually ventricular fibrillation, is the first manifestation in 20 percent of individuals who have coronary artery disease (Kannel, 1981). An estimated 35 percent of men and 47 percent of women die within the first year, the majority within the first month (Kannel, 1979). After the first year, post-myocardial infarction mortality rates average four percent (Luria et al., 1985), to 15 percent (DeBusk, 1986) per year. In the next five years, thirteen percent of men and 40 percent of women will experience a second myocardial infarction (Kannel, 1981). At a five-year follow-up period, about 68 percent post-infarction individuals survived and at 10 years, only about half survived (Luria et al., 1985). Ultimately, most die from ventricular fibrillation (Hammond, 1985).

Percutaneous transluminal coronary angioplasty treatment has a restenosis rate as high as 33 percent and does not appear to retard the atherogenic process (Reeder et al., 1984), further increasing the risk of a subsequent myocardial infarction. Even those undergoing coronary artery graft bypass surgery are at considerable risk of potential strokes, myocardial infarctions and death and, although valuable, this treatment does not retard the atherogenic process (Kannel, 1981). Of those undergoing a coronary artery bypass, angina was estimated to be completely relieved in 69 to 85 percent of the individuals (Jenkins et al., 1983), but progression of coronary artery disease was found to occur in most individuals (Frick et al., 1983). Some surgical results are less than optimal; patency of bypass grafts close potentially as early as during the immediate postoperative period, seven percent close in a three-week period (Frick et al., 1983) and five percent per year have recurrence of angina (Robinson, et al., 1984).

Psychologically, the acute ischemic event presents a massive disruption for the individual and his/her family (Doerhman, 1977; Davidson, 1979; Mayou et al., 1978a). Studies have suggested that even up to a year after a myocardial infarction individuals continued to experience psychological adjustments despite physical recovery (Bryne, 1984; Cay, 1982; Davidson, 1979; Mayou et al., 1978a; Mayou et al.,1978c; Stern et al., 1977; Wiklund et al., 1984a).

As with other coronary artery disease manifestations, coronary artery bypass surgery is described as a "profoundly disturbing" (Thurer et al., 1980-1981) and "an experience having tremendous emotional impact upon the person" (Jillings, 1978) period both before and after the actual surgery. Almost half reported the first postoperative months as a particularly bad time, but by six months postoperatively, this decreased to only eight percent. The majority are able to resume normal economic and social functioning (Jenkins et al., 1983). Sixty percent of the long-term survivors were extremely pleased with their surgical outcome 3.5 years later, only 4 percent were displeased (Kornfeld et al., 1982). Coronary artery disease manifestations represent possibly an unparalleled challenge for increased growth and awareness (Davidson, 1979; Rejeski et al., 1985) or they can become an enemy signaling personal weakness, loss and despair (Rejeski et al., 1985; Thurer et al.; 1980-1981).

Coping strategies encourage short- and long-term adaptation to illness (Gentry, 1979). True adaptation of a chronic illness is not static (Crate, 1965), but is a lengthy and ongoing process of stages (Crate, 1965; Miller, 1984). Some strategies are clearly successful while others may lead to maladjustment, and strategies helpful during the short-term may not be helpful during long-term adjustment (Gentry, 1979; Cohen, 1984). Adequate coping strategies can be taught, and if not taught, they can be encouraged (Hackett & Cassem, 1982). But, Cohen (1984) cautioned professionals to take into account specific situations when making judgments about whether coping processes are adaptive or maladaptive.

The physical severity of the heart attack, the degree of residual angina, or having a coronary artery bypass do not predict those who react negatively to their disease psychologically (Cay, 1982; Cay et al., 1972; DiMatteo & DiNicola, 1982; Gundle et al., 1980; Radley & Green, 1985; Ramshaw & Stanley, 1981; Thurer et al., 1980-1981). The psychological responses of people either preoperatively or postoperatively were unrelated to duration of heart disease, age, or severity of cardiac disease (Kimball, 1969). Those most upset and who had psychosocial problems were not always the ones who had the most severe cardiac problems, either past or present (Cay et al., 1972; Mayou et al., 1978b; Wiklund et al., 1984b).

> Krantz, (1980), described (as summarized) the determinants of adjustment after myocardial infarction as physical variables, such as the severity of myocardial infarction, the intensity of symptoms, and one's physical activity; psychological variables, such as one's perception of his health, his fear of reinfarction, anxiety or depression experienced, and locus of control; sociological and demographic characteristics, such as age, socioeconomic status, pre-myocardial infarction work, money available for early retirement; and characteristics of the health-care system, such as information or misinformation provided by the physician (Krantz, 1980).
>
> But, ultimately (as summarized) the response to illness by a person depends upon the meaning of the illness to him. Intrapersonal factors such as personality, life history, and emotional state at the time of the illness onset; interpersonal factors such as quality of the person's relationship at the time of the illness onset and during illness; and the presence of absence of social supports; sociocultural factors; and pathological-related such as the kind or degree of physiologic dysfunction, all influence one's meaning of illness (Steinhart, 1984).

More important than the actual disease, is the person's perception and coping response to his disease (Gundle et al., 1980; Ramshaw & Stanley, 1981; Steinhart, 1984; Thurer et al., 1980-1981). One's emotional recovery and the assumption of a 'well' role in his family and society is the key to successful rehabilitation (Jillings, 1978). A person's satisfaction rather than sheer amount of activity is the goal of cardiac rehabilitation (Jenkins et al., 1983).

The emotional response to a coronary crisis is shaped largely by two sources of psychological stress. The first, which occurs during the acute phase, is the immediate threat to life. The second is the threat that coronary heart disease will irreparably alter the person's life-style and livelihood (Hackett & Cassem, 1973). It is this perception of their excessive severity of infarction and excessive vulnerablity to sudden death or another infarction that continues to psychologically disable men and women (Steinhart, 1984; Wenger & Fletcher, 1985). One's prognosis seem to depend more whether these remaining fears and anxieties are amenable (Pilowsky et al., 1978).

Stages of adaptation to chronic illness have been identified (Crate, 1965; Miller,1984; Bramoweth, 1983). The individual with coronary artery disease may experience any or all of these responses, but not necessarily in the same sequence or intensity (Davidson, 1979). The first reaction to pain is shock and disbelief (Crate, 1965; Miller, 1984) and is the first time the persons learns of the situation (Bramoweth, 1983). This is often a foggy time and the individual seemingly floats along in blissful ignorance, unable to recognize implications and accept reality of the situation (Bramoweth, 1983; Cay, 1982; Crate, 1965; Davidson, 1979; Hackett & Cassem, 1973; Leech, 1976; Miller,1984; Spicer, 1983). Kimball, (1969) described this period for some prior to coronary surgery in which the person was amnesic, but oriented, passively cooperative, had 'affectless' facial expressions and made no attempt to engage in spontaneous conversation or elaboration. It appeared as if they were afraid to move (Kimball, 1969). Individuals are generally cooperative with medical treatment and are a 'good patient' (Leech, 1976), quiet, well-behaved and easy to manage (on the surface) (Cay, 1982). The reaction of disbelief is a necessary phase the the person must experience before being able to move through the process of adapting to coronary artery disease (Bramoweth, 1982).

In an effort to control his fears and protect himself as a person defenseless and vulnerable, anxiety and denial quickly follow (Crate, 1965; Miller, 1984). A common example of denial is during the prehospital phase (Bramoweth, 1983; Hackett & Cassem, 1973; Steinhart, 1984). Many times when the person has developed sudden, crushing pain, he holds to the conviction that it is indigestion and delays seeking medical assistance (Hackett & Cassem, 1973). Unfortunately, experience is not the best teacher. Even those with previously known heart disease have been identified as more anxious and have increased delay time than those without previously diagnosed coronary disease (Gentry & Haney, 1975; Kaufmann et al., 1985-1986). The time to seek medical assistance from the onset of symptoms is alarmingly high (Krantz, 1980), consistently lasting from three to six hours (Kaufmann et al., 1985-1986).

This is a dangerous time due to evidence that most deaths occur during the first two hours after the onset of symptoms (Rinker, 1986).

Anxieties and fears of a threatening illness and possible death, particularly during the first few hours following admission to the coronary care unit or following surgery, are extremely intense (Bramoweth, 1983; Jillings, 1978). This is a very normal reaction (Cay, 1982; Cook, 1979; Davidson, 1979; Hackett & Cassem, 1973). Anxiety is the most common emotion resulting from heart disease (Thomas et al., 1983). During this time of admission to the coronary care unit, the diagnosis of a myocardial infarction may not be known. But there appears to be little difference of anxieties and emotional upset between those suffering a myocardial infarction and those with only an ischemic event (Cay et al., 1972), regardless whether a myocardial infarction occurred (these could potentially included angioplastied individuals). Those who needed to be rehospitalized had more fears and adjustments (Stanton et al., 1984).

Anxieties and fears usually peak within the first few days (Cay, 1982; Cook, 1979; Davidson, 1979; Hackett & Cassem, 1973). Most anxieties during this time generally stem from the threat of sudden death (Hackett & Cassem, 1982), pain, and the unknown. Ischemic pain has been described as intolerable to just a mild discomfort. Fear may not even appear until the unsuspecting person is admitted into the hospital when wires and tubes are applied to "a body". These procedures cause pain. From a professional view, it takes a special focus to remember the person under the drapes. Defibrillation procedures are that applied to the heart are extremely painful. Even when persons appear to be unconscious, some are able to feel the pain. One lady during a discussion, was considering requesting never to have a defibrillation done even to save her life. "I don't want to go through that ever again."

Anxiety may be acknowledged by the person as admitted nervousness and apprehension (Cook, 1979). Individuals may be only able to comprehend simple instructions. But often anxiety is manifested possibly by excessive talking, an inability to concentrate, understand, or retain information (Cay, 1982; Davidson, 1979), and by physical restlessness, muscular rigidity, tremulousness, or diaphoresis (Davidson, 1979). Anxiety can present with unexplained rise in pulse rate or blood pressure, an overdependency, a curiosity, aggression, or a projection of feeling to others. The person may appear merely to be overconcerned with his symptoms, bodily functions or medications (Cay, 1982; Cook, 1979).

The increased sympathetic arousal that occurs in certain states as anxiety, depression, and anger is potentially hazardous (Kaufmann et al., 1985-1986; Rosenman, 1982). Persons manifesting considerable preoperative anxiety (or depression) have a greater chance of not surviving surgery and have greater morbidity after surgery than others (Kimball, 1969). If left untreated, anxiety may precipitate lethal arrhythmias, exacerbate pain, worsen heart failure, disrupt needed sleep, and contribute to the development of delirium (Kaufmann et al., 1985-1986). All of which increase the myocardial work demand, opposite treatment during the acute phase. During the acute phase the main concern is to lessen the oxygen demand of the myocardium, thereby lessening the extent of myocardial ischemia or damage.

Anxiety, even at a preconscious level, may persist for months and years after an myocardial infarction (Davidson, 1979). About one-fourth studied continued to be anxious six weeks post-infarction and most of those continued to be anxious through the following year (Stern et al., 1977). Similarly, for the person postoperatively, an estimated one-third admitted experiencing residual anxiety (Jenkins et al., 1983; Thurer et al., 1980-1981) four months later (Thurer et al., 1980-1981). Ramshaw & Stanley, (1981) suggested postoperative feelings of nervousness, fear, inability to cope, and lack of confidence have continued 12 to 27 months after surgery in an estimated nine percent (Ramshaw & Stanley, 1981). Gentry, (1979) suggested those who are extremely anxious over the possibility of recurrence of acute illnesses and death are unlikely candidates for a cardiac rehabilitation exercise programs and tend to be more frequent dropouts.

The person fears his future, whether he can function as a spouse, parent, and citizen, and if he has sufficient health, strength, energy, ability, and independence to perform normal activities (Hackett & Cassem, 1982; Leech, 1976; Stern et al., 1977). A person's ego, self-esteem suffer and his personal identity is vulnerable. For example, he may fear his loss of job, loss of earning power, aging and subsequent physical deterioration, exercise or perform sexually (Davidson, 1979; Gentry, 1979; Kaufmann et al., 1985-1986). Gentry, (1979) described coital death as one of the major fears, unrealistic for the most part, of the person with coronary artery disease and their spouse. Myths associated with coronary artery disease occupy much thought in the person's mind (Hackett & Cassem, 1982). Most do not ask directly for important information, and rather search for answers in professional expressions and other indirect messages (Davidson, 1979). After hospital discharge, many of these anxiety-provoking thoughts continue to worry individuals and their families, but are associated with other feelings and situations. These will be discussed later.

More commonly, denial characterizes the second stage to cope and relieve fears (Bramoweth, 1983; Cay, 1982; Crate, 1965; Davidson, 1979; Hackett & Cassem, 1973; Leech, 1976; Miller, 1984; Spicer, 1983). Denial can reduce a person's anxiety (Hackett & Cassem, 1973; Krantz, 1980), decrease the sensation of pain, and ultimately lessen the myocardial workload (Steinhart, 1984). Early in the illness, denial may aid to allow for better coping (Davidson, 1979; Krantz, 1980; Soloff, 1977-1978).

Denial may be manifested by persons who react (seemingly) inappropriately to the situation (Bramoweth, 1983; Kaufmann et al., 1985-1986; Krantz, 1980). They deny their feelings associated with having an ischemic event i.e., fear, anger, anxiety, etc. (Cook, 1979). As one man described, "I was the funniest man in the room (cardiac catherization lab). I was cracking jokes like you wouldn't believe. But, I couldn't stop. I knew it was serious, but I couldn't stop."

By the second or third day of hospitalization, the individual usually feels better, but may continue to use denial (Kaufmann et al., 1985-1986). Kimball, (1969) described preoperatively an euphoric group ("denial par excellence"), enthusiastic and describing surgery as 'nothing at all.'

> Thurer et al., (1980-1981) (as summarized) reported high levels of denial were present in many preparing to undergo a coronary artery bypass surgery procedure. Most of the individuals could not face the implication of bypass surgery. Before surgery, the use of denial was most common, approximately 50 percent

> considered in the 'maximal denier' group. They consistently denied feelings of apprehension about the impending operation, despite displaying symptoms of emotional tension. Individual's level of anxiety and denial of open heart surgery was so extreme that they had a defensive misconception and distortion of the procedure itself. They wrongly described the heart as being cut open and/or removed from the body, yet most claimed they received as much information as they wished. The individuals in this group also used other defense mechanisms, as rationalization, to cope. None regretted having surgery and described it as fulfilling their expectations, but they could not identify what the operation had accomplished or what they had gained. Individuals decided to have surgery and risked their life even though many had difficulty identifying what the operation had accomplished and could identify little apparent gain (Thurer et al., 1980-1981).

Specifically for those undergoing coronary artery bypass, approximately one-third developed postcardiotomy delirium during their hospitalization. This occurred more frequently in persons who were in a denial state, overtly anxious, depressed, and in those with poorest comprehension of his situation (Merwin & Abram, 1977).

Cognitive dysfunction (and emotional difficulties) frequently follows coronary bypass surgery, but this is usually a temporary phenomenon (Jenkins et al., 1983). In two studies, memory difficulties occurred in 15 percent (Ramshaw & Stanley, 1981) and 29 percent (Thurer et al., 1980-1981) postoperatively. Also, about one-half of the individuals described confusion and disorientation postoperatively (Thurer et al., 1980-1981). Abnormalities of intellectual function (motor-visual-spatial performance, attention span and concentration) during the early postoperative period occurred frequently, but these disappeared within six to eight weeks and were unrelated to higher levels of depression and/or anxiety (Raymond et al., 1984). Most regarded these effects as still insufficient as compared to the beneficial effects of surgery (Ramshaw & Stanley, 1981).

In long-term recovery, denial may be maladaptive, with some individuals maintaining this stage of recovery (Bramoweth, 1983; Soloff, 1977-1978). It is an attempt to fight against illness by retaining social activities, minimizing symptoms and the implications of the disease (Radley & Green, 1985). This may endanger individuals' chances for a satisfactory recovery

(Krantz, 1980) and may cause excessive physical stress, associated with heightened autonomic responses equal to those of anxiety or anger (previously discussed) (Gentry, 1979; Rosenman, 1982). Denial does imply a lack of introspection about the future, during a time in one's recovery in which some hope and optimism is important (Hackett & Cassem, 1973).

Denial may be manifested by people who intellectually acknowledge the occurrence of cardiac disease, but who refuse to comply with medical limitations and constraints, and react inappropriately (Bramoweth, 1983; Kaufmann et al., 1985-1986; Krantz, 1980). Individuals may avoid discussions regarding his/her cardiac disease, its severity, consequences, and significance (Davidson, 1979; Davidson & Maloney, 1985) or may repeatedly request information regarding his disease, but be unwilling to discuss his prognosis (Davidson & Maloney, 1985). Denial may be demonstrated through refusing to learn about heart disease, denying the presence of symptoms, disregarding medical advice, and minimizing possible effects of the illness upon lifestyle (Bramoweth, 1983).

The person demonstrating Type A behavior uses denial as a primary psychological defense mechanism (Gentry, 1979) to lessen uncertainty and anxiety, and gain mastery over their situation (Thurer et al., 1980-1981). The individual with type A behavior wants desperately to feel in control, and is often unaccepting of delays and excessively demanding. When he is not in control or not fully informed about plans for his care, he feels weak and very vulnerable (Jenkins, 1979).

> In the hospital, individuals identified as Type A were observed to be more alert and friendlier, more active, more competitive, more vocal about job concerns, including a desire to return to work, but more emotionally withdrawn while in the hospital. They displayed more self-initiative in their hospital care, which inturn was inversely related to a shorter hospital stay (Gentry et al., 1983).

Individuals with Type A behavior often find it difficult to accept that they have a cardiac disease and need changes in their lifestyle (Gentry, 1979). Many deniers may even increase their risk behaviors simply to show others that they 'have not had a heart attack' and that they 'are not the least bit worried' about their health (Gentry, 1979). Radley and Green, (1985) described the person's thoughts postoperatively as similar to: 'I don't like people to consider me as an invalid or ill, or to see me take medicine. I'll go until I drop.' They are likely to increase their vocational and avocational activities after a coronary episode or surgery (Gentry, 1979; Kornfeld et al., 1982). Type A individuals are most likely to try to hasten the recovery process by cramming a month of recovery progress into a week (Jenkins, 1979). Individuals with higher Type A scores worked at a relatively higher percentage of their heart rate range and also experience greater improvement in MET capacity (Rejeski et al., 1984). Deniers after a heart attack averaged three weeks sooner return to work and had essentially good outcomes in the first year (Stern et al., 1977).

But, Type A behavior and the emotional response to acute myocardial infarction clearly are related to subsequent prognosis (Rosenman, 1982). In attempt to establish their independence, they often resist efforts at cardiac rehabilitation or are prone to dropout, tend to overexert themselves and misjudge their capacities, and engage in increased social and physical activities, resulting in a higher risk for recurring heart problems, orthopedic and muscular problems (Franklin, 1978; Gentry, 1979; Soloff, 1977-1978; Springer, 1985; Steinhart, 1984). Rosenman, (1982) suggested those with Type A behavior (men and women) used denial to suppress fatigue and underreport symptoms while performing tasks they believe more effort was required succeed or to cope with threats to their self-esteem (Rosenman, 1982; Carver et al., 1976). This type of behavior is strongly related to a fivefold higher risk of reinfarction (Rosenman, 1982) and a higher morbidity and mortality rate of recurrent and fatal heart attacks (Gentry, 1979; Gentry et al., 1983).

The optimal amount of control is to allow the person to cope with the stressful aspects of the illness without leading to unrealistic expectations or having the person make medical decisions beyond their capabilities (Steinhart, 1984). Intervention with Type A behavior should not be aimed at confronting denial (Gentry et al., 1983).

Shaw et al., (1985) found those with higher levels of denial gained less information about heart anatomy and physiology,

> after "teaching." The authors suggested this may reflect a healthy reaction as the person may not be ready to accept the full impact of this traumatic event. Information may be threatening and those of high denial may be less able to assimilate it. At a 6-month follow-up there were no differences. However, the authors found the repressors mismatched with high information were associated with poorer recovery outcomes in higher reported complications, lower total rehabilitation success, lower psychomedical functioning, and lower social functioning. The authors cautioned professionals against insisting rehabilitation information be conveyed to the individual with a heart attack (Shaw et al., (1985).

By the third (Davidson, 1979) to the fifth day (Kaufmann et al., 1985-1986), one's physiological condition has stabilized (Davidson, 1979). Maintenance of denial becomes increasingly difficult at this stage, and the person begins to develop an awareness of the reality of his illness and limitations (Crate, 1965; Miller, 1984; Bramoweth, 1983). Leech (1976) identified this stage as characterized by sadness, others described this stage as characterized by anger and depression (Krantz, 1980; Crate, 1965; Miller, 1984; Bramoweth, 1983; Spicer, 1983; Holub et al., 1975; Springer, 1985; Hackett & Cassem, 1973).

This stage does often represent the first step of some acceptance and change (Bramoweth, 1983; Davidson, 1979; Hackett & Cassem, 1982). Postoperatively, this occurred about the time the person was on the regular floor room. Kimball, (1969) suggested this as a necessary experience, a time for physiological and psychological adjustment and healing, and possibly a grieving for their suffering time (KImball, 1969). All individuals required some manner of reflection to contemplate the extent of their experience and to integrate the past with present events or feelings, including recalling complications or the course of events (Jillings, 1978). Initially, individuals were withdrawn and slept frequently, described as 'I could give into my fatigue' (Kimball, 1969). A lowering of mood described as depression (the major portion), the blues or a down day, increased anxiety and apprehension, denial, or anger may occur depending upon his perceptions of loss or threats to self-image (Jillings, 1978; Kimball, 1969).

Feelings of sadness and anger are normal (Leech, 1976) and often associated with depression after a cardiac event (Bramoweth, 1983; Mayou, 1983; Mayou et al., 1987b; Steinhart, 1984). Either real or imagined, the person believes he has lost a valuable part of himself that is irretrievable and lost forever (Cook, 1979; Hackett & Cassem, 1982; Leech, 1976; Leobel & Eisdorfer, 1984; Springer, 1985; Steinhart, 1984). Others grieve for the loss of their youth and faith in their longevity (Thurer et al., 1980-1981). Anger, the outrage, is due to perceptions of being ill and damaged, of being seen as useless and rejecting the disabled image, of the difficulty of learning to function again, of "Why me?" Why did this happen to me? (Leech, 1976). Postoperatively, one-third commented how difficult it was to accept activity restrictions (Jenkins et al., 1983). They resent this and their uncertain prognosis (Thurer et al., 1980-1981).

Depression develops as a result of the person not expressing his anger (Leech, 1976). The person may direct anger toward himself (depression), his family, or work, the hospital staff or his restrictive regimen (Cook, 1979). Expressions such as hostility (overt-anger, covert-depression), frustration, resentment, guilt, helplessness, oversensitive, or dependency may be expressed (Bramoweth, 1983; Crate, 1965; Hackett & Cassem, 1982; Miller, 1984; Springer, 1985). Individuals have been described as provocative, difficult and testy (Kaufmann et al., 1985-1986). Others described symptoms of depressions, such as a loss of appetite, feelings of fatigue, weakness, lack of energy for any activity, slowness, looks of sadness, brevity of speech, sleep disturbances, or easily upset (Cay, 1982; Davidson, 1979; Degre-Coustry & Grevisse, 1982; Gundle et al., 1980; Hackett & Cassem, 1973; Springer, 1985; Steinhart, 1984). Others reacted by restricting their social life, describing a lack of pleasure from close relationships and serious distortions of body image, demonstrating persistent dependency needs of varying severity and a low self-esteem (Gundle et al., 1980).

The person's loss of self-esteem and worries of his future and life often accompany depression (Davidson & Maloney, 1985). Most become withdrawn, feel discouraged, more passive and out of control (Stern et al., 1977). Ell and Haywood, (1984), emphasized the importance of one's sense of personal control. The person's sense of control accounted for greater variance among most outcomes one year later than illness severity, pre-illness stress, or social support (Ell & Haywood, 1984).

The person feels a hopeless resignation, a combination of the loss of social activity and the sense of being overwhelmed by the illness, a cardiac invalid. The person's life is dominated by his cardiac disease, wondering if he is alright or if something is going to happen (Radley & Green, 1985). The state of their physical body and well-being become more of a focus (Stern et al., 1977). As one man described after his heart attack, "I didn't think I'd ever stop thinking about the center of my chest. Before I did anything, I'd always stop and think about right there (the man pointing to the center of his chest)." Although after a coronary event, individuals perceived an increased awareness of their heart function, they show no higher awareness than approximated chance interpretations. But if perceived, most reported they were concerned of the palpitations (Jones et al., 1985).

Persons postoperatively are also more somatically sensitive during this phase of their recovery and are often acutely aware of their sternal incision (Davidson & Maloney, 1985; Marshall, 1985; Soloff, 1978-1979). Jillings, (1978) suggested the first four days after surgery as the greatest time of somatic focusing. The individuals' attention was on himself, his bodily functions, and rarely on others (Jillings, 1978). Some may confuse its residual pain later in recovery with recurrence of ischemic anginal pain (Davidson & Maloney, 1985; Marshall, 1985; Soloff, 1978-1979), sometimes difficult for staff to distinguish chest discomforts as cardiac or noncardiac. Individuals complain of abnormal skin sensations (paresthesias), numbness, and edema at the site of the removal of the saphenous vein. These fears and sensations, and fear of injury, such as the sternal incision breaking open, further contribute to a self-imposed activity restriction (Marshall, 1985; Soloff, 1978-1979). About one-fourth of those after surgery, continued to experience extreme fatigue and shortness of breath even though their angina had been eliminated or reduced. They identified changes in their life as negative, feelings of incompetence, and had a stoical acceptance of their life (Ramshaw & Stanley, 1981). Painful physical symptoms of surgery largely disappear for most by eight weeks (Bramoweth, 1983) to four months (Thurer et al., 1980-1981).

Fortunately, depression resolves for most in three months, but in some it results in long-term invalidism (Bramoweth, 1983; Davidson, 1979; Hackett & Cassem, 1973; Krantz, 1980; Wenger & Fletcher, 1985). This is the most formidable problem in cardiac convalescence and rehabilitation (Hackett & Cassem, 1973; Wenger & Fletcher, 1985). In most, three-fourths, in the coronary care unit this is an especially difficult time and depression should be considered even though not clinically obvious (Hackett & Cassem, 1973). Cay et al., (1972) examined emotional upset including depression, in persons admitted to a coronary care unit, whether they had a myocardial infarction or not. Those presumed to have myocardial ischemia differed from those with actual myocardial infarction in that they had even poorer work records, were more withdrawn socially (Cay et al., 1972). One-third of persons postinfarction are moderately to severely emotionally upset (Cay et al., 1972; Mayou et al., 1978b), anxiety and depression being the most common (Mayou et al., 1978b; Stern et al., 1977). This number tends to increase after subsequent attacks (Cay et al., 1972).

Postoperatively, one-third to 40 percent of those studied reported feelings of sadness, anger, resentful, or depression, or cried easily (Jenkins et al., 1983; Thurer et al., 1980-1981). After surgery, some described they had 'paid their dues' and were entitled to do as they pleased in relation to lifestyle changes (Thurer et al., 1980-1981). Soloff, (1978-1979) suggested that depression was dominate in the early weeks of the posthospital convalescence, but eased by the second month.

Long-term adjustment and resolution of these feelings usually occur after hospital discharge (Spicer, 1983), potentially during the cardiac rehabilitation phase.

> Comparing those medically and surgically treated, the medically treated group demonstrated significantly higher mood disturbance on tension-anxiety of depression, anger, fatigue, confusion, and total mood disturbance and lower vigor after hospitalization. There was no difference in denial scores between the two groups. After a 6-week cardiac rehabilitation training program, both groups had greatly reduced mood disturbances, but the psychological advantage was toward the surgical group. They reported less fear of recurrence, lower anxiety in terms of long-term chronic coronary disease, and less

mood disturbances postoperatively than the medically treated person. The author suggested this may be, partly, related to the person's misunderstanding of the long-term effects of this treatment (Soloff, 1978-1979).

Attitudes and patterns of illness formed during one's hospitalization are evident and greatly influence the individual and family upon returning home (Bryne, 1984). For both the individual and his/her family after hospital discharge is a time of anxiety, struggling, attempting to resolve the conflicts of dependency and independency (Springer, 1985). Exaggerated dependency and irritability often lead to tension and hostility within the home (Davidson, 1979).

On one hand, the individual has been cast in a sick role with intensive medical care and support (Springer, 1985). Do not drive. Do not carry even moderately heavy items (less than five to ten pounds). Be careful. Slow down and limit your activities (Stanton et al., 1984). Do not overdo, lest risking another cardiac event (and return to the hospital). On the other hand, individuals are expected to take responsibility for their own lives, to provide as much self-care as possible, and to resume typical vocational, familial, and social roles as soon as possible (Springer, 1985). One of the most commonly reported problems in family relationships is the feeling of being 'overprotected' (Stanton et al., 1984). This interfers with the newly disabled adult's genuine opportunities to experience the outer limits of his or her abilities (Leech, 1976) and may accentuate the person's depression (Wenger & Fletcher, 1985). Postoperatively, 36 percent believed they were overprotected in their family and about half reported that their family worried more about their health after surgery than before surgery (Jenkins et al., 1983).

To add to the difficulties, the family is frequently experiencing many similar feelings, especially fear, and adaptive changes (Sikorski, 1985) and may not the major support system, expected by the person with coronary disease (Bramoweth, 1983). The person may incorrectly interpret this overconcern as uncaring and an unsupportive. One man described his anger while awaiting surgery at his wife for not being supportive when he first had heart troubles 20 years earlier. However, this may be a positive time for an increased expression of feelings and a greater appreciation and understanding of each other (Mayou et al., 1978a; Sikorski, 1985).

To further compound problems, the person feels weak and tired upon returning home. The person's physical weakness 'dogs' every activity (Hackett & Cassem, 1982; Mayou et al., 1978a). This is usually a result of bedrest and inactivity, causing muscle atrophy. Those undergoing coronary artery bypass surgery often present for surgery in an already deconditioned state as a result of previous angina and fatigue (Marshall, 1985). Postoperatively, Jenkins et al., (1983), identified fatigue, weakness, and their physical status as those most commonly complained and a main source of difficulty.

The person, however, nearly always interprets this incorrectly as a sign of his cardiac damage, how sick he really is, and this is representative of his future (Hackett & Cassem, 1982; Mayou et al., 1978a; Kaufmann et al., 1985-1986). He/she begins to believe the "messages" and myths heard. This only increases feelings of anxiety, helplessness, feeling overly sensitive, and decreased self-esteem, depression, and with restricted activity interfere with active participation and recovery upon returning home (Hackett & Cassem, 1973; Jillings, 1978; Kaufmann et al., 1985-1986). Soloff, (1978-1979) suggested there was marked differences in the fears of recurrence of cardiac problems if there was relief of ischemic symptoms of those treated medically and those treated surgically.

Coronary artery bypass surgery is unique because most individuals have time to consider the surgery and its meaning prior to the actual event. The hospital staff is responsible for providing pre-surgical teaching and counselling about the post-operative period toward recovery. In the author's discussions after hospitalization, many indicated feeling poorly prepared for the postoperative period. More than half of individuals postoperatively, felt they had not been adequately prepared for the emotional reactions that might be encountered and the reactions to their treatment by other people, such as overprotection (Stanton et al., 1984).

In addition to the factors suggested by Krantz (1980) and Steinhart (1984), as discussed earlier, the person's attitude and stage of emotional healing at the time of surgery is important. Ramshaw & Stanley, (1981) concluded that the surgical result, and individual personality and coping style interact considerably to influence the person's perceived surgical outcome and effects.

> Kimball, (1969) identified four groups of psychological responses prior to open heart surgery: adjusted, anxious, symbiotic, and depressed. As summarized: the adjustment group indicated an overall improvement in long-term response. To them their surgery was viewed as desirable, necessary, and potentially life-saving. They were able to express a moderated uneasiness, fear, or anxiety about the procedure, but their defenses to cope appeared adequate and intact. They admitted the possibility of their dying. They appeared confident, controlled, and direct in expressing their feelings regarding the operation as well as in reviewing their life and disease histories.
>
> The anxious group to a large extent minimized or denied their signs and symptoms of their illness, but persisted in their former roles and relationships. Their talk was in general terms that placed a distance between them and their illness. They manifested much uneasiness and a variety of defenses, such as focusing on other events in their lives, displacement, and projection. They appeared rigid, hyperalert, at times suspicious, motorically hyperactive, sleepless, and without appetite. Postoperatively, they experienced a high number of cardiac dysrhythmias.
>
> The symbiotic group demonstrated a life based on their secondary gains based on their illness state, usually over a lifetime of illness. Their relationships demonstrated considerable dependence on a parent, that was transferred to a spouse. They tended to deny apprehension about the operation and did not view any different future after their operation. They expected to be cared for by a family member. Interestingly, this group had a higher incidence of embolic cerebrovascular accidents. This group also experienced a number of altered states of consciousness postoperatively and their intermediate period was often prolonged, up to five to six weeks.
>
> The depressed group had given in to their disease and ultimately given up. They denied having anxiety about the procedure and had the surgery based on the idea that 'the doctors thought I should have it.' Their orientation to the future was poor and vague, and in unrealistic terms. Postoperatively, the depressed group had highest mortality, and the rest showed either no improvement or a deterioration (Kimball, 1969).

Radley & Green, (1985) indicated different styles of adjustment are consistent with different expectations of surgery, changes in patterns of activity, and particular courses or recovery.

Unfairly, some, the author has conversed with, are surprised to learn that the surgery will not cure their disease. They did not understand that the surgery was a palliative procedure and the atherosclerotic disease process might progress in spite of the surgery's success (Sikorski, 1985; Soloff, 1978-1979). Soloff, (1978-1979), suggested those medically treated versus surgically treated had different views of their illness, partly related to this mistaken belief, but this may have accounted for differences in mood between the two differently treated groups(discussed previously).

Psychodynamics evident prior to surgery tended to persist (Gundle et al., 1980; Thurer et al., 1980-1981). In research by Gundle et al., (1980), preoperative symptoms (angina) of eight months or more was associated with a significantly poorer overall adaptation one to two years after surgery. More specifically this was related to poor self-concept, that surgery did not rectify, inspite of good physiological outcomes. In this population, surgery only reinforced rather than repaired one's damaged self-concept (Gundle et al., 1980).

The person may use his illness to gain the dominant position in the family or use it as a means to avoid responsibility and an accepted reason for early retirement (Davidson, 1979). The person may withdraw from some activities (or responsibilities) and pursue other more rewarding (secondary gain), including sympathy or attention from others (Radley & Green, 1985; Steinhart, 1984). Potentially, surgical correction of cardiac conditions increased, rather than decreased, maladjustment because the person was confronted with problems he had previously avoided due to his disease (Kimball, 1969).

The sooner the person's sense of self-esteem is restored, the more rapidly the depression will resolve. There is no better approach to this than to make the person active again (Davidson, 1979; Hackett & Cassem, 1973). Physical activity was found to influence the participant's general self-image. This was reflected in the participants' optimism about their health and a lessened feeling of vulnerability to specific health threats, even heart attacks (Heinzelmann & Bagley, 1970). Perceptions of improved health and more positive job accounted for about one-fourth of the variance of men with coronary artery disease who were not exercising regularly 12 months after an exercise program of six months (Oldridge & Spencer, 1985).

The importance of depression is that it often sets the stage for a recurrence of illness. Feelings of high depression (and anxiety) are associated with higher levels of mortality and morbidity, and a hospital readmission rate after surgery and other cardiac illnesses (Hackett & Cassem, 1973; Kimball, 1969; Stern et al., 1977).

Interestingly, half of those depressed reported being anxious or depressed within the year before their infarctions (Stern et al., 1977). Also, Cay et al., (1972) reported 54 percent of hospital admissions had a clear history of increased agitation and tension before the onset of a major attack and the most had been present for 6 to 9 months. Even after their heart attack, 48 percent indicated they needed to cope with other life events independent of their attack of moderate or marked impact during the year following their illness (Mayou et al., 1978a).

The third stage of recovery is reorganization, characterized by periods of mood swings. This is a time of realization and of attempting to establish a continuity between the present and the past (Kimball, 1969). Postoperatively, the person evaluates how he is functioning, whether improved, the same, or worse as pertaining to his job, domestic life, and satisfaction with himself (Kimball, 1969). The person begins to reorganize his relationships with family and friends (Crate, 1965; Miller, 1984), the time needed to "confide and express" (Kimball, 1969). Thurer et al., (1980-1981) discussed that many reviewed their life and changed their priorities of valuing human closeness and devaluing work, and had a "renewed interest in life and/or rage." The individual begins to realize that any changes that will occur as a result of the heart disease will affect not only him but also his family, friends, and possibly, business associates.

Potentially, this is the stage that the greatest amount of sharing may occur between the person and his family (Bramoweth, 1983). Support groups are helpful during this time to encourage individuals to freely express their emotions, with emphasis placed on support and understanding, rather than confrontation or encounter techniques. Individuals become more talkative, aggressive, develop a group cohesiveness, and often display a need to help others (Davidson, 1979). This group cohesiveness, as observed, is protective of its members and they may resent others trying to help by giving unsolicited advice to any of its members. As a participant described: "They don't know. No one else really knows what we have gone through, so how can they tell us what to do or how it feels." This important for those working in cardiac rehabilitation to remember. Members of the group are a very important source of information sharing and support.

In stage four, resolution of the loss begins. The individual begins to form new relationships for support, to accept one's responsibility and make active attempts to cope with his loss by both dependent and independent behavior. He begins to acknowledge changes in how he sees himself, and he begins to identify with others who have the same problem (Crate, 1965; Miller, 1984; Bramoweth, 1983). Concerns for affection, belonging, recognition, and self-esteem emerge. As these feelings surface, the person begins to feel self-reliant again and often 'try out their wings' in some previously restricted activity (Spicer, 1983). Postoperatively, by the tenth day the person's physical condition continues to improve and is allowed a greater degree of independence with respect to daily activities (Jillings, 1978).

In the fifth stage, identity change, the person resolves the loss caused by the illness and recognizes changes within himself (Bramoweth, 1983). He attains self-independency, characterized by hope and bargaining, a change from thinking of the self as sick to thinking of the self as in control through awareness of new potential for wellness and a willingness to strive for its attainment. He further acknowledges himself as a person with a loss or damaged part, but, also, as a person worthy of respect (Crate, 1965; Miller, 1984). The person affected is ultimately the one responsible for his life and what happens. The person relinquishes some of his dependency and assumes the responsibility for setting realistic goals and determining the means to achieve them (Davidson, 1979). One is accepting of ability to cope consciously and subconsciously. This is the good learning stage (Holub et al., 1975).

Full adaptation has been reached when the persons are able to accept and to live with their illness within the limitations it may impose (Bramoweth, 1983). The healing process is reached when the person can say in effect, 'I have a disease and there are limits to my life because of it.' (Crate, 1965; Miller, 1984). Postoperatively, Radley & Green, (1985) described acceptance thoughts simmer to: 'you make the best of what you've got and adopt a life-style which is a reasonable, sensible one' (Radley & Green, 1985). Good surgical outcomes are more likely with attitudes such as the person believes they might suddenly fall ill but, are not afraid of their illness or worry about their health (Pilowsky et al., 1978; Ramshaw & Stanley, 1981), and are highly responsive to reassurance (the single most effective factor) (Ramshaw & Stanley, 1981). After surgery, about one-fourth of individuals indicated a satisfaction with their life, feelings of high self-esteem, and a positive changes since their surgery (Ramshaw & Stanley, 1981). Leech, (1976) identified the final stage as acknowledgment, rather than acceptance. He described this stage characterized by full awareness of one's strengths, limitations, potentials and possibilities. It is a dynamic process that is obtained through an active acknowledgement of and experiencing one's sadness, angers, and fears (Leech, 1976).

> A person does not necessarily progress through each stage as outlined. Each person's reaction to the cardiac disease will differ; similarly, the progression through the adaptive process will vary. Some will move through each phased smoothly, whereas others will be unable to resolve the loss they feel as a result of their disabilities. Still others will begin to progress through the stages but will become caught at some point, unable to advance toward full adaptation, despite the efforts of the health professionals. There are also those who are able to adapt to their present state of disability but, who because of the degenerative nature of their condition, are forced to retrace certain stages of the process. (Bramoweth, 1983).

After an acute episode of coronary disease, approximately three-fourths do well provided they are given active encouragement from the beginning (Cay, 1982; Gentry, 1979). Subjectively, most (77 percent) of those undergoing a coronary artery bypass surgical procedure, reported substantial improvements in overall quality of life, including general pleasure, reduction of anxiety and depression, and improvement in job satisfaction and family relations (Jenkins et al., 1983; Kornfeld et al., 1982). To deal with practical problems concerned with re-employment, measure to relieve financial worries and housing and family difficulties may be all that is necessary (Cay et al., 1972). Intervention, to be most effective, should be undertaken sooner rather than later, while a person's outcome remains, to a degree, under the influence of psychological response to illness (Byrne, 1982). Wiklund et al., (1984a) identified the period two to three months after a myocardial infarction as crucial in order to detect potential problems in need of intervention and extra rehabilitation measures (Wiklund et al., 1984a). Cardiac rehabilitation is part of the support system for individuals with coronary artery disease and their spouses that allows them to make positive changes (Oldridge, 1984b).

Behavioral Change and Compliance

A person's feelings and rehabilitative goals are similar whether the person is recovering from a myocardial infarction, coronary artery bypass graft surgery, percutaneous transluminal coronary angioplasty, or angina pectoris (Sikorski, 1985). Not only is the person after an acute cardiac illness attempting to cope and rebuild a "normal life" for himself, but he is also attempting to make behavioral lifestyle changes. Changes often focus on dietary modifications, weight loss, smoking cessation, stress management, and developing regular exercise as a habit (Newton et al., 1985). Even though specific guidelines and programs are available to help instruct the person with coronary artery disease, compliance with these programs is discouragingly inadequate.

Noncompliance with medical regimen's remains the best documented and studied, but the least understood health-related behavior problem (Becker & Maiman, 1975; Zisook & Gammon, 1980-1981). Soloff, (1977-1978) suggested noncompliance and rejection of medical advice and rehabilitation efforts may continue in individuals maintaining defenses in convalesence in coronary artery disease. Deniers reported more often that they could do nothing to prevent recurrence of a myocardial infarction, an attitude leading to noncompliance (Gentry, 1979). Noncompliance may reflect extreme denial and/or anger at the physician, health care staff, or the person himself (Springer, 1985) and represent a form of asserting one's control or self-regulation over one's situation (Conrad, 1985).

How does the individual make behavioral changes without completely disrupting his life, yet maintaining his self-esteem and acknowledging his feelings and own healing process? What guidelines can professionals offer to aid in behavioral changes, specifically for a regular exercise program during the healing process of one with coronary artery disease?

An individual must generate his or her own belief and attitude for behavior change. Behavior change is unlikely to result from coercion (DiMatteo & DiNicola, 1982), strong threats or shock messages. These may actually inhibit change, especially when the message is highly personal and emphasizes the person's vulnerability (Leventhal, 1973; Neufeld, 1976). Messages need to be perceived as controllable or feelings of helplessness and increased resistance may occur (Beck & Lund, 1981).

> Leventhal (1973) described the process leading to behavioral change as exposure, understanding, change of attitude and finally, action toward the problem behavior. The person needs awareness of the problem that exists and an understanding the problem as related to his current situation. Then, the goal becomes to create a motive or decision to change based on exposure, understanding, and change of attitude, and lastly to build an action structure to link attitudes to behavior. Structure for action is the predictive response and its value, and an exact specification of when, where and how to take action (Leventhal, 1973).

Attitudes, learned and changeable, consist of a cognitive component (made of one's beliefs about the object), an affective component (one's positive or negative feelings of the object), and a behavioral orientation (intention) to the object (DiMatteo & DiNicola, 1982). Behavioral change is ultimately the result of changes in beliefs, with changes in attitudes and then resulting changes in behavioral intentions (Fishbein & Ajzen, 1975). By participating individuals then learn that certain behaviors are associated with certain outcomes and may reformulate beliefs in order to reach these goals

(Given, 1984).

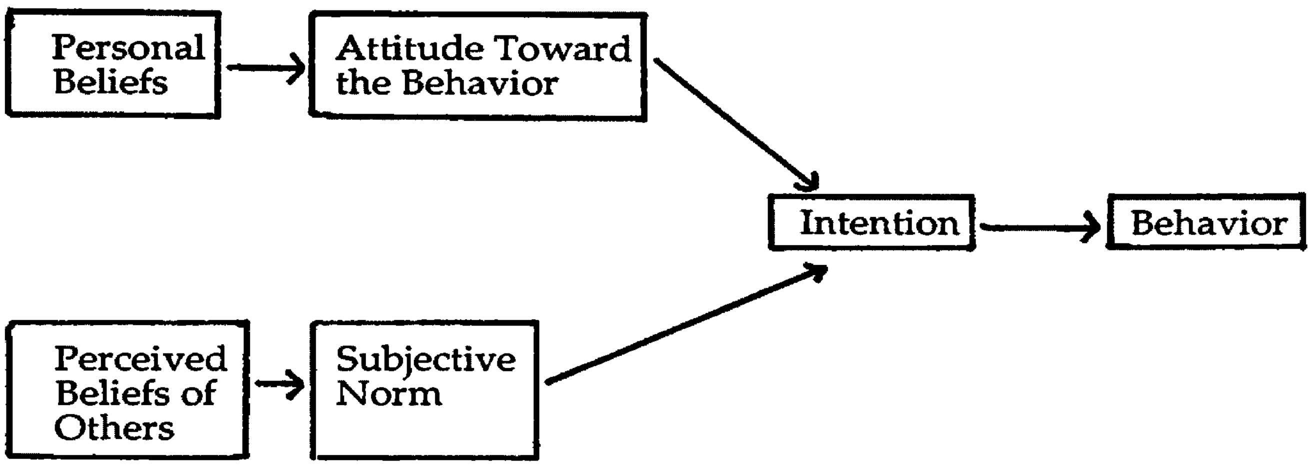
Miller et al., (1985), Miller et al., (1983), and Miller et al., (1982a) related the Fishbein model to the individual with cardiovascular disease of the interaction between beliefs and attitudes. As summarized, the following sequence should occur: First certain information (beliefs) would be known about the heart condition and medical regimen. From this basic information, values (attitudes) should be developed both about his heart disease, the medical regimen, and what he perceives significant others believe about his medical regimen (normative component). These attitudes and patients' perceptions of others' beliefs about their performance of the medical regimen should lead to the development of intentions to perform prescribed medical regimen behaviors. Intentions to follow the medical regimen should then lead to performance of specific regimen (Miller et al., 1985; Miller et al., 1983; Miller et al., 1982a) (Summarized in Diagram A).

However, others have suggested that participation in an exercise program influenced attitudes and beliefs of the health value of exercise, rather than attitudes and beliefs influencing exercise participation (Heinzelmann & Bagley, 1970; Oldridge, 1984c).

DiMatteo and DiNicola, (1982), summarized that beliefs and behaviors influence each other reciprocally. The theory of cognitive dissonance proposes that if a person's behavior is inconsistent with an attitude he or she holds at that time, the person will be motivated to seek a resolution that brings the beliefs and the behaviors into line. The self-perception theory also implies that belief change can occur in response to behavior change. For example, a person who engages in a healthy behavior may later change his or her values and beliefs of valueing health (DiMatteo & DiNicola, 1982).

Prospective investigations generally have not found correlations between health beliefs at the beginning of a course of therapy and subsequent compliance as strong as correlations between health beliefs and concurrent compliance. This may suggest that the relationship between health beliefs and compliance is at least partly bidirectional, that is, health beliefs, instead of preceding and determining compliance behavior, develop with compliance behavior as a result of experience with treatment gained by patients in the early weeks or months of therapy (Becker et al., 1979).

Diagram A- Model of Reasoned Action



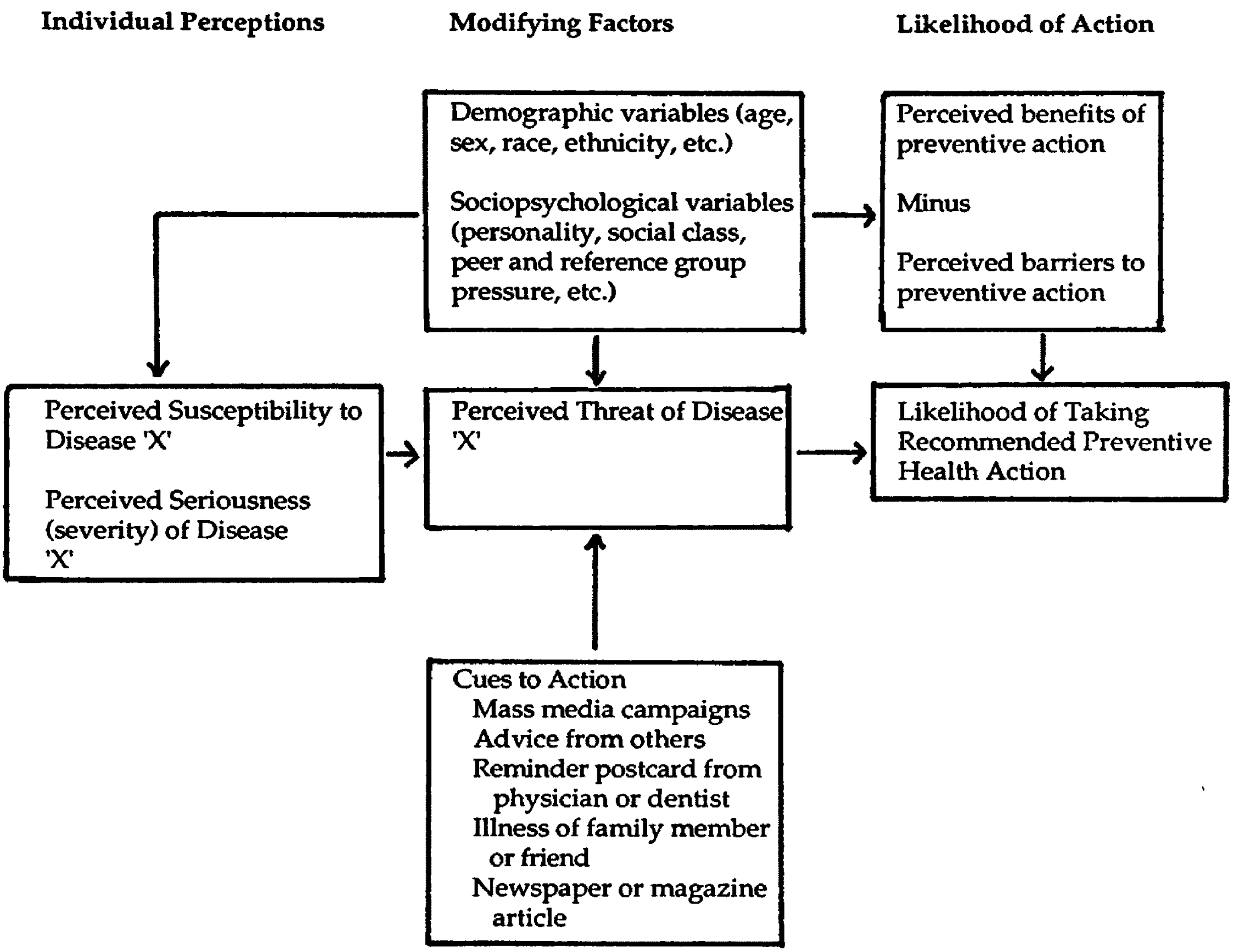
(Fishbein & Ajzen, 1980)

The health belief model (Diagram B) incorporates the patient's health attitudes, beliefs, current situations, and psychological factors in the behavior change process (Hijek,1984). People must possess some minimal level of health knowledge and motivation toward health (Becker, 1974; DiMatteo & DiNicola, 1982), but the likelihood of changing behavior is based on the attractiveness of the behavior to be changed and one's subjective personal estimate of likelihood of attaining the goal (Becker et al., 1979).

Individuals undergo an evaluative process during behavior change. People will be most likely to accept advice on how to protect themselves from a health threat when they have been convinced of its seriousness, their susceptibility and vulnerability to it, the effectiveness of the treatment, and the cost of action (in terms of time, money, energy, interest, fear, or embarrassment) is not too high in view of the benefits (Becker, 1974; DiMatteo & DiNicola, 1982; Leventhal, 1973).

> A cue to action or stimulus must occur to trigger the appropriate behavior by making the individual consciously aware of his feelings about the health threat. The cue may be either internal (perception of symptoms) or external (mass media campaigns or reminders from loved ones). Theory, then argues that whether or not an individual will undertake a recommended health action is dependent upon that individual's perceptions of: (1) their level of personal susceptibility to the particular illness; (2) the degree of severity

Diagram B- Health Belief Model



(Becker et al., 1979)

of the consequences (organic and/or social) which might result from contracting the disease; (3) the health action's potential benefits in preventing or reducing their susceptibility and/or severity of the disease; and (4) the physical, psychological, financial, and other barriers or costs related to initiating or continuing the advocated behavior (Becker et al., 1979) (Refer to Diagram B).

Hijek (1984) described the health belief model as related to the individual with coronary artery disease (as summarized):

> Cues to action either internal (as symptoms of coronary artery disease) or external (as family pressure). Perceived susceptibility is the patient's belief that he may have a second myocardial infarction. Perceived seriousness of disease, evaluates the extent to which a patient believes that myocardial infarctions generally are dangerous and if the patient's own myocardial infarction was serious. Perceived benefits and barriers includes the availability of preventive/rehabilitative health care, the perceived effectiveness of this care in altering the course of the disease, the monetary cost of care, the cost of time and inconvenience, and the effect care has on the lifestyle of the patient and family. The more benefits the patient perceives from the care, the more likely the patient will take action. The more barriers the patient perceives, the more likely the patient will not participate. (Hijeck, 1984).

Perceptions and beliefs that make up the health belief model have been demonstrated to be alterable (Becker, 1976). Also, it is thought the stronger one's perception of seriousness, susceptibility, and benefits are, the less intense the cue needs to be to trigger a conscious decision to participate (Hijek,1984).

Becker, (1976), described a model (Diagram C) that various sociodemographic and structural factors (modifying and enabling factors) influence, but are not directly causal of the individual's health beliefs and perceptions in compliance. Readiness, and modifying and enabling factors all affect compliance (Becker, 1976) (Refer to Diagram C for specific factor variables).

> Eraker (1984) expanded the health belief model to a health decision model. Any consideration of health decisions, subsequent behavior, and compliance must also incorporate an understanding of pre-existing behavioral biases and health beliefs. The health decision model included health beliefs, patient preferences, experience, knowledge, and social interaction factors. Sociodemographic factors influence health decisions, but are less amenable to intervention (Eraker, 1984) (Refer to Diagram D).

Motivations, subjective perceptions of the illness and its personal meaning, subjective estimates of the treatment and its effectiveness, demographic characteristics, regimen cost-benefits, attitudes and interaction of the facility and staff, prior illness experience (Becker, 1976), social factors of the person, family and friends (Haynes, 1976), sufficient capabilities, incentives

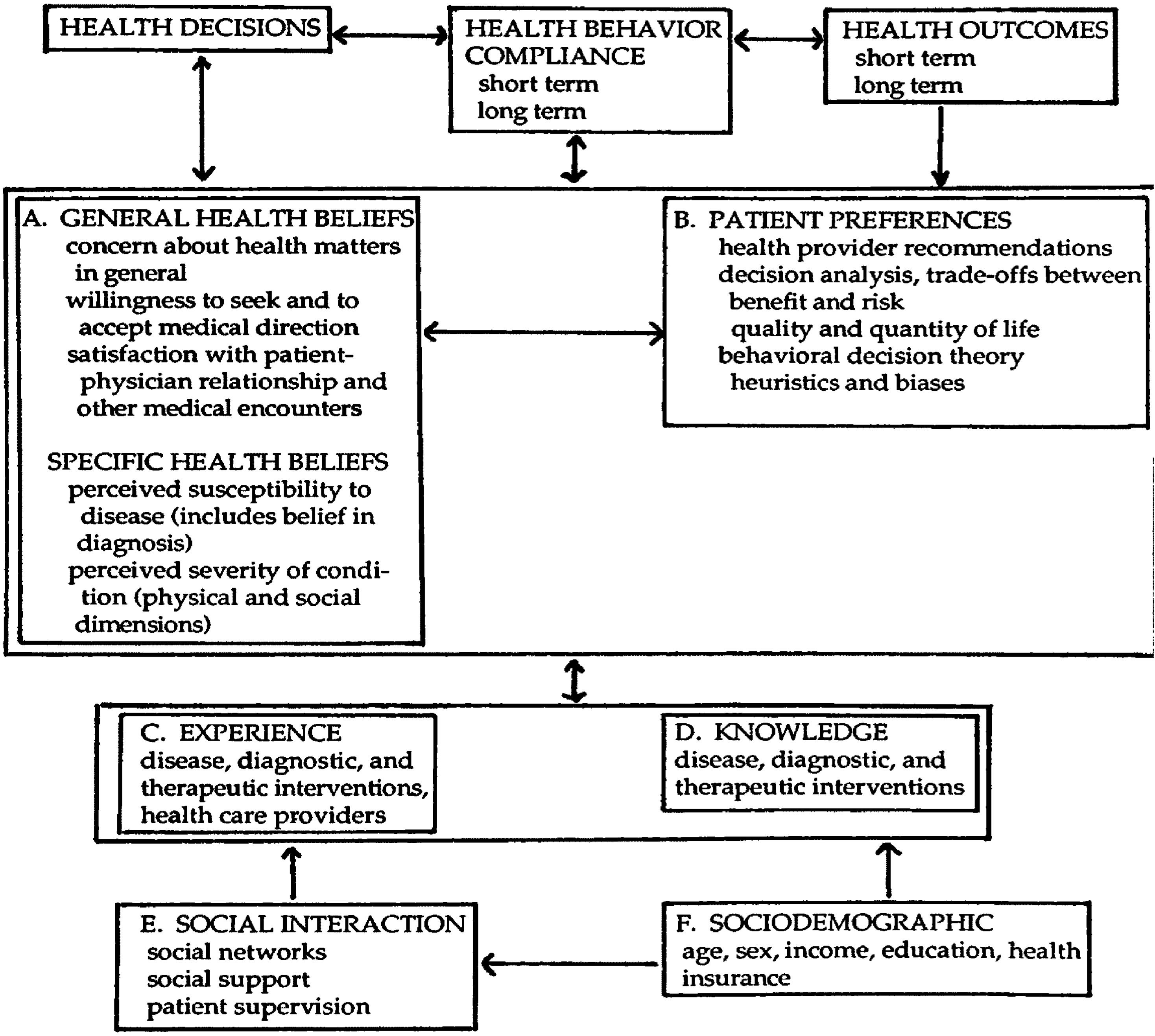
Diagram C- Hypothesized Model for Predicting and Explaining Compliance Behavior

READINESS TO UNDERTAKE RECOMMENDED COMPLIANCE BEHAVIOR	MODIFYING AND ENABLING FACTORS	COMPLIANT BEHAVIOR
Motivations Concerns about (salience of) health matters in general Willingness to seek and accept medical direction Intention to comply Positive health activities Value of Illness Threat Reduction (subjective estimates of): Susceptibility or resusceptibility (incl. belief in diagnosis) Vulnerability to illness in general Extent of possible bodily harm* Extent of possible interference with social roles* Presence of (or past experience with) symptoms Probability that Compliant Behavior Will Reduce the Threat (subjective estimates of): The proposed regimen's safety The proposed regimen's efficacy to prevent, delay, or cure (incl. "faith in doctors and medical care" and "chance or recovery")	Demographic (very young or old) Structural (cost, duration, complexity, side effects, accessibility of regimen, need for new patterns of behavior) Attitudes (satisfaction with visit, physician, other staff, clinic procedures, and facilities) Interaction (length, depth, continuity, mutuality of expectation, quality, and type of doctor-patient relationship; physician agreement with patient; feedback to patient) Enabling (prior experience with action, illness or regimen; source of advice and referral [incl. social pressure])	Likelihood of: Compliance with preventive health recommendations and prescribed regimens: e.g. screening, immunizations, prophylactic exams, drugs,diet, exercise, personal and work habits, follow-up tests, referrals, and follow-up appointments, entering or continuing a treatment program.

* At motivating, but not inhibiting, levels.

(Becker, 1976).

Diagram D- Health Decision Model



(Eraker et al., 1984)

(Bandura et al., 1977), knowledge and skills (Eraker, 1984) all influence compliance.

Specific characteristics and reasons have been identified as influencing exercise and rehabilitation program compliance and noncompliance, dropouts and adherers (Andrew et al., 1981; Blumenthal et al., 1982; Miller et al., 1982; Oldridge, 1984). Negative values aid to identify obstacles, and positive values can be utilized as motivating factors for rehabilitation planning (Miller, 1982).

Knowledge itself does not increase compliance, but it does help individuals be more supportive and make informed decisions of their exercise (Oldridge, 1984c; Haynes, 1979c; Hogue, 1979; Miller et al., 1983; Eraker, 1984; Wenger, 1979). Individuals do need to be aware of basic exercise prescription principles, proper techniques, and safety concerns (King & Frederiksen, 1984; Marlatt & Gordon, 1980; Martin et al., 1984; Oldridge, 1982; Tirrell & Hart, 1980). Previously sedentary adults embarking on a physical conditioning program often have unrealistic impressions of safe and effective training practices. To minimize injury, education should serve as an integral part of the exercise program (Franklin, 1978), but as suggested a secondary role (Dunbar et al., 1979).

Personal medical histories have been suggested as influencing and not influencing compliance. Some described angina and cardiac problems (Bruce et al., 1976; Shephard et al., 1981; Oldridge et al., 1983; Wilhelmsen et al., 1975), recurrent myocardial infarctions and poorer prognosis (Oldridge et al., 1978; Shephard et al., 1981) as factors influencing compliance, but others (Blumenthal et al., 1982; Bruce et al., 1976; Haynes, 1979b; Oldridge et al., 1978; Shephard et al., 1981) suggested disease features, medical problems, previous hospitalizations, and subjective improvement do not characterize of the majority of compliance characteristics.

Possibly, a more severe cardiac history, less "ability" for physical exertion, and greater perceptions of more barriers to exercise had little influence to exercise once started, but were more influential continuing exercise activity (Fontana, 1986). Shephard et al., (1981) determined dropouts tended to have angina, but the similarities were not associated with ST changes. Haynes, (1979b) supported this and suggested increasing symptoms may be associated with either an increase or decrease in compliance, depending on the person's interpretation.

Other complier characteristics identified as influencing compliance were compliers tended to be nonsmokers (Oldridge & Spencer, 1985) and be older in age (Oldridge & Jones, 1984; Oldridge & Spencer, 1985). While noncompliers tended to be smokers (Finnegan & Suler, 1985; Oldridge et al., 1983; Oldridge et al., 1978; Oldridge & Spencer, 1985; Shephard et al., 1981; Finnegan & Suler, 1985), have higher blood pressure (Oldridge et al., 1983), were younger (Oldridge et al., 1983) and overweight or overfat (Dishman, 1982; Dishman et al., 1980; Massie & Shephard, 1971; Finnegan & Suler, 1985). Other factors found not to have a significant effect on compliance were age (Oldridge & Spencer, 1985; Dishman &Ickes, 1980; Blumenthal et al., 1982), sex (Dishman &Ickes, 1980), smokers (Shephard et al., 1981), blood pressure (Blumenthal et al., 1982); blood lipid levels (Blumenthal et al., 1982) and weight (Oldridge & Spencer, 1985; Blumenthal et al., 1982).

Individuals identified direct benefits of exercise as, health benefits (Oldridge & Spencer, 1985; Miller et al., 1982; Finnegan & Suler, 1985; Andrew et al., 1981; Fontana et al., 1986; Heinzelmann & Bagley, 1970), such as weight control, increased energy and feeling better as reasons for exercise compliance. But if individuals felt they had benefited from exercise as much as they could, they did not adhere to an exercise program (Oldridge & Spencer, 1985; Andrew et al., 1981). Compliers tended to be active in their leisure time (Oldridge & Spencer, 1985) and even ate more balanced meals (Miller et al., 1982). Dropouts tended to be inactive in their leisure time (Oldridge & Spencer, 1985; Oldridge et al., 1978). However, the length of time from infarction to entry into an exercise program (Oldridge et al., 1978), maximum heart rate (Blumenthal et al., 1982; Oldridge & Spencer, 1985), and maximum work capacity (Oldridge & Spencer, 1985) did not appear to be factors related to compliance. Others found longer distances achieved (Bruce et al., 1976) and longer treadmill times (Blumenthal et al., 1982) were associated with compliers.

Occupations have been related to compliance. Compliers tended to have white collar occupations have been associated with compliance (Oldridge

& Spencer, 1985) and blue collar occupations associated with dropouts (Andrew et al., 1981; Oldridge & Spencer, 1985; Oldridge et al., 1983). Individuals who identified difficulty relaxing after work, also, tended to dropout of exercise programs (Andrew et al., 1981). Reasons related to employment were related to continuation of exercise, specifically improved performance at work and improved work attitude and satisfaction (Oldridge & Spencer, 1985; Miller et al., 1982). But, if work-exercise schedules conflicted, dropout of exercise programs tended to occur (Andrew et al., 1981; Bruce et al., 1976). A lack of or inconvenient time (Bruce et al., 1976; Oldridge & Spencer, 1985; Oldridge et al., 1983; Andrew et al., 1981) lended to difficulty maintaining an exercise program. Shephard, (1985b) suggested it was not the lack of time, but the need was actually how to use time available more effectively and how to budget leisure time.

Social aspects and improved interpersonal relations also were major values of cardiac rehabilitation exercise to aid compliance (Eraker, 1984; Miller et al., 1982; McMahon et al., 1986). Persons described their reasons to continue participation as exercise enjoyment, felt a sense of social support and personal commitment to continue, and welcome the opportunity to compare their own progress and level of fitness with that of others (Heinzelmann & Bagley, 1970). Feedback from others may influence one's self-image (Ell & Haywood, 1984).

Participants in cardiac rehabilitation and their families were found to have highly congruent positive and negative values of exercise therapy (Miller et al., 1982). A person's intentions to adhere to exercise therapy after a heart attack were closely related to what they perceived significant other's intentions to be (McMahon et al., 1986; Miller et al., 1982a), even perceived some higher than their own intentions (Miller et al., 1982a).

Whereas some described their spouse support as a negative or an indifferent factor associated with exercise dropout (Oldridge, 1982; Bruce et al., 1976), Andrew et al., (1981), reported spousal approval was the most significant factor of a high dropout rate. This implies gaining the support of the family in order to enhance continued participation, especially in the beginning of an exercise program, is of particular importance (Andrew et al., 1981; Miller et al., 1982).

Reasons for dropout were program type (Bruce et al., 1976; Andrew et al., 1981), most were in the individualized program, rather than a group program for middle-aged business men (Massie & Shephard, 1971). Some who are uncomfortable in social situations, more socially introverted, may find a group setting to be a source of stress and consequently may withdraw from the treatment regimen (Blumenthal et al., 1982; Finnegan & Suler, 1985). Adherence could be improved by arranging for home or work training facilities (Wilhelmsen et al., 1975).

> In a study by Heinzelmann & Bagley, (1970), men at risk for developing coronary artery disease listed as most important in influencing their decision to participate in an exercise program were the desire to feel better and healthier, and to lessen their chance of a heart attack. Moderately important were their desire to gain health knowledge, to have recreation and pleasure, and to vary their usual routine. The least important factors were the social aspects of the exercise program and their desire to please their wives. However, the factor that most influenced their continuing adherence were the social aspects (Heinzelmann & Bagley, 1970).

Motivation factors influencing adherence to exercise may be different from those influencing recruitment (Oldridge, 1984c; Heinzelmann & Bagley, 1970; Fontana et al., 1986).

> Fontana et al., (1986), examined (as summarized) characteristics of individuals adhering to exercise training during different phases. Those who were recruited for an exercise program had better prognoses, engaged in stationary activities that required more exertion, perceived fewer barriers to exercising, perceived themselves to be less vulnerable, expressed less frustration in dealing with challenging situations, were less likely to be smokers before hospitalization, had a greater liking for the rehabilitation staff, and more likely to have white collar occupations.
>
> Exercise in participation stage was related to a lower level of perceived vulnerability, had a higher level of anticipated help with transportation to the exercise center, were more likely to have a relatively normal ejection fraction and were closer to their ideal weight.
>
> Three months after the organized training period, those continuing had less perceived vulnerability and a greater liking for the staff. Nine months later, those continuing had a higher

ejection fraction and a nondisabled status, lower frustration, higher occupational status, and were not overweight. Only perceived vulnerability was significant in all three stages (Fontana, 1986).

One of the major factors associated with the wide range in dropout in exercise program are in program, the attractiveness of the facilities, leadership, and convenience as summarized by Oldridge, (1984c) and Daltroy, (1985), even though the research does not indicate this strongly (Daltroy, 1985). Hospital-based program may upgrade facilities to a local gymnasium (Daltroy, 1985) to aid satisfaction and compliance. Compliers were more predictable if they lived or worked near the exercise center (Andrew et al., 1981). Nonadherers tended to occur if they had difficulty arranging transportation or identified parking problems (Andrew et al., 1981) or had difficulties with the staff (Bruce et al., 1976; Andrew et al., 1981).

Exercise intensity described as high or low did not appear to be an important factor of compliance (Andrew et al., 1981; Oldridge et al., 1978; Oldridge et al., 1983), but when individuals described feeling fatigued with exercise they tended to dropout (Andrew et al., 1981). However, for middle-aged business men, dropouts were higher in stronger men, thought to be dissatisfied ex-athletes (Massie & Shephard, 1971).

Other reasons identified were practical reasons, such as change of residence (Bruce et al., 1976; Oldridge et al., 1983), family (Andrew et al., 1981; Bruce et al., 1976), financial difficulties, and cost of the program (Andrew et al., 1981; Bruce et al., 1976). About one-third described loosing income most attributed to their coronary illness (Mayou et al., 1978a). Specifically, with the financial aspect, an acute coronary event is expensive, a total cost estimated between 10,000 to 40,000 dollars. (The author was unable to locate a current published average costs.) The American Heart Association (1987) estimated 5.4 million dollars is spent on medications alone for all cardiovascular diseases. Potential exercise adherers with whom this author has spoken, would not choose to join an exercise program because of having too high a bill already, even with insurance coverage. Some with 80 percent coverage are still responsible for 6,000 dollars of a 30,000 dollar bill. A couple familiar to this author has a monthly medication bill of over 500 dollars a month. For many, spending more on health programs "is not possible at this time."

Personalities, such as an extraverted personalities (Massie & Shephard, 1971), Type A behavior pattern (Oldridge et al., 1978), or those who perceived stress as a cause of their coronary problems were more likely to show poor maintenance of exercise (Finnegan & Suler, 1985). Individuals greatly depressed, upset or anxious of their health (Finnegan & Suler, 1985; Gentry, 1979; Blumenthal et al., 1982), or those who had lower ego strength scores and coping abilities were likely to be a dropout of a rehabilitation program (Blumenthal et al., 1982).

Attitudes toward physical activity, locus of control, and health consciousness do not predict exercise adherence (Dishman et al., 1980). Asking a person's intentions of their exercise may be the most simple and ultimately most valuable predictor of compliance (Becker et al., 1979; McMahon et al., 1986; Oldridge & Jones, 1984).

However, the majority of individuals dropped out of cardiac rehabilitation programs because of lack of interest (Andrew et al., 1981; Bruce et al., 1976; Oldridge & Spencer, 1985; Oldridge et al., 1983; Oldridge et al., 1978) and motivational reasons (Oldridge et al., 1978; Bruce et al., 1976; Oldridge et al., 1983). Low self-motivation was associated with low exercise adherence (Dishman et al., 1980; Dishman & Ickes, 1980). Lack of participant motivation may be the single most important factor in a cardiac rehabilitation exercise program (Oldridge & Stoedefalde, 1984).

Behavior Modification Related to Exercise Therapy

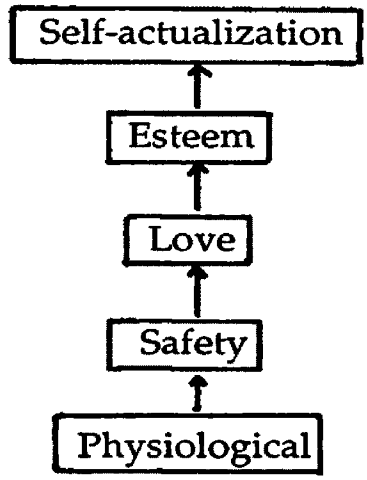
Inherent in the concept of compliance to exercise is the factor of motivation (Ice, 1985). Motivation is crucial in an exercise program's effectiveness (Franklin, 1978). Strategies to enhance motivation to modify coronary risk factors that further increase the risk of reinfarction and death may have tremendous potential in improving compliance (Blumenthal et al., 1983; Martin and Dubbert, 1982). Participant motivation is indirectly expressed by one's compliance to behavioral changes. Motivation is inferred from these behavioral changes and may be the single most important factor in a cardiac rehabilitation program (Oldridge & Stoedefalde, 1984). One's selection and preference for an activity, the duration of training, the effort invested and his performance in the activity by the individual expresses one's motivation (Suinn, 1980).

> Motivational needs (Diagram E) is based that man has needs arranged in a hierarchy which ascends from the most basic biological requirements to the quest for self-actualization and fulfillment. An unmet need for most on the lowest level is ordinarily the one that commands the individual's primary attention and effort. When these are satisfied, the higher level needs occupy the individual's attention and effort (Coleman & Broen, 1972).

Utilizing Maslow's hierarchy of needs, a coronary artery disease event constitutes a crisis that affects a person's most basic physiologic functions and safety needs (Diagram E) (Spicer, 1983) initially and potentially may affect each level.

> Motivation is also affected by social forces in one's environment, that is, by society's system of values and manipulations. The needs of groups and society are important determinants of the behavior of individuals. An individual's motivations are constantly influencing his perceptions, reasoning, learning, and psychological processes (Coleman & Broen, 1972).
>
> Oldridge & Stoedefalde (1984) described a modified Porter-Lawler model (Summarized in Diagram F) to understand patient motivation. (As summarized): The first component of patient motivation is the attractiveness (value) of the outcome (reward) of the exercise program to the patient, the second component is the perceived effort the patient perceives to attain the reward. These influence the amount of effort the patient invests to work for the goal. The characteristics of the patient such as personality, physical and motor skills and what the patient interprets as successful performance influences the effort. If he perceives the effort as successful and feels rewarded (intrinsic effect higher than extrinsic) comparable to his effort expended and his performance accomplished, then he likely to be satisfied and continue this process. Each of these components needs to be considered to aid one's motivation (Oldridge & Stoedefalde, 1984).
>
> Self-motivation is learned and dependent upon one's capacity for self-reinforcement and ability to delay gratification.

Diagram E- Hierarchy of Needs



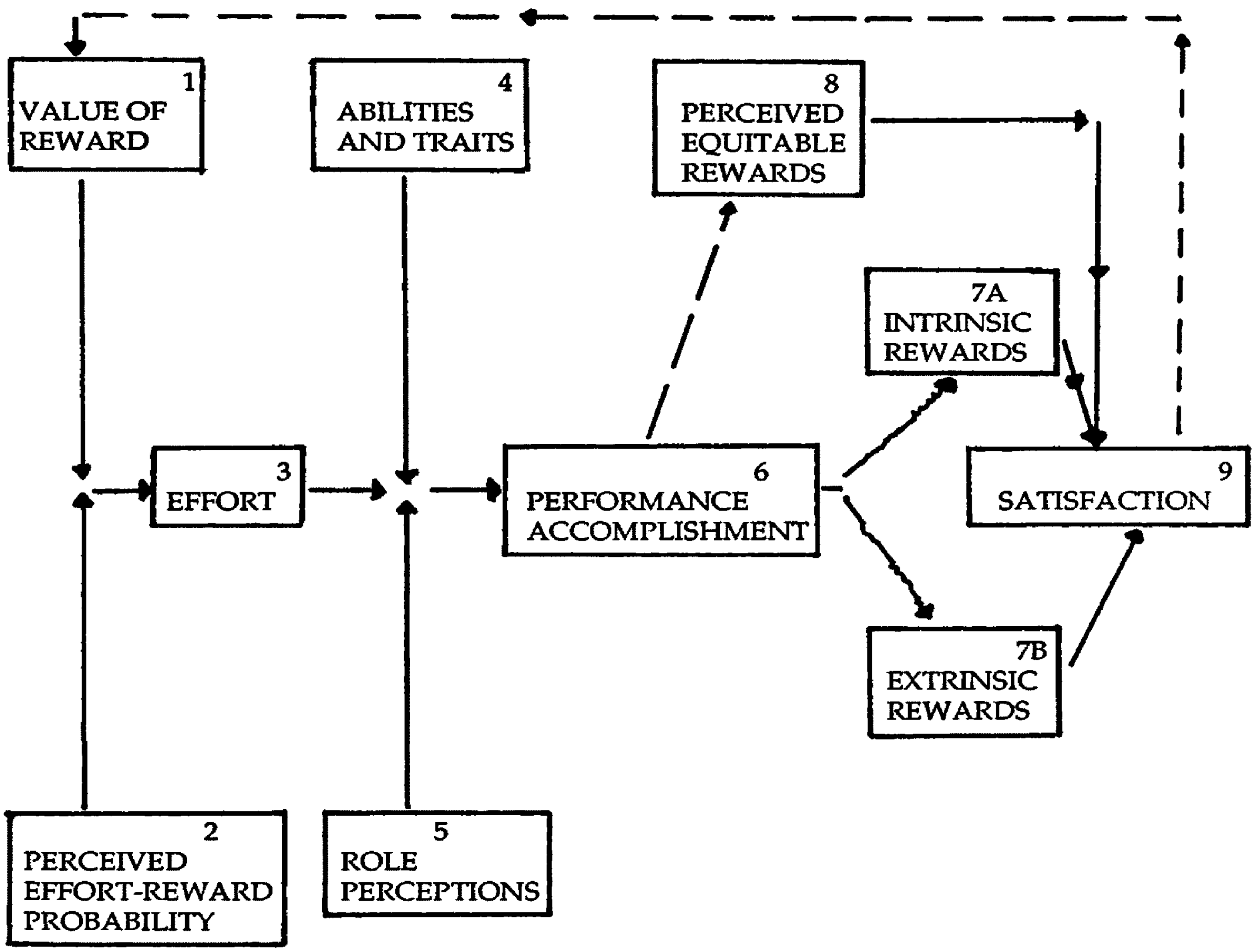
(Coleman & Broen, 1972)

It is largely based on self-perceptions and theoretically amenable to change as a function of exercise experience. However, an individual low in self-motivation, but whose exercise behavior reinforced by other means, might come to perceive that adherence as self-motivating and subsequently enhance his or her perceptions of self-motivation (Dishman, 1982).

Motivational components as applied to a health setting are concerned attitude about health matters, a willingness to seek and accept medical direction, an intention to comply, and engaging in positive health activities. Motivation, value of reduction of illness threat, and one's perceived probability that the compliant behavior will reduce the threat of the illness are described as factors of readiness necessary for behavioral compliance (Becker, 1976).

Behavior modification and combined strategies of educational and behavior strategies are most promising in aiding people to develop and maintain healthy, life-style behavioral changes (Haynes, 1984; Haynes, 1976d; Oldridge & Jones, 1983). It holds particular promise in the area of cardiac rehabilitation (Blumenthal et al., 1983) and exercise. Even though exercise prescriptions based on standardized thresholds of energy demand or heart rate may optimize physiological adaptations, compliance may be minimized if psychological and biological characteristics of the would-be-exerciser are

Diagram F- Process Model of Patient Motivation



(Porter & Lawler, 1968

ignored (Dishman, 1982). Once an intention has been stated, a behavioral approach is among the most 'fruitful' for enhancing compliance (DiMatteo & DiNicola, 1982).

A behavioral approach focuses more directly upon the behaviors involved (Haynes, 1976d). It concentrates on future behaviors, is optimistic because it suggests that a person can change with appropriate learning, and considers behavioral problems as stemming from a lack of skill at monitoring one's own behavior and the neglect or inappropriate use of reinforcements (DiMatteo & DiNicola, 1982). Behavior modification attempts to reduce barriers (such as expense or inconvenience), to cue or stimulate compliance, and to reward or reinforce compliance (Haynes, 1976d).

No single maneuver is potent enough to have an impact on medical compliance (Haynes, 1984; Given et al., 1984). Rather, long-term treatment programs that have been successful have all been "packages" of two or more behavioral modification techniques (Haynes, 1984; Given et al., 1984). One of the most important tasks is the development of powerful treatment "packages"--suitable for individual tailoring--that will yield acceptable adherence to both home and institutional/structured exercise programs (Martin & Dubbert, 1982).

This discussion will consider the current behavior modification methods used in "healthy" adult exercise programs that may be applied to cardiac rehabilitation programs. Disappointingly, only a limited number of resources were found of behavior modification methods used in cardiac rehabilitation exercise programs. Those that were located will be discussed in the appropriate sections.

Learning the exercise habit has different stages of development (Fontana et al., 1986; Martin & Dubbert, 1984). Martin & Dubbert, (1984) suggested two stages, acquisition and maintenance. There may be a critical period during involvement in an exercise program (Dishman, 1982). Many factors important in the acquisition/adoption phase of exercise and fitness may be less important in the maintenance phase (Martin & Dubbert, 1985; Shephard, 1979), when other factors are more important. During the initial weeks when demands of adaptation are the greatest, situational barriers (Dishman, 1982) and mood improvements are more important (Shephard, 1979). Maintenance factors such as opportunities to socialize, awareness of the relationship between exercise, mood, and energy levels may be dominant (Martin & Dubbert, 1985).

Behavior modification begins with shaping, a series of successive approximations of the desired behavior and gradually progressed to the desired behavior. Begin with a simple, easily performed behavior and to provide considerable positive reinforcement (Martin & Dubbert, 1984).

> The most common and destructive mistake made by exercise leaders and beginners is to start an exercise program at too high an intensity, frequency or duration level. The primary goal during the first eight to 12 weeks should be to establish the habit of exercise and the skills needed to perform the exercise, not physical conditioning. For most, it is better to start at too low or too easy a level than too difficult a level (Martin & Dubbert, 1984).

For individuals with coronary artery disease, safety being a primary concern, it is even more important to start at an easy and comfortable level of exercise. Keefe and Blumenthal, (1980) emphasized a very gradual shaping process for middle-aged, overweight men. Walking increases were limited to less than ten percent increase of the distance the previous week. These men only requested to begin jogging 33 to 51 weeks after walking had become a regular routine. Adherence was still maintained at a two-year follow-up (Keefe & Blumenthal, 1980).

Borg's rating of perceived exertion scale (RPE) (Diagram G) has been utilized in cardiac rehabilitation programs as a supplement to help identify a comfortable level of exercise, relating to heart rate intensity (Pollock et al., 1984). The goal of one's exercise is a perceived exertion of "somewhat hard" (Borg, 1982). Despite this valuable tool, the author was unable to located any behavioral modification exercise program studies using this scale to rate one's subjective exercise exertion.

In general, reinforcement incentives and rewards should be used frequently in the early stages

> to sustain the exercise habit until the intrinsic rewards of fitness become obvious. Particularly in the early stages, many aspects of a program may be negatively perceived such as cost of clothing and equipment, investment of time, pain and injury, discouragement, failure to realize goals, fatigue, and even alienation of family (Shephard, 1985b).

Reinforcers must be important to the person, accessible, and

Diagram G- Rating of Perceived Exertion Scale (RPE)

6	
7	Very, very light
8	
9	Very light
10	
11	Fairly light
12	
13	Somewhat hard
14	
15	Hard
16	
17	Very hard
18	
19	Very, very hard
20	

(Borg, 1982)

consistently applied (Falvo, 1985). One's reliance on material or physical reinforcers may be strong initially, but later these become less important and effective (Franklin, 1978; Keefe & Blumenthal, 1980). Incentives encourage a person to try hard so they find out what they are capable of doing, contribute to growth of interest and help to verify one's competencies (Bandura, 1981). A caution to staff not to reward overachievement less the type A striving is encouraged (Jenkins, 1979).

Many cardiac rehabilitation programs have been providing rewards to their participants in the form of 100 Mile Club, 1000 Mile Club, T-shirts (Pollock, 1978; Pollock et al., 1984), prizes, badges, pins, awards, club memberships or payment of dues (Shephard, 1985). Other reinforcements used for exercise have been token reinforcements (Libb & Clements, 1969), gold stars, gift certificates, exercise equipment, such as shoes or clothes (Martin & Dubbert, 1984), money, going to a movie or restaurant, social activities (Kau & Fischer, 1984), return of personal items deposited (Epstein et al., 1980), and other physical and material items related to the exercise itself (Keefe & Blumenthal, 1980) for different fitness or adherence levels achieved.

Lottery has been used in exercise programs (Epstein et al., 1980; Martin et al., 1984) in attempt to influence exercise attendance for sedentary adults.

Deposits were made prior to the beginning of the exercise program and after attending a certain number of class sessions participants would received a lottery chance card. For Martin et al., (1984) drawings were held weekly for a small jogging apparel, and at bimonthly intervals to receive a larger prize, a 60-dollar gift certificate at a running store (Martin et al., 1984).

Rewards may also be psychological, in the form of attention, recognition, encouragement, or friendship (Shephard, 1985).

> Martin & Dubbert (1982) emphasized the value of individualized feedback and praise during exercise. They hypothesized that the basic program of shaping, modeling, and personalized feedback and reinforcement during exercise, administered by enthusiastic participants and leaders, was such a powerful intervention that the tangible reinforcers were less important to the exercisers (Martin & Dubbert, 1982).
>
> This idea was shared with Martin et al., (1984). The effect of personalized feedback was so influential that lottery reinforcement and whether distance or time-based goals were used did not influence class attendance or out-of class exercise adherence. Feedback and social reinforcement given to an individual twice during an exercise session for two minutes each was described as immediate and personalized. Individuals who received personalized feedback had the highest exercise adherence (54 percent) in a 3-month follow-up, whereas only 17 percent of those receiving group feedback continued to exercise (Martin et al., 1984).

Reinforcement should be provided regularly during each session (Ice, 1985; Martin et al., 1984; Oldridge, 1984c) in a personalized feedback manner, rather than as a group and generalized at the end of an exercise session (Martin et al., 1984). If the staff is unable to provide this, shortly after the behavior will at least aid reinforcement (Ice, 1985).

Rewards are provided as a recognition of one's accomplishment (Franklin, 1978). Bandura, (1982), cautioned using extrinsic incentives for performance completion do not necessarily increase one's performance. Rewards need to be given for fulfilled personal standards or the competence of the performance (to aid improved self-efficacy, discussed in a later section) (Bandura, 1982). Also, staff who use praise excessively may undermine the person's own self-attribution of power to make behavioral changes (Lamkin, 1983).

In cardiac rehabilitation programs, individuals begin at different times and usually continue for two to four months. This allows many instances for modeling to occur, another important behavior modification tool. Modeling may be of exercise leaders exercising with them who provide appropriate exercises of warm-up and cool-down, proper jogging form, monitoring exercise heart rate and breathing comfort. Modeling may be of other participants who are further along the rehabilitation process who are more energetic, more aerobically fit, and have a more positive mental outlook. Modeling helps the newcomers to be aware that because of a coronary event, he need not spend the rest of his life as an invalid. Observing others provides information about the task; what it demands, how to and effective strategies to exercise, and one's chances of exercising (Bandura, 1982). Adult men identified the opportunity to compare their own progress and fitness level with that of others as primary reason for continued exercise adherence (Heinzelmann & Bagley, 1970). Modeling is a very important component of cardiac rehabilitation.

Group exercise sessions also provide for companionship and social support, another potent motivator (Heinzelmann, 1973; Pollock et al., 1978; Wankel, 1984). However, it is not the mere association in group settings which may be influencing behavior (Dishman, 1982). Persons need to feel a part of the group. Many described the social aspects of group exercise as one of their most influential reasons for continuing adherence (Heinzelmann & Bagley, 1970). Those individuals exercising with a partner or as a group member have been reported having a reduced exercise dropout rate (Massie & Shephard, 1971) and more frequent exercise in clubs than those exercising alone (Wankel, 1984). Cohesive, group-oriented individuals initiated almost twice the number of jogging episodes as controls (King & Frederiksen, 1984). Many articles researched used a group exercise program format.

> Wankel, (1984), emphasized a home and buddy support system. Buddies assisted members to maintain class attendance by phone reminders, encouragement, shared transportation and other positive reinforcements. A more supportive home environment was encouraged by suggesting the participant

> share the exercise booklet with the family and discuss problems of irregular attendance and aspects of the home routine that would assist or detract from regular attendance. Participants perceived the leader, buddy and general class support as most positive and beneficial to their class attendance. However, the author suggested buddy relationships were difficult to implement with strangers and a program of social support was need to facilitate exercise adherence (Wankel, 1984).

Daltroy, (1985a, check) indicated individuals with spouses, regardless of spousal participation, attended significantly better than did patients without spouses. Andrew et al., (1981), found little or no spouse support, and a perceived lack of individualized attention by participants related to a high dropout rate in a cardiac exercise program. Especially at the onset of a cardiac exercise program, family support to enhance continued participation is highly valued (Andrew et al., 1981). However, Daltroy, (1985a) cautioned to allow spouses to select their own means of encouragement. If it is not natural to the relationship, encouragement can quickly turn into nagging (Daltroy, 1985b).

However, group participation is cautioned because it may lead to competition (Pollock et al., 1978). During competitive activities individuals may be unaware of their messages of fatigue and exercise limit, at the expense of their safety. Especially in the initial stages of an exercise program, competition is strongly discouraged (Pollock et al., 1978). For the overly competitive person, Martin and Dubbert, (1982), recommended competitive activities be allowed only in addition to a more relaxed, enjoyable fitness training/maintenance program.

Social activities and clubs that emphasize comraderie, health and fitness encourage motivation. Walk-run events (5 K or 10 K), bicycle outings, family picnics, dining at heart-healthy restaurants, after exercise session game-type activities, and long-range clubs are fun and aid motivation (Davidson & Maloney, 1985; Ice, 1985; Oldridge, 1984c; Oldridge et a., 1978). Also, family involvement and activity opportunities have been suggested (Oldridge, 1984c; Oldridge et al., 1978).

Reinforcers are often combined with behavior in behavioral contracts (Eraker, 1984; Martin & Dubbert, 1984). Contracts ideally focus on a person's strengths (no matter how small) rather than weaknesses (Falvo, 1985). People respond best to a behavior management program when they are aware of the specific relationship between their behavior and reinforcement (or punishment) (Martin & Dubbert, 1984). This relationship is in the form of an agreement, either a verbal or written agreement, or a behavioral contract. Written agreements are not as effective as a behavioral contract, although they are probably more effective than no agreement at all (Oldridge & Jones, 1983).

The key is that individuals set their own goal based on their ability, such as 100 miles or 1,000 miles, attendance, improved fitness, greatest weight or body fat loss (Franklin, 1978). Precautions must be taken, however, to ensure people with coronary artery disease do not try to meet contract requirements in spite of cardiac warning symptoms, such as exercising in spite of symptoms in order to meet a time or distance goal (Martin & Dubbert, 1984).

Behavioral contracts are used to (1) help the participant actively initiate specific actions; (2) establish clear-cut criteria for achievement; (3) provide a mechanism for clarifying the consequences of engaging in the behavior (Kanfer, 1980); (4) provides an opportunity to discuss potential problems and solutions (Eraker, 1984); and (5) elicits a formal acceptable commitment of those involved (Epstein & Wing, 1979). Objectives should be set by the exerciser, be positive, clearly stated, and unambiguous; and be immediate and specific rather than distant and general (Oldridge, 1984c).

> Every written behavioral contract should contain seven elements:
>
> (1) A clear and detailed description of the required instrumental behavior should be stated;
>
> (2) Some criterion should be set for the time or frequency limitations which constituted the goal of the contract;
>
> (3) The contract should specify the positive reinforcements, contingent upon fulfillment of the criterion;
>
> (4) Provisions should be made for some aversive consequence, contingent upon nonfulfillment of the contract within the specified time or with the specified frequency;
>
> (5) A bonus clause should indicate the additional positive reinforcements obtainable if the person exceeds the minimal demands of the contract;
>
> (6) The contract should specify the means by which the contracted response is observed, measured, recorded; a procedure should be stated for informing the client of his achievements during the duration of the contract;
>
> (7) The timing for delivery of reinforcement

contingencies should be arranged to follow the response as quickly as possible (Kanfer,1980).

Exercise aerobic points (Cooper, 1977) have been used with behavior contracts (Wysocki et al., 1979; Epstein et al., 1980). College students deposited items prior to the beginning of their exercise program to earn back based on their aerobic points (Wysocki et al., 1979) or their attendance (Epstein et al., 1980). Contracts were renegotiated weekly. Most (87 percent) participants increased their aerobic point earnings and indicated this procedure enabled them to endure the more aversive early periods of exercise. At a one-year follow-up most indicated they were exercising more than baseline (Wysocki et al., 1979).

> Epstein et al., (1980) combined and compared a contract with a lottery to encourage attendance in a running program for college-aged women five days weekly. Both groups attended significantly more exercise sessions than did a control group. The rate of fitness change and aerobic points earned was greater for the contract groups, as compared to the lottery group indicating the potential benefit of contractual procedures (Epstein et al., 1980).
>
> Wysocki et al., (1979) suggested the initial meetings be directed to describe the program and write initial contracts for maintaining meeting attendance to help protect against early dropouts. The aerobic point criteria could be introduced at a later time (Wysocki et al., 1979).

Behavioral contracts are based on a set goals. Martin et al., (1984), conducted a series of studies to examine the types of goals that encourage exercise attendance and adherence.

> In study 1, goals based on time or distance were examined with either personalized-immediate versus group-delayed feedback. The individualized distance goals were increased 0.25 miles per week and timed goals were increased about three minutes per week. Overall, exercise attendance did not differ greatly whether time goals versus distance goals. However, in the group with less individualized attention and more group-oriented feedback, time-based goals had better exercise adherence than distance-based goals. The group-delayed feedback and distance-based goals had the poorest attendance, out-of-class adherence and the most dropouts. A three-month

follow-up indicated no difference between the time and the distance goals groups in exercise adherence (Martin et al., 1984).

In study 2, participants who had goals that they were able to modify daily, rather than received a fixed distance had better exercise class attendance, out-of-class exercise adherence, greatest increases in fitness, lowest dropout rates and a higher exercise maintenance at a 3-month follow-up. Time-based goals, described in study 1, may allow some flexibility and may be important in the early stages of exercise (Martin et al., 1984).

Study 4 examined goals set weekly (proximal) or at 5-week intervals (distal). There was no significant difference in attendance or fitness changes. However, the distal-goal group did tend to set higher goals, have a slight increase in out-of-class exercise adherence, and were twice as likely to continue exercise three times a week at a 3-month follow-up. The authors suggested fewer goals may allow subjects to falter or progress slower without frequent goal deadlines serving as reminders of failure. The authors recommended goals be flexible and set by the individual for each session and long-term goals set on a monthly basis in consultation with the exercise leader (Martin et al., 1984).

As a reminder, the exercise programs are to meet the needs and interests of its participants. The goals should be participant-set and short-term, and allow as much flexibility and choice as possible. A public statement of one's commitment can aid motivation, but flexibility needs to be considered with "loners" (Oldridge, 1984c).

Another powerful tool used in behavior modification is the use of stimulus control, antecedent prompts and cues that help increase the probability of exercise behavior (Ice, 1985).

> Prompts from a variety of sources, such as teaching exercisers to encourage others to ask about their exercise, public posting of running mileage or time, signs or posters, or even billboards, radio, television and newspaper advertisements are effective. Teaching people to lay out their exercise clothes the night before, to wear exercise clothes around the house or town, to carry exercise equipment in their car, to spend time with others who exercise frequently, and driving to the exercise facility or class even though one may not feel like exercising that day may also help increase exercise probability (Martin & Dubbert, 1984).

Other stimulus control measures may be to consider a certain period of time as one's exercise period, a part of one's daily routine. For many, the first thing in the morning has the fewest chances for interruptions (Pollock et al., 1978). This exercise time should be planned in advance.

> Measures including exercise the same time of day and in a similar setting, and engaging in a sufficient ten-minute warm-up period, were positive at a two-year follow-up for overweight, inactive, and middle-aged men. The authors believed these measures were important in the exercise behavior developed; that exercise adherence may be more influenced by manipulation of antecedent environmental stimuli than to modifications of exercise consequences (Keefe & Blumenthal, 1980).

If an individual prefers to exercise in their home, timing their exercise period with an exercise television program may help. Brownell et al., (1980) related the use of a cartoon sign that encouraged people to use the stairs rather than an escalator had a significant effect. Others have made signs for themselves at home or stored exercise equipment and clothing in a visible location.

Telephone prompts have also been suggested (Wankel and Thompson, 1977).

> Telephone calls prior to exercise attendance were examined for individuals with coronary heart disease and their spouses. The telephone calls were designed to convince individuals of benefits of regular exercise, ways to cope with the likely drawbacks of exercise, and to elicit an oral commitment to attend two classes per week for the first six weeks. Pamphlets were then mailed to reinforce the discussion. This intervention was found to significantly increase attendance in the first three months of a prescribed exercise program (Daltroy, 1985).

Cognitive strategies, what individuals are thinking before, during and after exercise may have an impact on exercise adherence, particularly in the formation of the habit.

> Telephone calls were combined with inactive females' thoughts of their anticipated outcomes based on returning to a health club. The authors suggested self-persuasion effect influenced the higher rate of return and average attendance. Groups were further divided to list and verbalize either their perceived positive and negative reasons, or only positive

> reasons for returning to the health club. Based on the results the authors suggested the positive-only orientation may be more effective for initial decision to attend, but for continued involvement a more balanced consideration of positive and negative outcomes would be desirable. In this study, gains and losses to self, gains and losses to important others, approval and disapproval from others, and approval and disapproval from himself were examined (Wankel & Thompson, 1977).

The types of goals an individual focuses upon may also influence exercise behavior, as previously described (Ice, 1985; Martin et al., 1984). When combined with other stimulus control measure, middle-aged men who set a goal not greater than ten percent of the previous week's distance continued to adhere to their exercise program at a two-year follow-up (Keefe & Blumenthal, 1980).

One's perception of their activity choice during a volunteer exercise session influenced the frequency of exercise behavior. Adult women who perceived a choice in their exercise were exercising twice as frequently and indicated a higher intention for future exercise by the sixth week of exercise (Thompson & Wankel, 1980).

How a person talks to himself are as important as engaging in the exercise behavior (Redd et al., 1979; Martin & Dubbert, 1984). For example, rather than looking at a running distance as "I knew I didn't want to exercise today" to a more positive statement as "I've come all this way and am doing well in spite of feeling low energy earlier. I'll just go slow today and notice the flowers." Behavior change doesn't happen overnight. A little gentle and kind consideration directed to the person himself could do wonders. Many start a new exercise program and make it much harder by saying negative statements about themselves and what they are doing. People are encouraged to be especially generous in the beginning (Martin & Dubbert, 1984).

The types of thoughts one focuses upon during exercise also has an effect of one's perception of exercise effort and exercise attendance. During exercise thoughts may be associative (internal body sensations, such as breathing, temperature, muscle fatigue, and tension in arms) or dissociative (external distracting, such as watching scenery or non-exercise related objects, counting backwards, and repeating a rhythmic phrase) (Martin et al., 1984;

Okwumabua et al., 1983). Individuals who used dissociative thoughts had greater improvement in their running times (Okwumabua et al., 1983; Pennebaker & Lightner, 1980). Groups focusing on dissociative thought had significantly better in-class and out-of-class exercise adherence, and exercise maintenance at a three month follow-up (Martin et al., 1984).

To aid performance and satisfaction, recommendations for beginners were to exercise away from the confines of a track (Pennebaker & Lightner, 1980). Dissociative thoughts are beneficial during initial training (Martin et al., 1984; Okwumabua et al., 1983; Pennebaker & Lightner, 1980), but over time associative thoughts were more common and useful (Okwumabua et al., 1983). Pennebaker and Lightner, (1980), suggested it may not be the decreased internal focus important for the increased performance and satisfaction, but rather than the increased external attention.

> College-aged men joggers who focused on external cues in an exercise setting had a reduced awareness of internal sensations and fatigue, while those who attended to their internal cues had greater perceptions of exertion and fatigue. Similar exertional symptoms occurred whether jogging cross-country or on a lap track. The authors suggested individuals set and maintain their jogging pace in accord with their perceptions of fatigue-related symptoms, as in the Borg RPE scale (Borg, 1982) (Pennebaker & Lightner, 1980).

Many of the techniques described thus far are particularly useful early in the change process to establish a new exercise behavior. Maintenance of exercise behavior change is even more difficult than achieving the initial exercise behavior (Blumenthal et al.,1983). The crucial transition from an individual acquiring the exercise behavior to maintaining this behavior requires that the individual attribute the causes of their behavior change to themselves (internalized), and that this behavior is reinforced and maintained by that individual (Kanfer, 1980). Although helpful during the acquisition phase, self-control methods are more desirable near the maintenance phase because the individual is an active participant, and has more control and responsibility (Kanfer, 1980; Martin & Dubbert, 1984; Pomerleau et al., 1975). However, prior to training an individual in self-control techniques, the conditions for instigating the behavior change must already be created (Kanfer, 1980).

Most self-control programs combine self-monitoring, standard setting, self-evaluation and self-reinforcement. Self-monitoring is deliberately and carefully observing one's own behavior, usually by recording its frequency or intensity and is based on the individual's standards (Kanfer, 1980; Schunk & Carbonari, 1984).

> In aerobic exercise programs, self-monitoring often includes recording the type of activity performed and a measure of duration and/or intensity, such as heart rate (pre, post, and during exercise), time, distance or aerobic points earned. They may also record the time of day, the place and with whom they exercised or graph daily or weekly progress (miles covered or sessions attended). This information may be recorded in a notebook, on an index card, calendar or special form. These recordings may provide additional social recognition. In general, to enhance compliance, recording should be kept to a minimum, but if complete enough, can aid in relapse prevention training (discussed in later section) (Martin & Dubbert, 1984).

Graphs may have aerobic points earned charted (Kau & Fischer, 1984). Men with coronary disease have been asked to record daily physical activity levels, weight, smoking habits and their heart rate during a submaximal exercise test (Martin & Dubbert, 1984; Oldridge and Jones, 1983). Also, noting one's energy and enjoyment level during exercise, the "bad days" or "slips" is helpful.

> Self-monitoring by its very occurrence may alter the behavior being observed if it is closely related to that target behavior. For example, asking individuals to monitor their daily pedometer reading is likely to produce better adherence with a walking program than recording the presence of anginal pain. Participants may learn to evaluate their own progress over time by observing decreases in resting heart rates and increases in exercise duration or distance (Martin & Dubbert, 1984).

For individuals with coronary artery disease, self-monitoring may also help lessen fear of overexertion.

> Baile & Engel, (1978), examined a program of self-planning and self-monitoring with weekly visits to review data of individuals recuperating from a myocardial infarction. Individuals were found to be highly compliant (86 to 100

> percent) during the program length of 12 to 23 weeks. They were expected to keep records, take pulse rates before and after activities, keep a schedule of ten progressing activity hierarchy each identified and any related symptoms, and keep their appointments with physicians and interviewers. All the individuals reported the pulse taking during activities were gratifying because it enabled them to evaluate their recovery in terms that were easily to understand (Baile & Engel, 1978).

After self-monitoring, the person then evaluates whether the behavior meets a desired performance (self-evaluation) and depending on the outcome rewards (usually) himself according to contingencies (self-reinforcement) (Kanfer, 1980; Schunk & Carbonari, 1984). The major difference of self-contract from behavioral contracting, previously described, is that the individual rather than the helper has control of the administration of the contract, what reinforcements are valuable to themselves, and the delivery of those reinforcements (Martin & Dubbert, 1984). The self-rewards (or self-punishment) may also be cognitive self-statements.

> Self-reinforcement was combined with stimulus control for an individual exercise program. Middle-aged men made a list of ten potentially rewarding stimuli. Each then set an exercise criterion level, based on Cooper's aerobic points (Cooper, 1977), for self-administration of each rewards. All met with the authors for eight to ten one hour sessions over one year. As discussed, exercise adherence continued at a two-year follow-up (Keefe & Blumenthal, 1980).

Kau and Fischer, (1984), discussed self-modification methods combined with a written contract based on Cooper's aerobic points. The reinforcers were chosen by the individual, but issued by a second person as agreed (Kau & Fischer, 1984).

> A signed written contract was combined with self-monitoring in a six-month exercise program for men with coronary artery disease. Men who signed the agreement had significantly higher attendance than those who did not. Self-monitoring of each person's submaximal heart rate during a "mini-test" each month proved to be a much more practical adjunct in a cardiac rehabilitation program than self-monitoring of other health behaviors. The regular testing and feedback was one of the most helpful motivational strategies (Oldridge & Jones, 1983).

In another study, the feedback from objective exercise testing accounted for about half the variance in exercise behavior at six months between compliers and dropouts (Oldridge & Spencer, 1985).

In the maintenance phase, relapse prevention training a program of exercise has also been suggested (Marlatt & Gordon, 1980; Martin & Dubbert, 1984). Rarely does behavior changes occur on the first attempt, rather change occurs in a process of trial and evaluation. Individuals may need help to view their slips as likely. It is highly unlikely that anyone will be able to adhere perfectly to a planned exercise regimen, even with the highest motivation (Martin & Dubbert, 1984).

Marlatt & Gordon, (1980) proposed teaching cognitive strategies, i.e., restructuring one's thoughts concerning personal "failure", and behavioral methods, i.e. planning alternative behavioral skills to be used when relapse is possible. How a person views exercise relapse, as a slip or a failure, that they are a failure and have lost control, is important. Exercisers are encouraged to view their adherence to an exercise program as a continuum rather than either totally adherent or nonadherent, a relapse is a single, temporary event. For example, a lapse of one week after 19 weeks of exercise could be viewed as a slip from 100 percent to 95 percent, rather than a sudden fall to zero percent (Martin & Dubbert, 1984). Similarly, the idea of fitness is a continuum, there are different levels of fitness. Abstinence does place a person at risk, but it can also be an opportunity for positive learning of one's self (Marlatt & Gordon, 1980).

Cognitively, also how a person identifies himself as an exerciser or nonexerciser is important. Exercisers would be more likely to integrate exercise in their routine daily activities, such as taking stairs, and walking or bicycling to work or while doing errands, even part way. Encouraging these activities may help one's identification as an exerciser. One's reaction to a health behavior change, then, may affect a person's ability to facilitate and ultimately, maintain changes in other health behaviors. Regular adherence to any regime (exercise) may have beneficial effects on self-esteem and self-efficacy that generalize to other aspects of the person's life and their ability to cope (Finnegan & Suler, 1985). But, when the person attempts to change exercise with other behaviors at the same time, failure rates increase (Ice, 1985).

An individual abstaining from exercise is making a decision and also creating cognitive dissonance. A conflict then exists with their image as an exerciser and one who is abstaining from exercise. By making a decision, the individual has considered the positive and negative outcomes, at least at some level (Marlatt & Gordon, 1980).

Skills offer more help to the individuals than relying on one's "will-power" or trying to adhere to advice. Skills may help a person cope more successfully with a relapse, either to prevent it from occurring or by minimizing the extent of the relapse if it does occur (Marlatt & Gordon, 1980). Skills are need to resist the pressure to revert to previous habits, and to withstand frustrations and setbacks (Leventhal & Cleary, 1979).

Teaching the individual to identify high-risk situations likely to increase one's omission of their exercise behavior is a step in relapse prevention training (King & Frederiksen, 1984; Marlatt & Gordon, 1980). High risk situations may include scheduling another activity or starting an activity just before one's planned exercise time, planning a vacation in which eating will be encourage and activity limited, or associating with non-physically active people just prior to one's planned exercise time (Martin & Dubbert, 1984). Self-monitoring procedures provide the best method of identifying high-risk situations (Marlatt & Gordon, 1980). Stimulus control techniques and creating situations prior to exercise may aid the person to make exercise more convenient and enjoyable (Martin & Dubbert, 1984).

A planned relapse practiced for a period of time (usually one week), then resume their exercise program, is recommended (Marlatt & Gordon, 1980; Martin & Dubbert, 1980). Since it is the helper that is responsible for the omission of exercise, it may minimize the individual's sense of failure and conflict of what they believe they should do (Marlatt & Gordon, 1980). This time allows the person to examine his thoughts about the relapse and other responses that could be used under more supportive conditions instead of omitting the exercise. Problems may be identified and remedied (Marlatt & Gordon, 1980; Martin & Dubbert, 1984). Returning to exercise results in an increased sense of control, accomplishment, and the feeling of "I know I can do it," and thereby increasing one's inclination to continue exercise (Marlatt & Gordon, 1980).

> Interestingly, the potential for relapse also increases for persons who fail to include periods of some self-rewarding or pleasurable activity in their daily schedule. Initially, exercise is not thought of as a relaxing or rewarding activity, and usually must be "fit into" an already busy schedule. The authors suggested individuals examine activities they feel obligated to perform (a should activity), and activities they like to perform (a want activity). By examining the want/should ratio, if a strongly weighted should ratio exists, the probability of relapse may be high. The individual may need to discover other alternatives of want activities, rather than the want of abstaining from exercise. Later, exercise may become the want activity that is relaxing in itself and thereby reinforcing (Marlatt & Gordon, 1980).

A five-week relapse prevention training course for college-aged women was conducted. The women were asked to jog independently on an indoor running track. In a three-month follow-up, 83 percent of the relapse-only group continued to jog (King & Frederiksen, 1984).

> Generalization training of similar target behavior (exercise) in a new setting (stimulus generalization), or a new behavior (a second exercise) in the same environment (response generalization), or both is another method to help identify problems early. The authors suggested an additional exercise day in the person's home environment after the second week, using an exercise identical to the program exercise sessions. If the person is having difficulty, other class members are encouraged to exercise with the person in their home environment several times (Martin & Dubbert, 1984).

Many studies suggested at least one other exercise session not in the organized program (Oldridge & Jones, 1983; Martin et al., 1984; Keefe & Blumenthal, 1980).

The difficulty is how to keep one's motivation alive. Ultimately, the motivation to continue an exercise program must be intrinsic rather than extrinsic (Franklin, 1978; Ward & Morgan, 1984). Generalization training and behavior modification should eventually emphasize more natural reinforcers and intrinsic motivation, such as positive comments from others, increased feelings of self-control and self-esteem, increased energy levels, and negative feelings associated with inactivity, and involvement of others (family or friends) in the new setting (Martin & Dubbert, 1984; Ward & Morgan, 1984). Ultimately, the motivation to exercise must come from within.

> A particular exercise program based on behavioral modification was studied for those who suffered from chronic obstructive pulmonary disease. The behavioral methods incorporated were goal-setting, a behavioral contract and contingency management, and two sessions of relaxation training, while the cognitive methods attempted to challenge irrational beliefs and negative self-statements concerning walking, to promote positive self-talk with specific cues. A combination of behavioral and cognitive methods raised maximally a person's self-efficacy for walking. The perceived self-efficacy of walking exercise was a better predictor of actual behavior change. These changes in walking self-efficacy were significantly correlated with walking compliance at 3-month follow-up (Kaplan et al., 1984).

The relationship between knowledge and action is thought to be mediated by a person's thoughts about themselves and their abilities to perform the behavior (Schunk & Carbonari, 1984). How people judge their capabilities and their perceptions of their efficacy, affects one's motivation and ultimately, behavior (Bandura, 1982). Bandura, (1977), theorized the missing link in the behavioral change process is a cognitive mechanism, one's perceived self-efficacy. Personal-efficacy was the most important predictor to perform recommended behaviors than increased feelings of fear, concern, threat, and intention (Beck & Lund, 1981). Self-efficacy combines components of cognitive, social, and behavioral skills (Bandura, 1982). If self-efficacy is lacking, people tend to behave ineffectually even though they know what to do (Bandura, 1982).

Exercise Self-Efficacy in Coronary Artery Disease

The quality of life is a function of the person's experiences and his perceptions of his physical limits and abilities (LaMendola & Pellegrini, 1979). Regardless of medical determinations, a person will define his own capacities (Davidson, 1979). What the individual perceives and his own emotions contribute more to the general sense of well-being in coronary artery disease than physical symptoms (Jenkins et al., 1983). Problems in recovery stem more from one's perceived physical inabilities than from actual debilities (Bandura, 1981).

In coronary artery disease, the heart heals rapidly, but the psychological recovery is slow for those who believe they lack the physical ability and fear resuming their usual activities (Bandura, 1982; Bandura, 1981). Recovery from cardiac disease is tremendously facilitated by the enhancement of the person's judgments of their physical and cardiac capabilities (O'Leary, 1985). The restoration of perceived physical efficacy is essential (Bandura, 1982; Bandura, 1981).

Becoming physically changed, damages one's perceptions of his capabilities (Bandura, 1981). It destroys one's confidence. Every activity will be approached as if it has never been tried before and the person will have countless fears associated with it even though he may be physically capable (Leech, 1976). After cardiac surgery, an estimated 40 percent of the individuals perceived some physical limitation an average 2.5 years after surgery (LaMendola & Pellegrini, 1979). Gundle et al., (1980) suggested high unemployment after surgery was related to an altered perception of capability, not physical disabilities (Gundle et al., 1980).

> Even though all men with coronary disease were considered capable, only 50 percent attempted an exercise training program. A person's perception of vulnerability was the only significant factor through all phases of an exercise program. People who perceived themselves as more vulnerable were less likely to attempt exercise training in the first place, were less likely to participate fully in a training program if they did attempt it, and were less likely to exercise beyond completion of the program (Fontana, 1986).

Experiences following an acute coronary artery disease episode influence the person's perception of his physical abilities which, in turn, influence other activities (LaMendola & Pellegrini, 1979; Bramoweth, 1983). Steinhart (1984) viewed one's subjective opinion of his physical capabilities as the most important predictor of the outcome after a myocardial infarction. Enhancing self-efficacy and self-esteem in health changes may prevent or alleviate depression (Finnegan & Suler, 1985).

Self-efficacy influences one's thought patterns, actions, and their emotional arousal (Bandura, 1982). Perceived self-efficacy influences one's choice of activity and environmental settings, how much effort a person will expend, how long they will persist in the presence of obstacles, and their thoughts and emotional reactions during anticipatory and actual experiences (Bandura, 1981; Bandura, 1977; Schunk & Carboni, 1984). People will only approach, explore, and try to deal with stressful situations they perceive within their capabilities. They will avoid those perceived as exceeding their ability (Bandura, 1977).

Self-efficacy is a person's perception and judgement of his ability to perform a behavior in the presence of ambiguous, unpredictable, and often stressful situations (Cervone & Peake, 1986; Bandura, 1981; Bandura & Schunk, 1981). How a person reads their performance successes influences them more than the actual success (Bandura, 1982). Past behavior attainments has less effect on further behavior than does one's perceived self-efficacy (Bandura, 1982; Bandura et al., 1977). One's perception of his abilities is central to self-efficacy (Bandura, 1977).

Persons who have a strong sense of efficacy focus their attention and efforts to the situation and utilize more effort in the presence of obstacles, whereas, those perceiving themselves as inefficacious focus on their failures and potential failures (Bandura, 1982). Stronger self-efficacy encourages more vigorous and persistent efforts (Bandura, 1981). This was supported in a studies of men after a myocardial infarction. The self-efficacy scale was strongly related to the treadmill test performance (functional capacity) (Ewart et al., 1986). In another study, an interactive relationship was found between perceived self-efficacy and physical activity performance. Self-perceived efficacy was highly correlated with actual functional capacity (peak heart rate) three weeks post-infarction. Perceived physical efficacy, not peak heart rate during a treadmill test, was also more predictive of longer duration and higher exercise intensity at home. The high self-efficacy lead to a greater effort, which in turn lead to higher physical attainment at home (Ewart et al., 1983).

Those who have a strong sense of efficacy deploy their skills to the demands of the situation and are spurred by obstacles to greater effort, which enrich ones life (Bandura, 1981). The higher one's perceived self-efficacy, the greater one's persistence to master the challenge (Bandura, 1982). A sense of personal efficacy in mastering challenges is apt to generate greater interest and ability in the activity (Bandura & Schunk, 1981). A strong sense of self-efficacy is an aid to good performance, helping to withstand failures and coupled with challenges, spur further acquisition of knowledge and skills. Increased knowledge and skills tend to further heighten interest and confirm self-efficacy (Bandura, 1982). Skills developed by competency of proximal standards may build interest in even disvalued activities (Bandura & Schunk, 1981). There may be, however, a temporary lag between self-efficacy and interest of newly acquired activities, even those previously disliked (Bandura, 1982).

Active participation contributes to growth, while avoidance prevents negative self-percepts from changing and remain inefficacious (Bandura, 1977; Bandura, 1981; Schunk & Carbonari, 1984). Persistent efforts will eventually help eliminate one's inhibitions through corrective experience (Bandura & Adams, 1977).

People who doubt their capabilities avoid threatening situations, slacken their efforts or give up (Bandura, 1977). If, while attempting a task, the person discovers something intimidating that indicates a limitation, then a decline in self-efficacy occurs despite a successful performance (Bandura, 1982). Self-efficacy decline is apt to set in motion further decline. People who are insecure about their efficacy not only curtail their range of activities but undermine their efforts in those they undertake, resulting in a progressive loss of interest and ability (Bandura, 1981; Bandura & Adams, 1977). Those who judge themselves inefficacious tend to spend excessive time and energy evaluating potential situations (Schunk & Carbonari, 1984) and direct their energies toward their inadequacies rather than their potential abilities (Bandura, 1981). When people avoid what they fear and stop prematurely, they retain their self-debilitating expectations and defensive behavior (Bandura & Adams, 1977).

Self-efficacy does not imply a direction of causation. Self-efficacy influences behavior and behavior influences self-efficacy (Kaplan et al., 1984). In a study by Taylor et al., (1985), similarities occurred. Perceptions of one's capabilities predicted their treadmill performance (the higher the perceived physical efficacy prior to testing, the higher was their peak treadmill workload and heart rate attained). Similarly, high peak heart rates and workloads attained on the treadmill were associated with high cardiac and physical efficacy ratings (Taylor et al., 1985). Ewart et al., (1983) suggested initial self-efficacy predicted the treadmill test peak heart rate and the peak heart rate achieved then affected the postreadmill self-efficacy (Ewart et al., 1983).

Self-efficacy is changeable (Bandura, 1981). An increase in physical and cardiac efficacy occurred after a treadmill testing and after a counselling experience (Taylor et al., 1985). In men after a myocardial infarction, self-efficacy scores changed after a treadmill test. Those who performed well on a treadmill test, sustained higher self-efficacy scores (+58 percent) than prior to the test. Whereas, those who performed less well, had a decrease in their physical self-efficacy scores (-33 percent) (Ewart et al., 1983).

Successes raise efficacy and repeated failures lower them (Bandura, 1981). And with any new behavior: slips are the rule rather than the exception (Schunk & Carbonari, 1984). After a strong sense of efficacy for exercise is developed, an occasional failure or session skip is unlikely to have much effect on self-efficacy (Bandura, 1981; Schunk & Carbonari, 1984). When failures occur and are attributed to unusual circumstances, insufficient effort, despondent mood, or temporary physical debilitation high self-efficacy should not change (Schunk & Carbonari, 1984; Bandura, 1981). Individuals who experience periodic failures but continue gradual improvement are apt to raise their perceived efficacy. Failures overcome by determined effort instill even more efficacy (Bandura, 1981). Likewise, low self-efficacy will continue even if one 'success' occurs after many 'failures' (Schunk & Carbonari, 1984). Less improvement of self-efficacy occurs when people's rate of improvement begins to level off (Bandura, 1981). Attainments gained through much effort denote a lesser ability and are thus likely to have weaker impact on perceived self-efficacy (Bandura, 1981).

Perceived efficacy is also affected by one's faulty judgment of their self-capabilities (Bandura, 1977). Performance may be hindered by attending to unfamiliar parts of tasks rather than what is familiar and within one's capabilities (Bandura, 1982).

> Biases of one's performance may encourage the person to selectively attended to the more negative aspects of his performance. When this occurs people tend to underestimate or overestimate their efficacy. People who overestimate their capabilities suffer needless failures and possibly injuries. People who underestimated their capabilities avoid beneficial situations and cut themselves off from potentially rewarding experiences (Bandura, 1981).

People may credit their achievements to external factors rather than to their own capabilities if using faulty judgment (Bandura, 1977).

People who experience setbacks, but detect relative progress will raise their perceived efficacy (Bandura, 1977; Schunk & Carbonari, 1984) more than those who succeed but see their performances leveling off (provides no new information) compared to their prior rate of improvement (Bandura, 1977). Perceived efficacy will not be aided much if individuals believe that these behaviors have stabilized at undesirable levels (Schunk & Carbonari, 1984).

Self-efficacy and interest is also influenced by the type of goals and rewards an individual identifies (Bandura, 1982). Proximal goals provide immediate incentives, guides for specific action, and markers of progress to further increase self-efficacy. Distal goals are too far removed in time to effectively mobilize effort or to direct action (Bandura, 1982; Schunk & Carbonari, 1984), creating further disparity between current performance and future standards (Bandura & Schunk, 1981). Proximal goals increase interest by emphasizing satisfaction and self-efficacy (Bandura, 1981; Bandura, 1982; Schunk & Carbonari, 1984) and with distal goals interest fails to develop even skills may develop (Bandura & Schunk, 1981).

> Both the anticipated self-satisfactions for matching accomplishments and the self-dissatisfaction with substandard performances provide incentive for heightened effort. Attainments that match or surpass personal standards create self-satisfactions that serve as positive inducements for further pursuits. Moderate difficult tasks yields the highest performance. Performances that fall markedly short are apt to give rise to discouragement and goal abandonment (Bandura &

Cervone, 1983).

> Rewards for perceived tasks mastered, rather than rewards gained by performing routine activities encourage interests in the activity. When performance competencies are ambiguous (especially when people do not perform to maximum ability) rewards given for competent performances increase self-efficacy (Bandura, 1982).

The impact of happy or sad moods also influence self-efficacy. More positive moods were associated with higher self-efficacy, whereas, sadness was associated with lower self-efficacy (Kavanagh & Bower, 1985).

Self-percepts of efficacy are attained by four sources of information: performance attainments (enactive mastery), vicarious experience, verbal persuasion, and emotional arousal (Bandura, 1977; Bandura, 1981; Bandura, 1982; Schunk & Carboni, 1984). Regardless of the source, there is a close relationship between self-percepts of efficacy and action (Bandura, 1977).

Enactive mastery (the person's actual performance attainments) is obtained through participant modeling, performance desensitization, performance exposure, and self-instructed performance (Bandura, 1977; Bandura, 1981; Bandura, 1982). Enactive attainments provide the most influential source of efficacy, the highest, strongest, and most generalized increases, because it is based on direct performance accomplishments (Bandura, 1982; Bandura et al., 1977). This provides direct demonstration of one's current level of skill and ability (Bandura, 1982).

To raise and strengthen perceptions of cardiac robustness in individuals after a coronary event, enactive efficacy information is conveyed through treadmill exercises (Bandura, 1982) and participating in a cardiac rehabilitation exercise program. Individuals who find that they can exercise without undue fatigue should feel more efficacious for sustaining regular participation than those who find exercise laborious. Individuals who hold doubts about their capability to exercise regularly are apt to feel a stronger sense of efficacy after they have been participating regularly for some time (Schunk & Carboni, 1984).

> However, the treadmill test by itself may have a limited impact on perceived cardiac and physical efficacy to reassure individuals and their spouses. A treadmill test with a

> counselling session early after a myocardial infarction were associated with increased levels of perceived cardiac and physical efficacy increased in men three weeks after their myocardial infarctions. The counselling session provided an opportunity to generalize the implications of the treadmill test performance to activities and conditions quite different from treadmill exercise. (Taylor et al., 1985).

Vicarious experience is obtained through observing the performances of other individuals who have previously had similar problems and who, preferably, exemplify active lives. (Bandura, 1977; Bandura, 1981; Bandura, 1982). This experience is a less dependable source of information than direct accomplishment (Bandura et al., 1977). Watching similar others perform successfully raises efficacy expectations in the observers when they believe they possess those capabilities for similar activities (Bandura, 1981; Bandura, 1982). But, when the person observes others enjoying the benefits of a successful effort and perceives himself as ineffectual, this may increase self-criticism and possibly depression (Bandura, 1982). Observing a person who failed may boost the observer's self-efficacy if they believed their abilities superior. But, if similar, the effect may be negative (Bandura, 1981). A person is likely to experience a heightened sense of efficacy for maintaining a regular exercise program if a friend of comparable ability has been able to maintain one for months. This effect may be negated by actual participation (Schunk & Carboni, 1984).

The above was supported by McAuley, (1985). Those aided in participant modeling performed significantly better than did the unaided participant modeling group. The author suggested that self-efficacy was a more important determinant (significant predictor) of motor skill acquisition, than anxiety reduction (to be discussed later) (McAuley, 1985).

Verbal persuasion is obtained through persuasive suggestions that the person possesses certain capabilities to perform a behavior (Bandura, 1981; Bandura, 1982; Bandura et al., 1977). This method is frequently used after a coronary to raise and strengthen perceptions of cardiac robustness (Bandura, 1982). Persuasive efficacy information is furnished by informing patients about what they are capable of doing (Bandura, 1982). This method is limited in its effectiveness, but is readily available and 'easy' (Bandura, 1981; Bandura, 1982; Bandura et al., 1977). Its effectiveness does depend on the degree to which people believe what they are told (Bandura, 1982) and the credibility of those telling (Bandura, 1981). As previously discussed, Taylor et al., (1985) suggested a counselling session after treadmill test combined to further increase physical and cardiac efficacy scores. These scores appeared to increase less for the wives who actually participated in the testing situation (Taylor et al., 1985).

Physiological arousal is influential in individual's judging their capabilities, anxieties, and vulnerability to a situation (Bandura, 1981; Bandura et al., 1977). Individuals are more likely to expect success when they are not beset by aversive arousal. In general, moderate levels of arousal facilitates performance, while high arousal debilitates performance. Fear reactions generate further fear through anticipation (Bandura, 1981). Lessened emotional arousal is obtained through attribution, relaxation, symbolic desensitization, and symbolic exposure to lessen physiological states (Bandura, 1977; Bandura, 1981; Bandura, 1982). In a study by McAuley, (1985), anxiety reduction was mediated by one's perceived self-efficacy, rather than self-efficacy a by-product of anxiety reduction (McAuley, 1985).

Levels of physiological fear arousal before, during, and after a trying experience are influenced by self-efficacy (Bandura, 1981; Bandura, 1982). As one's self-judged efficacy increases, one's anxiety and fear arousal declines (Bandura, 1981; Bandura, 1977; Bandura et al., 1977) and threatening tasks are performed with virtually no apprehensiveness. Individuals who had stronger perceptions of their physical efficacy were, also, found to have less anxiety and self-consciousness, higher self-esteem and a higher perceived control of situations (Ryckman et al., 1982).

This is meaningful to the person with cardiac disease as previously discussed. Many after a heart attack are overly attentive to their cardiac activity and feelings of fatigue (Bandura, 1982), even erroneously (Jones et al., 1985). The meaning of physiological efficacy information is explained to ensure that individuals do not misread their physiology, by interpreting heart rate acceleration as warning to a reinfarction. (Bandura, 1982). This may also aid in restoring a sense of control over one's body and activities (Bandura, 1982; O'Leary, 1985; Bandura, 1977; Ryckman et al., 1982). It is the perception of control rather than the actuality of control that is stress reducing (Bandura, 1981). In physical activities, people read their fatigue, aches, and pains as indicates of their physical efficacy, but people are more influenced by their self-percepts of efficacy, than their visceral cues (Bandura, 1982). The emotional arousal can distort self-monitoring, retention, and processing of efficacy information (Bandura, 1981).

One's spouse's notions about the other's physical capabilities can aid or retard the recovery process (Bandura, 1982; Taylor et al., 1985), either by encouraging physical activity or by communicating worry and concern about the person's ability (Taylor et al., 1985). A problem of a partner overly protective after a cardiac event frequently occurs (as previously discussed). This deprives the individual of the chance to restore their self-efficacy (Davidson & Maloney, 1985). Interestingly, before intervention, wives rated their husbands' cardiac and physical efficacy substantially lower than their husbands' perceptions. This reflected the wives' doubts about their husbands' capacity for physical effort (Taylor et al., 1985).

The perception of the spouse's capabilities after a coronary event is important.

> Taylor et al., (1985) examined the effects of the wife's involvement (as summarized). Those that performed and observed the same treadmill test as their husband, compared to those who did not participate, had increased and significantly higher levels of their husband's perceived cardiac and physical efficacy. This compared to lower levels prior to intervention, as discussed. The person with coronary disease's perception of physical efficacy was some related to their treadmill performance, but a combination of husband's and wife's perceived cardiac efficacy was most predictive of treadmill performance (heart rate and maximum workload) at testing, 11-weeks and 26-weeks after a person's myocardial infarction. This study emphasized the value of treadmill testing after myocardial infarctions for both husbands and wives, by direct participation to alter perceptions of physical and cardiac abilities (Taylor et al., 1985).

Age-related decline in physical stamina may partly be reflected by a lowered self-efficacy. During one's middle years, there is a natural decline physical stamina and people are confronted with limits of their physical capabilities (Bandura, 1981). This was not confirmed as expected by Godin & Shephard (1985). Reported self-efficacy did not appear to decline with increasing age with volunteers. But, there was a gender difference of men tending to have higher physical efficacy levels than women (Godin & Shephard, 1985).

Enhanced self-efficacy tends to transfer to similar situations and other activities in future situations (Bandura, 1977; Kaplan et al., 1984; Bandura et al., 1977). The greatest increase in self-efficacy occurred after a treadmill test for activities similar to the treadmill exercise, such as walking and climbing stairs (Ewart et al., 1983). Kaplan et al., (1984) studied individuals with chronic lung disease. Self-efficacy of walking changes were significantly correlated with compliance to a walking program and further associated with enhanced expectations for performing these behaviors in the future. Self-efficacy generalized from walking to other similar activities of climbing, lifting, and pushing at a three-month follow-up (Kaplan et al., 1984). However, for more dissimilar activities, counselling combined with actual performance increased one's self-efficacy (Ewart et al., 1983).

Goals combined with feedback is critical to changes in motivation (Bandura & Cervone, 1983) and adherence (O'Leary, 1985). Simply adopting goals, whether easy or personally challenging ones, without knowing how one is doing seems to have no appreciable motivational effects (Bandura & Cervone, 1983).

> How an individual judges their capabilities through their self-perceived efficacy, affects their motivation and behavior. When perceived self-inefficacy increases, one's vulnerability to relapses increases. Perceived self-efficacy was a better predictor of subsequent behavior than was performance attainment. The higher one's perceived self-efficacy, the greater the performance accomplishment and the more likely are people to persist in their efforts. (Bandura, 1982).

Perceived self-efficacy is a reliable predictor both of who will relapse and the circumstances of person's first slip (O'Leary, 1985). Probing self-efficacy during the course of treatment can be a helpful guide during a program of personal change (Bandura, 1982).

> Ewart et al., (1986) examined men with documented coronary artery disease and determined self-efficacy to be an important predictor of behavioral compliance to exercise guidelines. The self-efficacy scale proved superior to other measures (including treadmill performance) in predicting patient adherence to exercise prescriptions. Only the self-efficacy scale identified in advance those overachievers who exercised at intensities above the prescribed heart rate range, thereby increasing their risk of cardiovascular complications. The person's self-perceived abilities was more related to exercise noncompliance than his actual abilities, as measured by the treadmill test results (Ewart et al., 1986).

It is imperative that the responsibility for change be shifted gradually onto the individual to foster interpretation of one's capabilities. When an individual is able to monitor his own habits, it develops a sense of efficacy, motivation (Schunk & Carbonari, 1984), and more generalized behavioral changes (Bandura et al., 1975).

Generalized, lasting changes in self-efficacy and behavior can best be achieved by initially using powerful induction procedures in safe restricting environments to develop efficacy, then removing external aids gradually to verify personal efficacy, and finally using self-directed mastery in increasing higher-risk situations to strengthen and generalize expectation of personal efficacy (Bandura et al, 1975; Schunk & Carbonari, 1984). When knowledge of health risks is combined with a strong sense of efficacy for avoiding them, long-term maintenance of healthy lifestyles result (Schunk & Carbonari, 1984).

Principles of Aerobic Exercise in Coronary Artery Disease

The competency of personnel involved in exercise in the clinical setting is based on an understanding of exercise physiology (Oldridge, 1979). Many have described the effects of exercise training. It is the intention of this author to review the main effects of chronic endurance training as related to cardiac function specific to the person with coronary artery disease. Circuit weight training and flexibility exercise will also be summarized in this discussion.

After an acute event, physical conditioning has a strong advantage--it is something to do. In a long list of don'ts- don't smoke, don't eat ice cream, don't rush--physical conditioning stands out as an affirmation, a person may exercise (Hackett & Cassem, 1973). By participating in exercise, the person with coronary disease is able to demonstrate to himself and his family that he is not totally debilitated (Stern et al., 1977). Conditioning is perhaps the most important aspect of convalescence to control depression, increase a sense of independence (Hackett & Cassem, 1973) and restore confidence. Some, after a coronary event, may need a year or more before confidence becomes sufficient to permit serious endurance training (Shephard, 1979).

A person's ability to train is similar after an acute myocardial infarction, coronary artery bypass graft surgery, in coronary disease when a myocardial infarction has not occurred (DeBusk, 1986; Franklin et al., 1984; Franklin et al., 1986; Froelicher et al., 1985; Hammond, 1985; Hartung & Rangel, 1981; Meier et al., 1983), and after a percutaneous transluminal coronary angioplasty (Franklin et al., 1986; Maresh et al., 1985; Meier et al., 1983). The majority of those with coronary artery disease will show lower aerobic capacities than "healthy individuals" (Clausen, 1976; Haskell, 1979) and those who have not had a myocardial infarction tend to have the edge of greater aerobic capacity after training (Cass Principal Investigators and Their Associates, 1983; Robinson, et al., 1984). Those with angina will tend to have lower aerobic levels than those with an uncomplicated myocardial infarction (Clausen, 1976). The major differences of exercise training, however, are related to applying the principles of frequency, intensity, duration, the rate of progression, and the of mode of training to the person (Pollock, 1985).

During the early stages, an exercise program is progressed first by increasing duration and frequency, and to a lesser extent, through intensity (Pollock, 1985; Metier et al., 1986). Exercise intensity and duration is usually slightly faster for the person after surgery than after a heart attack during the first four to eight weeks. Then, those with coronary artery disease manifestations, have similar exercise prescriptions and intensity (Franklin et al., 1986; Metier et al., 1986; Pollock, 1985).

Extra precaution with those after a myocardial infarction or coronary artery bypass surgery need to be considered for the first six to eight weeks to allow sufficient healing of scar tissue and the sternum (Pollock, 1985; Metier et al., 1986). Caution for the person after surgery, if at any time sternal instability occurs, as evidenced by clicking, grating or movement on palpation, upper-extremity and trunk range-of-motion exercises should be avoided (DeBusk, 1986; Metier et al., 1986).

> This occurs in about five percent of individuals and they should be advised to avoid vigorous upper-extremity activities until at least a month after the clicking is no longer evident. Lower-extremity activities that do no jar the upper body can be undertaken even with sternal instability. Physical disruption of the chest wound is unlikely after three weeks of healing and leg discomfort rarely limits exercise performance after four weeks (DeBusk, 1986).

A prescribed and supervised exercise treatment program may be initiated as early as three weeks after the acute event at physician discretion (Council of Scientific Affairs, !981), but most begin exercising during their hospitalization and may continue in an outpatient program as early as two weeks after a coronary infarction or surgery. The goal at this beginning stage is not training, but rather to maintain current functional level consistent with the diseased state (Hoskins & Habasevich, 1978).

Basic components of a training session include a warm-up, a muscular conditioning period, an aerobic exercise, and a cool-down (Pollock, 1985). The aerobic level may or may not be determined by an maximal exercise test during phase II, some prefer a submaximal test (Hoskins & Habasevich, 1978). Exercise principles for warm-up, cool-down, and muscular exercises will be discussed in a future section.

> Exercise is prescribed in terms of intensity, frequency, duration and type of activity. A satisfactory training effect occurs at 70 to 85 percent of the maximum attainable heart rate (intensity), an aerobic period of 20 to 45 minutes (duration), a minimum of three days per week (frequency), and utilizing large muscle groups in a continuous, repetitive movement. For those severely deconditioned, a lower intensity heart rate (60 to 65 percent of maximum heart rate), shorter exercise time period and more frequent exercise sessions per day and per week may be more appropriate initially in their exercise program (American Heart Association, 1975).

Individuals with coronary artery disease tend to over-or-underestimate their pulse rates (Ewart et al., 1986). The rating of perceived exertion (RPE) is used to provide a subjective supplemental method to relate to one's heart rate (Burke & Collins, 1984). As summarized (Burke & Collins, 1984; Metier et al., 1986; Pollock, 1985) an RPE of 13 is equivalent to 70 percent of one's maximum capacity.

Training progressively increases in intensity, duration and frequency. The higher percent of the maximal heart rate is more appropriate if no complications occur with exercise and after the healing phase, described frequently as Phase III exercise (Hoskins & Habasevich, 1978; Pollock, 1985). Rigorous game activities are not recommended until six months after beginning rehabilitation (Pollock, 1985). Greater improvement tends to occur when training sessions are four or more per week, last more than 45 minutes, and at an intensity 70 to 90 percent of one's aerobic capacity, although lower intensities may be compensated by increased duration or frequency (Franklin et al., 1984; Hagberg et al., 1983).

In general, the level of adjustment to exercise still depends on the disease severity, but a wide range may occur (Clausen, 1976). Characteristics of the coronary disease, such as ventricular ejection fractions (Blumenthal et al., 1982), infarction size, left ventricular performance, summarized by Franklin et al., (1984), and medications (Pratt et al., 1981) are poor indicators of an improved aerobic capacity in persons with coronary heart disease. However, there still may be some (less than 25 percent) who despite faithful adherence to a prescribed exercise program, will show minimal or no improvement in their exercise ability (Clausen, 1976; Council on Scientific Affairs, 1981).

The greatest increases tend to occur within the first three to six months of conditioning, with slight additional increases thereafter (Foster et al., 1984; Franklin et al., 1984; Hammond, 1985; Hoskins & Habasevich, 1978; Miller et al., 1984; Oldridge et al., 1978b; Taylor et al., 1985). Increases in exercise level may occur after six weeks of training (Soloff, 1978-1979). However, increased exercise levels in earlier periods, as between six and 12 weeks, may be attributed to a greater confidence, less fear of physical exertion (Maresh et al., 1985; Mayou, 1983), or even a normal healing process after a myocardial infarction (Savin et al., 1981), rather than to a physiological training.

Greater levels of exercise may take some with coronary artery disease over 12 months to reach (Hagberg et al., 1983). It usually takes three to six months before even those highly motivated and not symptom-limited can perform moderately hard exercise (Ehsani et al., 1981). A maintenance level of aerobic training for one with coronary disease may take up to six to 12 months longer than that of a healthy adult, usually attainable in five to six months of training (Metier et al., 1986; Pollock, 1984). Many with uncomplicated cardiac disease should be encouraged to attain the 300 KCal per energy expenditure or an estimation of 1000 Kcal (Metier et al., 1986; Pollock, 1985) to 2000 Kcal (Alexander, 1982) per week. A planned program participation has been suggested of three to six months (Wenger, 1982). It is conceivable that the trained state must be sustained for months or even years before full potential health gains are realized for the person with coronary artery disease (Shephard, 1979).

In the training effect, the body's ability to obtain and use oxygen is the key (Burke & Collins, 1984). Benefits of habitual exercise in coronary artery disease seem to result from both cardiac and peripheral changes (Spicer, 1983). The most important physiological benefit is an increased aerobic and work capacity in the amount of work (intensity) and duration at a specific workload (Nutter, 1979; Rigotti et al., 1983) without an increase metabolic cost, demand and work of the myocardium (Froelicher, 1983; Nutter, 1979; Spicer, 1983; Wenger, 1979). The person with coronary disease tends to have less ischemic symptoms (anginal pains or ST-segment depression) and, if they appear, they tend to appear at higher and/or longer workloads, before the person is limited (Clausen, 1976; Haskell, 1979; Nutter, 1979; Rigotti et al., 1983; Spicer, 1983).

Some with coronary heart disease may begin exercise programs with aerobic capacities less than 10 ml./kg./min. But, after a conditioning program, some increase 10 to 40 percent from preconditioning levels (Ehsani et al., 1981; Ehsani et al., 1982; Franklin et al., 1984; Hagberg et al., 1983; Haskell, 1979), up to potential increases of more than 50 percent in persons with or without angina (as summarized by Clausen, 1976; Franklin et al., 1984; Haskell, 1979). These increases compare to ten to thirty percent for a healthy person (Haskell, 1979).

Increases in maximum aerobic capacity short-term (less than 6 months) may be attributed to peripheral adaptations to exercise and central cardiac changes may occur over a longer training period (Franklin et al., 1984; Froelicher, 1983; Froelicher & Brown, 1981; Hagberg et al., 1983; Savin et al., 1981), possibly even 32 months (Oldridge et al., 1978b). The increased aerobic capacity occurs primarily changes in the peripheral vascular system and at the muscular level. The peripheral effects of training are probably more important for the person with coronary artery disease (than healthy person) than are central effects (Clausen, 1976; Froelicher, 1983; Spicer, 1983). Limitations of aerobic capacity are generally attributed to central (heart rate and stroke volume) factors rather than peripheral (Clausen, 1976; Franklin et al., 1984). The peripheral effects allow the heart to do less work at any given workload (myocardial oxygen consumption) (Alexander, 1982; Rigotti et al., 1983).

The increased aerobic capacity is increased by the peripheral effects of the trained skeletal muscle (Clausen, 1976; Haskell, 1979; Hammond, 1985). Enhanced metabolic activity occurs in the trained muscle (Haskell, 1979; Hammond, 1985). Mitochrondrial changes allow the muscle to function at a lower oxygen saturation level, create an increased arterial-venous difference of oxygen levels, and aid preference of fatty acids as fuel (Franklin et al., 1984; Hammond, 1985; Haskell, 1979). The trained peripheral muscles actually perform more work of extracting more oxygen from arterial blood to allow the person to exercise more efficiently with a lower heart rate (Alexander, 1982; Clausen, 1976; Fletcher, 1981; Franklin et al., 1984; Hagberg et al., 1983; Savin et al., 1981; Spicer, 1983).

The change in arterial-venous difference influences the lower heart rate, lower blood pressure (Hagberg et al., 1983; Haskell, 1979), and less peripheral vascular resistance (Hagberg et al., 1983; Hammond, 1985) during exercise, to further reduce the myocardial work and oxygen demand (Haskell, 1979). During submaximal exercise trained working muscles need and actually receive a decreased blood flow to exercising muscles (Franklin et al., 1984; Haskell, 1979; Hammond, 1985). This improvement in arterial-venous oxygen differences does not occur at rest (Haskell, 1979).

Heart rate is a major determinant of myocardial oxygen demands

(Hammond, 1985). Myocardial oxygen consumption (work) is best estimated by the product of heart rate and systolic blood pressure (Froelicher, 1983; Oldridge et al., 1978b) and is represented as the rate-pressure product (Rigotti et al., 1983). A decrease in either heart rate or systolic blood pressure will lessen the work of the heart (Clausen, 1976).

With exercise training the rate-pressure product is lower with submaximal exercise (Ehsani et al., 1981; Hammond, 1985; Hoskins & Habasevich, 1978). Correspondingly, a person's heart rate is lower at rest and at a given submaximal workload (Ehsani et al., 1981; Ehsani et al., 1982; Fletcher, 1981; Froelicher, 1983; Froelicher et al., 1985; Hammond, 1985; Haskell, 1979; Spicer, 1983). This is the primary benefit of exercise in increasing work capacity in persons with coronary heart disease (Hammond, 1985). Systolic blood pressure at a given submaximal workload show a decrease (Clausen, 1976; Ehsani et al., 1982; Fletcher, 1981; Froelicher, 1983; Sanne, 1978).

The heart functions more efficiently, at lower work and decreased myocardial oxygen consumption (Franklin et al., 1984; Hammond, 1985; Rigotti et al., 1983; Spicer, 1983) for equal or greater body workloads (Clausen, 1976; Hammond, 1985). Also, higher rate-pressure products are tolerated at higher levels with training before a person is limited (Clausen, 1976; Maresh et al., 1985). This is important in the person limited by angina pectoris. When a critical rate-pressure product is reached, the person will experience a limitation in his exercise. Responses to exercise, the type of exercise, emotions, environmental temperatures, after eating, or to smoking may affect this critical product (Clausen, 1976).

At maximum exercise, heart rate has been shown to increase (Hagberg et al., 1983; Savin et al., 1981) or decrease (Ehsani et al., 1981) with training. Rate-pressure product (Ehsani et al., 1981) at peak exercise does increase with training. Maximal mean blood pressure response does not change (Hammond, 1985), but did increase for others (Ehsani et al., 1981; Hagberg et al., 1983). Resting blood pressure may (Clausen, 1976; Ehsani et al., 1981) or may not change (Clausen, 1976; Haskell, 1979).

The increase in aerobic capacity is largely attributed to a widening of the arterial-venous oxygen difference, but the remainder increase is from an increased cardiac output (Faulkner, 1979; Froelicher, 1983). The increase in cardiac output may result from an increase in stroke volume or heart rate, or from a combination (Faulkner, 1979). Endurance training in the presence of coronary heart disease is suggested to increase stroke volume (Clausen, 1976; Haskell, 1979; Plotnick et a., 1986) up to 18 percent (Hagberg et al., 1983) in some persons during submaximal exercise, while others it may decrease (Clausen, 1976). Resting values of cardiac output or stroke volume may also increase with training (Hagberg et al., 1983; Haskell, 1979).

Improvement in exercise capacity appear to be due more to a reduction in myocardial work and oxygen demand at submaximal exercise than to any substantial increase in myocardial oxygen supply resulting from regression of coronary atherosclerosis, an alteration of coronary artery vasculature (Froelicher, 1983; Haskell, 1979) or cardiac effects, as ejection fraction changes (Rigotti et al., 1983). This is subject to much discussion and study (Franklin et al., 1984; Froelicher & Brown, 1981; Rigotti et al., 1983).

There is a large individual difference in the ejection fraction response in those who have sustained a myocardial infarction due to differences in the size of the myocardial infarction, the number and severity of vessel involvement, and the presence (and effectiveness) of collateral circulation (Froelicher, 1983). Those who have had a myocardial infarction may decrease, show no change (Froelicher, 1983), or increase (Froelicher, 1983; Plotnick et al., 1986) in their ejection fraction during submaximal exercise. Most with coronary disease do not have an increased left ventricular ejection fraction response to exercise (summarized by Iskandrian & Heo, 1986; Hakki et al., 1983). At maximum values, most with angina pectoris have a decrease left ventricular ejection fraction response (Froelicher, 1983). Those with coronary artery disease but without angina or infarction usually do not significantly increase their peak exercise ejection fraction value from rest (Foster et al., 1984; Froelicher, 1983).

Theorectically, with a decrease heart rate, there is an increased coronary blood flow (Franklin et al., 1984). Authors (Haskell, 1979) have suggested no changes occurred in the coronary lesion, collateral vascularization, in coronary blood flow or myocardial function (Hagberg et al., 1983) in persons with coronary disease. But others have suggested there is some evidence for improved myocardial perfusion (Franklin et al., 1984; Hammond, 1985; Nutter, 1979; Scheuer, 1982). The evidence for animals developing coronary collateral growth due to chronic exercise training is much stronger than for humans (Froelicher, 1983; Froelicher & Brown, 1981; Scheuer, 1983). Froelicher, (1983) suggested even if collateral circulation occurs in humans, this does not mean a corresponding increase in myocardial perfusion. There is no change in coronary artery size with training in older individuals (Froelicher, 1983).

Indications of ischemia (ST-segment depression) are observed with significant coronary lesions with or without angina pectoris or myocardial infarctions (Hirzel et al., 1985). An exercise program does not lessen exercise-induced ischemia (Froelicher, 1983), but if sufficiently prolonged and intense exercise-induced ischemia may be lessened at a given submaximal exercise, at a given rate-pressure product and at maximum exercise, possibly related to an enhanced myocardial oxygen supply (Ehsani et al., 1981).

Other beneficial changes important in coronary artery disease is in the level of catecholamines (Froelicher, 1983). Exercise training reduces the level of catecholamines ((Council on Scientific Affairs, 1981; Fletcher, 1981; Franklin et al., 1984; Haskell, 1979; Leon, 1985). This also reduces the myocardial work at rest and during exercise (Franklin et al., 1984) and possibly the risk of ventricular fibrillation (Hammond, 1985; Haskell, 1979; Leon, 1985).

Exercise training has also been related to lessening the coagulation processes, associated with the coronary occlusions (Council on Scientific Affairs, 1981; Fletcher, 1981; Leon, 1985; Sharkey, 1979). In addition, exercise may cause beneficial changes in certain blood lipid fractions (Council on Scientific Affairs, 1981; Fletcher, 1981; Franklin et al., 1984; Sharkey, 1979; Wenger, 1979). A regular exercise program trains the body to a more rapid and normal return after an exercise session (Council on Scientific Affairs, 1981; Froelicher, 1983).

Circuit Weight Training

Dynamic exercise, primarily based on leg training, is the main focus in cardiac rehabilitation exercise programs. Exercise programs based solely on lower body endurance fail to consider that daily living activities utilize all major muscle groups (Fardy, 1979). Upper body strength is important for many isometric activities during occupation and leisure-time even for those with coronary artery disease (Fardy, 1979; Kelemen et al., 1986; Metier et al., 1986). Some have occupations that require arm work (Fardy, 1979), Just because an acute cardiac event has occurred, most will not totally restrict these activities. But people can be taught to restrict their activity within a safety guidelines rather than totally refrain from all forms of isometric activities (Goldberg et al., 1982) or to participate at a danger to themselves. According to a local cardiologist, the danger is that people will participate in isometric activities without proper training (Stone, 1987).

It is important to listen to values of the individuals in the cardiac rehabilitation program. In this author's experience many members of the cardiac rehabilitation program have focused on their "flabby arms". Even though a person has improved their general body conditioning, their focus continues to be on their upper body strength. Men have described their difficulty (and lower self-esteem) of allowing their wife to carry items that they once did with ease. Particularly men, evaluate their conditioning in terms of their upper body appearance and strength. To promote a total fitness program, all major muscle groups, including upper body musculature need to be included (Fardy, 1979; Metier et al., 1986)

Circuit weight training programs have been developed in response to the need expressed by those in cardiac rehabilitation programs with a positive response. Of great concern for those with coronary artery disease is a static exercise and its effect on arterial systolic blood pressure (Painter & Hanson, 1984) and ultimately the left ventricle's ability to function. In recent literature, authors have suggested complications of isometric-type exercises may be less for those with cardiac disease than originally theorized (Kelemen & Stewart, 1985; Kelemen et al., 1986; Sheldahl et al., 1983; Temkin, 1983; Wilke et al., 1985) and potentially even less than dynamic exercises prescribed (Kelemen & Stewart, 1985; Kelemen et al., 1986). Because of the lower weights and greater number of contractions are used, venous return, and consequently cardiac output, is not compromised as severely in a circuit weight-training program (Kispert & Nielsen, 1985). Using light to moderate loads for exercising is relatively safe in selected individuals with coronary disease (Franklin et al., 1986). Kelemen et al., (1986) suggested the circuit weight training program also had a significant positive influence in compliance to exercise programs.

Circuit weight training is a relatively new type of exercise designed to develop strength, power, muscular endurance, speed, agility, flexibility and cardiovascular endurance. With circuit training, the individuals proceeds through a series, usually six to ten, of selected exercises or activities that are performed in rapid sequence or in a circuit (Pollock et al., 1984).

As discussed previously, extra precaution is needed in the first six to eight weeks after a cardiac event. Those after a myocardial infarction start strengthening exercises in the hospital with one-pound weight, five to ten repetitions and progress to two pounds by discharge. Those after coronary bypass surgery progress to three pounds upon discharge (as summarized by Metier et al., 1986). An upper body strength routine can be used by uncomplicated persons with coronary disease beginning the second week of the phase II program. Most begin the weight training program with three-pound weights and progress to five to seven-pound weights before the six to eight week exercise test (Metier et al., 1986; Pollock et al., 1984).

Depending on test results and individuals needs, weights may be increased up to 12 to 15 pounds before completion of the phase II program. (Metier et al., 1986; Pollock et al., 1986). The precautions previously described for those after coronary artery bypass surgery continue to apply. Most those after bypass surgery are limited to ten pounds weights in the first six to eight weeks (Pollock, 1985). After the sternum has healed and the exercise test has been administered, many of the general restriction on lifting, pushing, and pulling weights with the arms can be eliminated (Metier et al., 1986).

Individuals after a myocardial infarction and coronary artery bypass surgery may begin a more formal Nautilus-type program at least 6 weeks after the acute event. Recommendations for the person include that they have normal left ventricular function (ejection fraction greater than 50 percent) or a functional exercise capacity of 7 to 8 METS, and have hypertension under control (Metier et al., 1986).

Guidelines should include low intensity isometric work, a measured 40 percent of a maximal voluntary contraction effort (Painter & Hanson, 1984; Kelemen et al., 1986). Weights are then gradually progressed. Those with coronary artery disease should stay within their target heart rate guidelines (Kelemen et al., 1986; Painter & Hanson, 1984; Pollock et al., 1984), be reminded to avoid the valsalva maneuver (Painter & Hanson, 1984), and utilize continuous movements, good posture and proper breathing techniques (Metier et al., 1986). The Borg scale for rating perceived exertion has also been suggested as a supplement to isometric exercise (Goldberg et al., 1982).

Circuit weight training should utilize large muscle groups and avoid hand-gripping activities (Metier et al., 1986; Pollock et al., 1984). Different types of exercises have been suggested. Activities such as shoulder press (Kelemen et al., 1986; Kelemen & Stewart, 1985; Metier et al., 1986; Pollock et al., 1984), arm curls (Kelemen et al., 1986; Kelemen & Stewart, 1985; Pollock et al., 1984), side bends (Pollock et al., 1984), French curls (Metier et al., 1986; Pollock et al., 1984), upright rowing (Metier et al., 1986; Pollock et al., 1984), bench press (Kelemen et al., 1986; Kelemen & Stewart, 1985; Metier et al., 1986; Pollock et al., 1984) bent leg sit-ups without weights (Kelemen, 1986; Kelemen & Stewart, 1985; Metier et al., 1986), double leg curls and double leg extensions (Kelemen et al., 1986; Kelemen & Stewart, 1985).

The circuit should have six to ten exercises (Kelemen & Stewart, 1985; Kispert & Nielsen, 1985; Pollock et al., 1984) with 15 to 30 seconds rest periods between sets and be performed two to three times (Kelemen, 1986; Kelemen & Stewart, 1985; Kispert & Nielsen, 1985). Some authors have suggested ten to 15 repetitions during a 30 second period (Kelemen et al., 1986), then continue to next station (Kelemen et al., 1986). A preference of a cardiologist is 20 to 25 repetitions (Stone, 1987). Total exercise time is 20 to 30 minutes (Kelemen, 1986; Kelemen & Stewart, 1985; Kispert & Nielsen, 1985).

Warm-up and Cool-down Exercises

For persons with coronary disease, warm-up and cool-down exercises are important (Froelicher, 1983). Warm-up periods need to be longer, at least five to ten minutes (Pollock, 1985), preferably even ten to 20 minutes. A cardiorespiratory warm-up that involves the total body should increase the heart rate to within 20 beats per minute of the target heart rate (Franklin et al., 1986). This time allows increase body temperature (Reith, 1984), circulation, a gradual increase of heart rate and blood pressure, and joint lubrication to help protect against musculoskeletal injuries (Hoskins & Habasevich, 1978). During these exercises, care should be taken the valsalva maneuver or straining does not occur (Hoskins & Habasevich, 1978).

The major importance of warm-up for the cardiac population is reduction of myocardial ischemia (Reith, 1984). This lessens the risk of exercise-related cardiovascular complications, such as ventricular ectope, ST-segment depression, and possibly ventricular wall motion may be lessened (Franklin et al., 1986).

To prevent muscular tearing of cold muscles, muscular stretching has been recommended during the cool-down phase of activity or at least after five minutes of warm-up exercises (Paris & Patla, 1986). Muscular stretching is a static technique with a position hold of 30 to 60 seconds. Areas of the triceps, shoulders, chest, back of upper legs, trunk, inner thigh, abdomen, lower back, front thigh, calf, and lower legs are frequently stretched during exercises (Reith, 1984).

Similarly, cool-down activities after exercise permit the body to readjust to a resting state. There is a transient decrease in venous return or coronary blood flow, but high catecholamine levels (Franklin et al., 1986) and a myocardial demand initially (Reith, 1984). Post-exercise blood flow must be maintained during the cool-down period to the myocardium and exercised muscles (Reith, 1984). Without a cool-down period more serious problems such as, angina pectoris, ischemic ST-segment depression, or ventricular dysrhythmias may occur (Franklin et al., 1986).

Relaxation exercises after a exercise session may also be conducted. These should only be initiated after sufficient cool-down to help avoid the complications previously described (Fardy, 1980b).

Legal Considerations

This paper proposed to determine what legal responsibilities and concerns were important for cardiac rehabilitation staff by a review of the literature of past legal cases and professional recommendations. An extensive search of literature was conducted using Westlaw, the Current Law Index, West's General Digest, and the Legal Resource Index. Discouragingly, few sources of previous legal cases were found related to exercise or exercise therapy. Two important texts (Nygaard & Boone, 1981; Herbert & Herbert, 1984) were located by this author that provided a summary of general implications for exercise programs and cardiac rehabilitation exercise therapy. Much of their discussion will be summarized and implications for cardiac rehabilitation exercise therapy programs will be identified for this paper.

Legal duties of staff in exercise therapy programs are divided into three distinct legal considerations, professional licensure, malpractice, and negligence (Nygaard & Boone, 1981).

> The typical staff in cardiac exercise therapy is multidisciplinary and may include physicians, nurses, exercise physiologists, psychologists, health educators, physical therapists and physical educators. Professional staff members who plan, supervise, and conduct cardiac rehabilitation exercise therapy must have evidence of high professional competence. An image of professionalism is indicated by documentation of professional education and training, continuing in-service education, certifications and maintaining communication with profession societies (Herbert & Herbert, 1984).

Key personnel should have completed the advance life support course and be at the instructor level in basic life support (Davidson & Maloney, 1985; Fletcher, 1982), but the only universal training requirement for staff is basic cardiopulmonary resuscitation certification (Herbert & Herbert, 1984).

Even though standards and guidelines have only recently been developed,

> if an injury does occur to an exercise participant resulting a subsequent lawsuit, that facility will be judged by expert witnesses. Expert witnesses are members of, but not limited to the following groups: The Joint Commission on Accreditation of Hospitals, The President's Council on Physical Fitness and

> Sports, The American Medical Association, The American Heart Association, The American College of Cardiology, The American College of Sports Medicine, The American College of Chest Physicians, The American College of Obstetricians and Gynecologists, The American Physical Therapy Association, The American Association of Cardiovascular and Pulmonary Rehabilitation, The Aerobics and Fitness Association of America, The International Dance-Exercise Association Foundation, The Aerobics Institute, The Association of Fitness in Business, and Young Men's Christian Association (Herbert, D. L., 1987).

Organizations are beginning to address cardiac rehabilitation exercise specifically and provide standards of care owed to participants in cardiac rehabilitation exercise therapy programs. Certification of personnel through these organizations would be highly desirable (Herbert, D. L., 1987).

In general, a physician's standard of care will apply to diagnosing an individual's disease and the treatment that should be given to that person with the disease (Herbert & Herbert, 1984). A non-physician provider of care would be judged by his peers whose collective opinion would provide the norm of expected behavior (Herbert, D. L., 1987). However, a vaguely defined area exists in providing home exercise guidelines to cardiac rehabilitation participants.

> Herbert & Herbert, (1984) recommended that a physician be involved in a cardiac exercise program in a significant way. The physician at minimum should conduct pre-test physician and medical evaluations, provide indirect supervision (physician in the facility and nearby, but not necessarily in visual contact) of exercise testing, provide consultation with program staff of interpretation of test results and exercise prescription, be present, accessible or direct on-call during exercise sessions and provide consultations and periodic review of exercise program procedures (Herbert & Herbert, 1984).

Until uniform standards and guidelines are developed, adherence to the most conservative standards will clearly provide the greatest professional protection (Herbert & Herbert, 1984). In general, proper monitoring of the exerciser's blood pressure, heart rate, heart rhythm, fatigue, perspiration and facial expressions of strain as well as any expressed statement of extreme or unusual fatigue or pain is important during exercise participation (Edelman, 1987).

Malpractice is a failure to follow reasonable competent medical practice or the appropriate standard of care (Edelman, 1987).

Acts or omissions of the defined duties as described below are generally accepted that claims against personnel could be founded upon allegations that such persons:

1) failed to properly monitor or properly stop a stress test (and exercise therapy) in the exercise of competent professional judgment;

2) failed to adequately and competently instruct participants as to the safe performance of the recommended conditioning activities or in the proper use of exercise equipment;

3) failed to properly and competently evaluate the participants' capacities or physical impairments as these would limit or contraindicate certain types of exercise;

4) failed to prescribed a proper exercise intensity in terms of metabolic and cardiovascular demand;

5) failed to properly supervise the participants' exercise during program sessions or advise individuals regarding any restrictions or modifications that should be followed in modifying physical activities during unsupervised periods;

6) failed to assign participants to an exercise setting with a proper level of physiological monitoring, supervision, and emergency medical support; or,

7) failed to perform or rendered performance in a negligent manner in a variety of other situations (Herbert & Herbert, 1984).

In addition to malpractice legal duties owed to participants, legal duties owed to participants may also be related to negligence. Failure to provide any of the following could be identified as negligence:

1) provide adequate supervision;
2) provide good, sound planning;
3) warn participants of the inherent risks in the activity;
4) provide a safe environment for participation;
5) provide adequate and proper equipment;
6) evaluate participants for injuries or incapacitating condition;
7) match participants fairly for competitive condition; and
8) provide proper medical assistance and follow established emergency medical procedure (Nygaard & Boone, 1981).

The cardiac rehabilitation staff must provide specific supervision during activities, with a suggested patient-to-staff ratio of less than 10:1 (Davidson & Maloney, 1985). New participants will need closer monitoring than regular members. This is the responsibility of the supervisor to attend to the new participant's needs.

Supervision is needed for the participants, what they are doing, how are they responding to physical activity, or if they are matched to the appropriate exercise equipment for his/her ability. Staff must supervise, provide proper instruction for the use of all pieces of equipment, and provide warning of any possible danger which may result form using the equipment when needed. Staff are responsible for general supervision to enforce conduct and safety guidelines, and regulate the use of the facility (Stotlar, 1986). Even once a participant is instructed in the equipment use, supervision of its must continue so any follow-up instruction may be given (Herbert, & Herbert, 1984). Supervision also includes observing for potentially an unsafe environment (equipment or facilities), an injury or incapacitating condition, or if to initiate emergency measures should the need arise.

An undefined standard exists whether to use telemetry monitoring on participants during exercise sessions and how long to continue this treatment. Herbert, W. G.,. (1987) described recently that "telemetry monitoring is the 'current' standard for supervision of all patients who are exercised in rehabilitative treatment programs (until convincing evidence to the contrary is established)." Others have suggested continuous monitoring is recommended during the first12 weeks of exercise therapy (Meyer, 1984). Longer periods of monitoring are recommended for those of high risk or with dangerous heart rhythm disturbances (Pollock et al., 1979).

Telemetry-monitored programs provide for closer supervision to augment dysrhythmia detection (Franklin, 1983). Many of the heart rhythms are ventricular fibrillation that convert to liable rhythms the sooner a countershock is administered (Cobb & Weaver, 1986). Telemetry also offers advantages for patient teaching and instruction during exercise activity (Franklin,1983). A concern of long-term telemetry monitoring would be the participant's dependency to the monitor itself. If extreme, the participant may refuse to exercise or refuse to exercise anywhere but at the exercise facility.

Sound planning prior to participant's participation is important for legal concerns. Procedures for emergency situations need to be written for staff to know what to do and how to react in situations prior to the emergency. Clearly defined responsibilities of each staff person and program rules are important so those supervising know what to do in situations. Planning of program content, planning for emergency situations, planning the organization of the physical facility and equipment to be in proper order are all an important legal duty the staff owes to the participants.

The participants must know of the inherent risks or expected discomforts or risk in the activity prior to engaging in the activity. This must be identified in writing and is frequently accomplished in the informed consent. At times in the professional judgement, a full disclosure of all know risks will unnerve or adversely affect an anxious participant such that additional risks are created and a consequence of the disclosure. In such situations partial disclosure may be indicated, but the professional may be in question of his or her actions (Herbert & Herbert, 1984).

As described earlier, a legal duty is to provide a safe environment for the participant. An activity area needs to be sufficient size and free of physical objects to prevent further risk to participants. Every effort should be made to inspect, make safe, and record facility checks for floor surfaces, exercise grounds, exercise mats, locker room facilities, and equipment. All areas must be regularly checked and kept free of defects and nuisances so as to minimize the chance of participant injury or illness or death (Herbert & Herbert, 1984).

Participants need to be evaluated for injuries or incapacitating conditions. Physician referral is an important first step in this requirement. Individuals with coronary artery disease may not tell staff if they do have had cardiac symptoms prior to this session. But with specific questions rather than "how have you been doing," the participant is more specific with his or her answer. They need to be evaluated if symptoms are present or have occurred. The participant is under no general duty to volunteer information that he or she would reasonably expect that staff to ask (Mackey v. Greenview Hospital). But as described in the "Participant Informed Consent for Cardiac

Rehabilitation Exercise Program," the participant is under an obligation to tell staff if they experience any symptoms or sensations.

Participants must be matched through adequate planning and supervision to eliminate competitive conditions. A main focus of cardiac rehabilitation is to avoid the competitive situations.

Proper first aid and follow established emergency medical procedures through proper planning and supervision of participants when to initiate such procedures. Personnel should be trained and readily available with the proper equipment needed. Emergency equipment should include a monitor and defibrillator, oxygen and respiratory equipment, emergency medications, methods to administer and previously physician signed orders permitting such administering of treatment.

The cardiac rehabilitation staff have a responsibility to document these measures described.

> It is of particular importance to note the following:
> 1) the program must develop and maintain a policy and procedure manual based upon individualization of nationally formulated standards and guidelines;
> 2) written records of participants' informed consent, questions, concerns, exercise test results, exercise prescriptions and recommendations for physical training, special instructions, warning conveyed to participants, questions of participants with responses, staff observations of participant exercise tolerance and progress in activity, and other related communications
> 3) participant progress records should also be kept and periodically reviewed in writing by notations
> (Herbert & Herbert, 1984).

As an aid to make the participant more responsible, behavioral contracts and progress records of staff efforts to prevent and to monitor noncompliance can aid the staff to identify those who choose not to follow recommendations (Ulmer, 1982).

CHAPTER VI

PROGRAM DEVELOPMENT

Introduction and Program Goal

Behavioral modification strategies are more successful when two or more techniques are used (Haynes, 1984; Given et al., 1984). In the literature review, many programs that included behavior modification and motivational strategies did not publish the actual strategies to allow for their evaluation. The purpose of this paper is to research the literature and develop a motivational exercise therapy program for individuals with coronary artery disease. This chapter will include a proposed program. The goal of this program is to restore individuals with coronary artery disease to their highest potential of exercise lifestyle behavior and physical fitness achievement within their physiological limitations and recommended exercise guidelines, utilizing motivational and psychological considerations.

Program Purpose

The purpose of this program is:

1. To provide participants with a safe environment (described in Chapter 5: Legal Considerations) to exercise utilizing described exercise guidelines and legal considerations
2. To present to participants methods of behavior modification for development and maintenance of exercise behavior
3. To determine participant physical fitness assessment prior to exercise participation, at eight weeks and six months of participation
4. To determine participant psychological assessment by questionnaire and personal discussion of participant anticipated barrier and cost of exercise lifestyle behavior

5. To determine participant psychological assessment by questionnaire and personal discussion of participant perceived coronary artery disease episode, cause of coronary artery disease episode, and anticipated influential factors in course of coronary artery disease episode
6. To determine participant perceived exercise self-efficacy by questionnaire prior to exercise participation, and at eight weeks and six months of participation
7. To provide by example an exercise program format of warm-up, muscular strengthening and endurance, aerobic, flexibility, cool-down activities
8. To provide the spouse of the participant the opportunity to observe participant in physical activities, to actually perform similar activities as the participant, and to engage in an exercise program with their spouse affected by coronary artery disease

Organization of the Proposed Program

This paper is organized according to sessions for each corresponding week. Each class session of this program is identified as a Session # "X". The title of the particular session is identified.

An outline of each class session includes the following:

A. Purpose
B. Leader Objectives
C. Participant Learning Objectives
D. Leader Lesson Plan
E. Materials Needed

Following, the lesson content for the leader is presented in written form (Session # "X": Leader Lesson Content). The lesson content is an explanation written in lay terms as the author would talk to the participants.

The last portion for each particular session, is the corresponding exercise session for the corresponding week. There will be three organized sessions conducted per week. These are listed as session "X" A, session "X" B, and session "X" C. The primary focus or focuses during the exercise session and any special motivational considerations will be noted. Any changes in the exercise guidelines, particularly circuit weight training, during the sessions will be identified.

For the purpose of this paper, the person affected with coronary artery disease will be identified as the "participant" and the married spouse of that person will be identified as the "spouse." One of the leader's who will work primarily with the participant will be identified as the "leader" and the leader who will work primarily with the spouse will be identified as the "co-leader."

For the purpose of this paper, the exercise program of the spouse will be included only as related to the participant specifically. A specific exercise program for the spouse will not be identified in this paper.

Other Characteristics of Proposed Program

The educational session will be organized just after the first exercise session of each week. There will be three exercise sessions that will correspond to the particular educational session but session #C will be the first session of the next week. The exercise sessions offered would ultimately depend upon the numbers of participants. Initially these sessions would at least be offered in early morning, late morning, noon-time, afternoon, late afternoon and evening. These would change according to the needs of the majority of participants.

As described in Chapter 5: Legal Considerations, a physician would be present. Depending on participant numbers, the staff supervision would be as indicated. At minimum at least one staff for every seven to ten participants.

In each exercise session there will be a special activity for participants. Special activities will be varied and activities would also include those suggested from participants. The activities identified at present include:

1) Pass balloon with knees to other participants and staff
2) Hula hoop demonstrations by participants and staff
3) Pass balloon with feet while sitting to other participants and staff
4) Bounce pass ball to other participants and staff
5) Nerf ball basketball game of "horse" or "motivation"
6) Balloon volleyball

7) Pass balloon with hands, feet, or head to other participants and staff, or

8) All sessions will include music from "dance" era.

Individualization of participant instruction and attention would be of primary concern even in group discussion meetings. The relationship between program staff and participant is important to convey mutual respect, acceptance, and empathy to enhance open communication. The fitness and social characteristics of the staff members aid the participant. These important issues will not be described in the program format, but would be included in the program.

This program description will not describe the planned social marketing techniques, of exercise promotions, signs, posters, and a monthly fitness newsletter. The newsletter will include birthday dates of participants, articles of interest, or planned classes, meetings, or special events. A bulletin board would be visible for participants with the same type of interest notes to participants. Participants would be given a packet of classes and special exercise sessions planned for the program.

For discussion session, video tapes or films would be included. At present, this author is unaware of current materials that would apply to the planned sessions.

Exercise sessions would include mileages reached, for example at 100, 500, or 1000 miles. Awards or trophies would be presented to the participants. Special family and participant days would be included as special events, such as picnics or other social functions.

After the participant's completion of the program, a follow-up phone call will be made each month. This would be to update participant's progress, to invite participant to special activities or events, and to invite participant for testing sessions as he/she desires.

The final evaluation of this program will be a continual process of updating and revising as the need arises. This proposed program is an initial guideline to begin this process.

Session #1: Participant Introduction and Orientation

A. Purpose:
1. Introduce and orient the participant (with spouse) to the program staff, purpose and facilities
2. Provide open and supportive atmosphere groundwork for participant
3. Assess participant fitness and coronary artery disease-related psychology
4. Elicit participant's intention to attend next program meeting

B. Participant Learning Objectives:
1. Participant will be able to verbalize introduction staff name
2. Participant will consent with their signature an informed consent
3. Participant will identify verbally and/or in writing anticipated barriers and cost of participation in cardiac rehabilitation program
4. Participant will verbalize own intention to comply with cardiac rehabilitation program for a period of six months

C. Leader Lesson Plan:
1. Introduce self and co-leader to participant and spouse
2. Describe plan and purpose of the interview process to participant and spouse
3. Take participant and spouse on tour (optional) of program facilities
4. Begin interview process with participant and spouse independently
5. Verbally describe to participant the purpose of the program
6. Discuss "Participant Informed Consent for Cardiac Rehabilitation Exercise Program" (refer to Appendix A)
7. Elicit questions from participant
8. Write questions of participant on informed consent form
9. Verbally respond to questions to potential participant to best of leader's ability
10. Elicit participant's signature of "Participant Informed Consent for Cardiac Rehabilitation Exercise Program" (refer to Appendix A)
11. Determine participant physical efficacy by questionnaire

"Participant Physical Efficacy Scale" (refer to Appendix C) and discussion

12. Determine participant psychological assessment by questionnaire "Participant Questionnaire" (refer to Appendix E) and discussion
13. Identify next meeting date, time, place and content with participant (and spouse)
14. Determine participant's and spouse's intended commitment to attend planned meeting
15. Indicate the T-shirts will be given at next exercise session

D. Materials Needed:

1. "Participant Informed Consent for Cardiac Rehabilitation Exercise Program" (refer to Appendix A)
2. "Participant Physical Efficacy Scale" (refer to Appendix C)
3. "Participant Questionnaire" (refer to Appendix E)

Session #1: Spouse Introduction and Orientation

A. Purpose:

1. Introduce and orient the spouse (with participant) to program staff, purpose, and facilities
2. Provide open and supportive atmosphere groundwork for spouse;
3. Assess spouse's fitness
4. Assess spouse's perception of participant physical efficacy and psychology
5. Elicit spouse's intention to attend next program meeting with participant

B. Spouse Learning Objectives:

1. Spouse will be able to verbalize introduction staff name
2. Spouse will consent with signature an informed consent
3. Spouse will identify verbally and/or in writing anticipated barriers and cost of participation in cardiac rehabilitation program for participant
4. Spouse will verbalize own intention to comply with cardiac rehabilitation program for a period of six months

D. Co-leader Lesson Plan:

1. Introduce self and co-leader to spouse and participant
2. Describe plan and purpose of the interview process to spouse and participant
3. Take spouse and participant on tour (optional) of program facilities
4. Begin interview process with spouse and participant independently
5. Verbally describe to spouse the purpose of the program
6. Discuss "Spouse Participation Informed Consent for Cardiac Rehabilitation Exercise Program" (refer to Appendix B)
7. Elicit questions from spouse
8. Write questions of spouse on informed consent form
9. Verbally respond to questions to potential spouse to best of leader's ability
10. Elicit spouse's signature of "Spouse Informed Consent for Cardiac

Rehabilitation Exercise Program" (refer to Appendix B)

11. Determine spouse's perception of participant physical efficacy by questionnaire "Spouse Physical Efficacy Scale" (refer to Appendix D) and discussion
12. Determine spouse's perception of participant psychology by questionnaire "Spouse Perception Questionnaire" (refer to Appendix F) and discussion
13. Identify next meeting date, time, place and content with spouse (and participant)
14. Determine spouse's intended commitment to attend planned meeting
15. Discuss group T-shirts will be given at Exercise Session #1C

E. Materials Needed:

1. "Spouse Informed Consent for Cardiac Rehabilitation Exercise Program" (refer to Appendix B)
2. "Spouse Physical Efficacy Scale" (refer to Appendix D)
3. "Spouse Perception Questionnaire" (refer to Appendix F)

Session #1: Leader Lesson Content

A. Plan and Purpose of Interview Process
B. Purpose of the Program
C. Participant Psychological Assessment

Plan and Purpose of Interview Process

As part of this initial introduction, we would like an opportunity to meet you and your spouse independently. After a heart problem has occurred, there are times that both of you have concerns that each of you may feel is important, but not necessarily the same as your spouse. We would like time to visit with each of you, so that we may understand better each of your concerns. The co-leader will meet with the spouse and the leader will meet with the participant.

Purpose of the Program

This cardiac rehabilitation program is a combination of exercise and motivational suggestions to help you discover easier ways to make exercise a part of your life. This is a program for individuals like yourself who have had a heart problem such as heart attack, heart surgery, or chest pains. Coronary artery disease is the underlying disease that caused these problems. We are here to assist you, with you to make the final decision of how much you wish to attain your fitness potential and make exercise as part of your lifestyle.

This program will include monitoring your heart, pulse rate and blood pressure while you are exercising. In the exercise sessions you will have the opportunity to learn different kinds of exercise for you that are appropriate now and after your body has had a chance to heal. Would you find that helpful?

While some in our groups feel their exercise program is too easy, I hope you will be patient with us. Our intentions are to avoid as much muscle soreness and stiffness as possible, and gradually increase your exercise as your heart heals. We do get most people up to as high an exercise level as they wish, but we encourage this gradually. During the first two months we encourage you to look more at your habit of exercise rather than how high a fitness level you have. You will probably have some conditioning, but we hope the exercise skills and low exercise levels are more of a primary focus at first to help you exercise on a regular basis.

There will be weekly sessions on motivational suggestions to help you begin your exercise program and then how to continue with an exercise program. During the next session you will be asked to deposit 50 dollars that will be returned to you as you and your buddy accomplish what you agree to do as part of the motivational section. This intended to help your motivation during the early phases of the program. The cardiac rehabilitation program will keep none of your money. Are you agreeable to deposit the money with us? Please bring the money to the next session.

Please ask questions. This is your program and we want to help you with what you feel is important to you.

Questions for discussion:

What is important to you participating in a program such as this?

Do you prefer group activities or activities by yourself or just a few people?

We also encourage your spouse to attend sessions with you. In our discussions with other participants and spouses, many have indicated how helpful it was to include the spouse so they also learn what kind and how much activity is advisable to you. How do you feel about your spouse attending the program with you?

<u>Participant Psychological Assessment</u>

Each participant will undergo a psychological assessment. This assessment will be conducted during the participant's orientation and introduction session. The psychological assessment will include:

1. "Participant Physical Efficacy Scale" (refer to Appendix C)
2. "Participant Questionnaire" (refer to Appendix E)
3. A follow-up discussion of the psychological assessment will be conducted upon its completion.

Questions for discussion:

What further questions do you have for me or about the program?

Will you commit to attend the next exercise session?

The next session will be place_____, time_____, and date_____.

There are no other forms or preparation that is needed. I will see you then.

Session #1: Co-leader Lesson Content

A. Purpose of the Program
B. Spouse Perceived Psychological Assessment

Purpose of the Program

This cardiac rehabilitation program is a combination of exercise and motivational suggestions to help you and your spouse (the participant) discover easier ways to make exercise a part of your lives. This program is for individuals like your spouse who have had a heart problem such as heart attack, heart surgery, or chest pains. Coronary artery disease is the underlying disease that caused these problems. We are here to assist you and your spouse (the participant). Both of you will make the final decision of how much either of you wishes to attain a potential fitness level and make exercise a part of your lives.

This program will include monitoring of your pulse rate and blood pressure while you are exercising. Monitoring for your spouse will include his/her heart, pulse rate and blood pressure while he/she is exercising. In the exercise sessions you will have the opportunity to learn different kinds of exercise appropriate for you and your spouse (the participant). Would you find that helpful?

While some in our groups feel their exercise program is too easy, I hope you will be patient with us. Our intentions are to avoid as much muscle soreness and stiffness as possible, and gradually increase your exercise as your heart heals. We do get most people up to an exercise level as high as they wish, but we encourage this gradually. During the first two months we encourage you to look more at your habit of exercise rather than how high a fitness level you have. You will probably have some conditioning, but we hope the exercise skills and low exercise levels are more of a primary focus at first to help you exercise on a regular basis.

There will be weekly sessions on motivational suggestions to help you and your spouse (the participant) begin an exercise program and how to continue with the exercise program. During the next session you will be asked to deposit 50 dollars that will be returned to you and your buddy as you accomplish what you agree to do as part of the motivational section. This is intended to help your motivation during the early phases of the program. The cardiac rehabilitation program will keep none of your money. Are you agreeable to deposit the money with us? Please bring the money to the next session.

We would like to encourage your participation in the cardiac rehabilitation program for several reasons. Many times while the participant is often the focus, the spouse is also going through difficult times with many changes and concerns. Some spouses I have talked with have described feeling much uncertainty once the participant was at home of how much can they do, how do I know what to do if something happens, what can I do to help the participant? Some have described trying to take on responsibilities that were once shared or your spouse (the participant) had. The time while your husband/wife (the participant) was in the hospital is often described as a difficult time. Personally, from my experience I believe it is just as difficult for the person in the waiting room hour after hour as it is for the one in the hospital bed. The participant has already gone through a difficult time, but we also want to understand your concerns and thoughts. Does any of this fit for you?

There is an adjustment time when we recommend the participant begin slow after the hospitalization, but eventually most are able to return to an active and fulfilling life. We also wish to include you in this program because many times how the person with heart disease feels about his/her capabilities is strongly related to your perception what his/her capabilities are after a heart problem. How do you feel about attending the sessions with your spouse (the participant)?

During the sessions we wish this to be helpful to your and your spouse (the participant), so please ask questions as they come. This is your program and we want to help you with what you feel is important to you. What is important to you participating in a program such as this?

Spouse Perceived Psychological Assessment

Each spouse will undergo a psychological assessment of their perception of the participant's abilities. This assessment will be conducted during the spouse's orientation and introduction session. The psychological assessment will include:

1. "Spouse Physical Efficacy Scale" (refer to Appendix D)
2. "Spouse Perception Questionnaire" (refer to Appendix F)
3. The follow-up discussion of the psychological assessment will be conducted upon its completion.

Questions for discussion:

What further questions do you have for me or about the program?

Will you commit to attend the next exercise session?

The next session will be place_____, time_____, and date_____ .

There are no other forms or preparation that is needed. I will see you then.

Session #1: Week of Exercise Sessions

Session #1A: Participant/Spouse Fitness Assessment

Each participant and spouse will have a fitness assessment prior to their group participation in the exercise sessions. This assessment will be conducted during the participant's and spouse's first scheduled exercise session. The fitness assessment will include the following:

A. Body Composition Measurements:

1. Skinfold caliper assessment
    a) Women, a sum of:
        (1) Triceps-a vertical fold on the posterior midline of the upper arm (over triceps muscle), halfway between the acromion and olecranon processes; the elbow should be extended and relaxed
        (2) Suprailium-a diagonal fold above the crest of the ilium at the spot where an imaginary line would come down from the anterior axillary line
        (3) thigh-a vertical fold on the anterior aspect of the thigh, and midway between hip and knee joints
    b) Men, a sum of:
        (1) Chest-a diagonal fold taken one half of the distance between the anterior axillary line and the nipple
        (2) Abdomen-a vertical fold taken at a lateral distance of approximately 2 cm from the umbilicus
        (summarized by Pollock et al., 1984)
        (3) Thigh-a vertical fold on the anterior aspect of the thigh, two thirds of the distance from the knee cap to the hip
        (McArdle et al., 1986)
    c) Refer to Appendix G and Appendix H for chart of calculations
2. Body girth measurements
    a) Men (27-50 years of age)
        (1) Buttocks-maximum protrusion with the heels together
        (2) Abdomen-one inch above umbilicus

(3) Right forearm-maximum circumference with the arm extended in front of the body with palm up
(4) Percent fat = Constant A + Constant B - Constant C - 15.0

b) Women (27-50 years of age)
(1) Abdomen-one inch above umbilicus
(2) Right thigh-upper thigh just below the buttocks
(3) Right calf-widest circumference midway between the ankle and knee
(4) Percent fat = Constant A + Constant B - Constant C - 18.4

c) Refer to Appendix I and Appendix J for Constant values

d) Use for:
(1) Men and women less than 50 years of age (if greater than 50 years of age refer to skinfold caliper assessments)
(2) Individuals excluded those very thin or very fat
(3) Individuals excluded those athletic team members
(4) Individuals excluded those engaged in resistance training

(McArdle et al., 1986)

B. Body Dimension Measurements:

1. Chest-taken in the horizontal plane at the nipple line at mid-tidal volume
2. Waist-taken in the horizontal plane at the level of the umbilicus
3. Hips-taken in the horizontal plane at the largest circumference around the buttocks. Subjects stand with feet together and gluteals tense
4. Thigh-taken in the horizontal plane just below the gluteal fold or maximum thigh girth with thigh flexed
5. Calf-taken in the horizontal plane at the maximum girth of the calf with muscle tensed
6. Upper arm-taken at maximum girth of the midarm when flexed to the greatest angle with the underlying muscles fully contracted

(Pollock et al., 1984)

C. Other Measurements:

1. Height

2. Weight
3. Flexibility of sit and reach

D. Blood Chemistry:

1. Total cholesterol (milligram per deciliter)
    a) High value = > 240
    b) Intermediate value = 200-240
    c) Low value = < 200
2. Triglyceride (milligram per deciliter)
    a) High value = > 200
    b) Intermediate value = 100-200
    c) Low value = < 100
3. High density lipoprotein (milligram per deciliter)
    a) High value = > 55
    b) Intermediate value = 35-55
    c) Low value = < 35
4. Ratio of total cholesterol to high density lipoprotein
    a) High value = > 5.2
    b) Intermediate value = 4.0-5.2
    c) Low value = < 4.0
5. Glucose (milligram per deciliter)
    a) High value = > 110
    b) Intermediate value = 100-110
    c) Low value = <100

(Pollock et al., 1984)

E. Submaximal Physician-directed Aerobic Exercise Test:

1. Based on the modified Bruce protocol. This test includes four three-minute stages:
    a) Stage I, 1.2 m.p.h. and 0 per cent grade
    b) Stage II, 1.2 m.p.h. and 3 per cent grade
    c) Stage III, 1.2 m.p.h. and 6 percent grade
    d) Stage IV, 1.7 m.p.h. and 6 per cent grade

(Pollock et al., 1984)

2. An exercise target heart rate will be determined by the Karvonen

formula (summarized by Pollock et al., 1984):

a) Supervised:

Target Heart Rate= 80% (Max HR - Rest HR) + Rest HR

b) Unsupervised (home program):

Target Heart Rate= 70% (Max HR - Rest HR) + Rest HR

(Stone, 1987)

F. Assessment Materials Needed:

1. Treadmill
2. Electrocardiogram monitor
3. Emergency medications and supplies
4. Blood pressure sphygmomanometer
5. Stethoscope
6. Tape measure
    a) Cloth, flexible steel or plastic measuring tape
    b) Positioned on skin surface so tape is taut but not tight
    c) Result based on average of three measurements taken

(McArdle et al., 1986)

7. Corresponding charts of body composition and body dimension analysis (Appendixes G through J)
8. Participant/spouse record forms (refer to Appendixes R through T)

G. Follow-up Discussion of Fitness Assessment:

1. Discuss aerobic and fitness test results according to:
    a) Aerobic level achieved
    b) Functional capacity of corresponding age group (refer to Appendix U)
    c) Estimation of percentage of body fat
    d) Determined body dimensions
    e) Cholesterol, triglyceride, glucose, and high density lipoprotein blood chemistry levels
2. Verbally discuss safety characteristics of participant's aerobic exercise:
    a) Intensity (heart rate)
    b) Borg's Rating of Perceived Exertion (RPE)
    c) Duration

d) Frequency
e) Aerobic activity of bicycling or walking
3. Present in writing to participant participant's:
a) "Home Exercise Guidelines" (refer to Appendix K)
b) "Helpful Hints and Exercise Precautions" (refer to Appendix L)
c) Determined body dimensions
d) Estimated percent of body fat
e) Aerobic fitness level achieved
f) Cholesterol, triglyceride, glucose and high density lipoprotein blood chemistry levels
4. Planned minitest in one month of:
a) Aerobic fitness level
b) Body dimensions
c) Estimation of percent of body fat
d) Flexibility set and reach
e) Cholesterol and glucose blood levels

Session #1B: Exercise Session

Begin exercise session of participant (with spouse) with co-leader and group format.

A. Focus:

1. Introduce participant to other exercising participants
2. Teach participant proper technique of warm-up/cool-down exercises
3. Coordinate with previous discussion participant personal pulse taking skills
4. Coordinate with previous discussion participant personal rating of perceived exertion
5. Aerobic session limit of:
a) Continuous activity for at least five to ten minutes
b) Rest ten minutes
c) Repeat aerobic activity for additional five to ten minutes
d) Activity as tolerated
6. Discuss home exercise program guidelines:
a) If participant following guidelines

b) If participant having cardiac symptoms, such as soreness or increased fatigue

c) Conditions of exercise-where, with whom, when, and how much

7. Provide individual positive reinforcement of support and encouragement

B. Exercise Session:

1. Warm-up activities-active, such as:
   a) Neck-roll, side to side, right to left, front to back
   b) Shoulders-shrugs
   c) Arms-double circles
   d) Upper legs-partial squats
   e) Calves-heel raises
   f) Supine activities-bicycling, hip raises
2. Circuit weight training
   a) Limit 1-pound weights
   b) Limit to 10 repetitions and 30 seconds or as tolerated
   c) Exercises
      (1) Shoulder press
      (2) Arm curls
      (3) Side bends
      (4) French curls
      (5) Upright rowing
      (6) Bench press
      (7) Bent-leg situps (without weights)
      (8) Double leg curls
      (9) Double leg extensions
3. Aerobic opportunities
   a) Walking laps or treadmill
   b) Stationary bicycling
4. Special activity
5. Cool-down activities-stretching, such as:
   a) Calves- wall stretches

b) Thigh-front leg stretch, hamstring stretch
c) Groin stretch
d) Front leg stretch
e) Lower back stretch
f) Trunk rotation
g) Neck-roll, side to side, right to left, front to back
h) Arms-double circles

6. Relaxation session of either:
   a) Passive relaxation
   b) Active muscular relaxation
   c) Imagery
   d) Meditation

Session #1C: Exercise Session

Continue participant participation with co-leader.

A. Co-leader review:
1. Review with participant proper technique of warm-up/cool-down exercises
2. Review with participant personal pulse taking skills
3. Review with participant personal rating of perceived exertion
4. Review home exercise program:
   a) If participant following guidelines
   b) If participant having cardiac symptoms, such as soreness or increased fatigue
   c) Conditions of exercise-where, with whom, when, how much, etc.
5. Continue to provide individual positive reinforcement of support and encouragement
6. Aerobic session limit of:
   a) Continuous activity for ten to 15 minutes
   b) Rest five minutes
   c) Continuous activity for ten to 15 minutes
   d) Activity as tolerated

B. Exercise Session:

1. Warm-up activities as previously described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit 1-pound weights
   b) Limit to 10 repetitions and 30 seconds or as tolerated
   c) Exercises as previously described in Session #1B: Exercise Session
3. Aerobic opportunities as previously described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

C. Other: present T-shirt in presence of other group members for first week of attendance

Session #2: Beginning Behavior Modification

A. Purpose:
   1. Introduce participants to entire group
   2. Create participant support system
   3. Introduce written contracts with buddy
   4. Introduce money deposit plan

B. Participant Learning Objectives:
   1. Participant will verbally introduce another person to group
   2. Participant will complete contractual agreement another person to attend next meeting
   3. Participant will deposit $50 dollars into group "fund"

C. Leader Lesson Plan:
   1. Welcome participants as discussed in "Welcome"
   2. Discuss "Behavior Modification"
   3. Discuss "Buddy System"
   4. Provide time for group members to:
      a) Divide into pairs (two or three, nonspouses)
      b) Find interesting facts about another person, such as:
         (1) Why that person is here
         (2) When they were discharged from the hospital
         (3) If and/or why they wish to develop exercise lifestyle habit
         (4) What would they like from this class and its members
   5. Encourage participant to verbally introduce the other person to group
   6. Discuss "Deposit System and Contracts"
   7. Collect 50 dollars from each participant for deposit plan
   8. Provide time for each participant to complete contract for next session for return to next meeting (1 week later).

E. Materials Needed:
   1. "Behavioral Contract" forms (refer to Appendix M)
   2. Container for money deposit

Session #2: Leader Lesson Content

A. Welcome
B. Behavior Modification
C. Buddy System
D. Deposit System and Contracts

Welcome

Welcome! This is the educational component of the cardiac rehabilitation program. This is our discussion, sharing, exploring and support time. During this time we will be exploring different ways to help start your exercise program and different ways to help staying with your exercise program easier. At times I will talk of different motivational suggestions. But please keep in mind this is your program. We are here to assist you. You make the final decision.

Behavior Modification

Behavior modification is a word that you will hear often with motivation. We will be using behavior modification techniques in this program. But, (and I highlight but) behavior modification is not a way to trick you or to control you. Quite simply, behavior modification is a way to provide suggestions to help you start exercise behavior, probably new for some. There will be no magic or tricks. For example, a behavior modification technique that we will use is called stimulus control. Using stimulus control, a person can do things to help them think and plan about exercise ahead of the scheduled exercise time. This way you can begin to plan and think about your exercise prior the session. This can help get yourself ready for your exercise. Changing into exercise clothes prior to your exercise or using signs to encourage you to take stairs rather than using the elevator are two examples of the use of behavior modification.

Questions for discussion:

What is your impression when you hear the word behavior modification? (Allow class discussion time and clarify misconceptions).

It not always as easy as people are led to believe after a heart problem to begin new changes and then how to continue them going as you return to your usual life patterns. We, as a part of the hospital staff, forget at times how really difficult it is to actually make the changes that we so neatly talk about when you or your spouse were in the hospital.

The focus of this program is exercise and how to make it an easier part of your lifestyle. There are also other changes that we suggest such as changes in diet, stress, and smoking. This part of the program will not refer to these directly, but do keep in mind that these areas are also very important. And please, don't try too many changes at one time. I suggest just one change at a time. That is, your diet, stress, smoking and other concerns can be dealt with later.

Buddy System

A very important part of developing a habit is to have encouragement from others in the group. This is your time for you to share with others, support others, explore new ideas and begin to make changes.

There are several newcomers in the group, and I'd like to give each of you an opportunity to know about each person in the group. I'd like each of you to pair into groups of two or three, but please not with your spouse. For the next five minutes I'd like you meet and pair with another person, ask them questions, and let introduce themselves to you. For example, you might want to know why that person is here, when did they get out of the hospital, what they would like to get from this class. Then reverse so the other person gets a chance to introduce themselves. After about ten minutes we'll meet back in the group and each person will introduce their partner.

As part of this program, I would like to encourage you to make commitments with each other. This partner-like person would be to help another and may include telephone reminders of classes or sessions, make agreements with, or share transportation (maybe even to another exercise area on "off" days).

Questions for discussion:

How would you suggest doing this?

Would you like one person as a buddy:

Would you like to switch each time?

What ideas do you have to help make this work? (Allow time for discussion).

Deposit System and Contracts

I'd like to focus on the money deposit. I repeat all of the money, but ten dollars for a lucky person lottery drawing, will be returned to you depending on the agreements you make. The cardiac rehabilitation program will keep none of it. The lottery starts with today's session. What would the group like to have a lottery based on? My idea is that everyone who attends a certain number of exercise sessions of the next nine sessions enter their name in the "pot." What do you think? (Take group consensus).

The agreements are based on the type of commitments that you agree to make during the program. Then money will be returned to you as the commitments are made. However, the first contract, I'm going to suggest you commit yourselves to return next week, so your buddy can receive his five dollars. That is, when you attend the next week session your buddy will get five dollars from your account. If everyone returns (special allowances can be make if group decides an important reason exists after group discussion), then everyone gets their first five dollars returned. (Break for discussing and completing contract sheet).

Session #2: Week of Exercise Sessions

Session #2A: Exercise Session

A. Focus:

1. Continue to review with participant pulse taking skills, proper technique of exercises, rating of perceived exertion, and home exercise program
2. Continue to provide individual reinforcement of participant's attendance, effort, home exercise, energy, abilities, etc.
3. Aerobic session limit of:
   a) Continuous activity for 15 minutes
   b) Rest briefly 30 seconds to one minute
   c) Continuous activity for 15 minutes
   d) As activity tolerated.

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variations
2. Circuit weight training
   a) Limit 2-pound weights
   b) Limit to 10 repetitions and 30 seconds or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variations
6. Relaxation session as described in Session #1B: Exercise Session

Session #2B: Exercise Session

A. Focus:

1. Continue to review with participant pulse taking skills, proper technique of exercises, rating of perceived exertion, and home exercise program
2. Continue to provide individual participant positive reinforcement of participant's attendance, effort, home exercise, energy, abilities,

etc.

3. Aerobic session of continuous activity for 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variations
2. Circuit weight training
   a) Limit 2-pound weights
   b) Limit to 10 repetitions and 30 seconds or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as previously described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variations
6. Relaxation session as described in Session #1B: Exercise Session

<u>Session #2C: Exercise Session</u>

A. Focus:

1. Continue to review with participant pulse taking skills, proper technique of exercises, rating of perceived exertion, and home exercise program
2. Continue to provide individual positive reinforcement of participant's attendance, effort, home exercise, energy, abilities, etc.
3. Aerobic session of continuous activity for 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variations
2. Circuit weight training
   a) Limit 2-pound weights
   b) Limit to 10 repetitions and 30 seconds or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session

with some variations

6. Relaxation session as described in Session #1B: Exercise Session

Session #3: Exercise Preferences and Exercise Monitoring

A. Purpose:
   1. Identify participants' preferred choices of aerobic, warm-up, and cool-down exercises
   2. Initiate participant monitoring of exercise and activity

B. Participant Learning Objectives:
   1. Participant will list in writing one indoor and one outdoor aerobic exercise preference
   2. Participant will check from a list their first, second, and third preference of warm-up and cool-down activities
   3. Participant will renew written contract with buddy to monitor exercise behavior of:
      a) Exercise or activity accomplished
      b) With whom exercised
      c) Heart rate, RPE achieved
      d) Time of day exercised
      e) Location of exercise activity
      f) Length of time of activity
      g) Thoughts during activity

C. Leader Lesson Plan:
   1. Discuss previous contracts of returning to today's session
   2. Reward each buddy of participant attending (five dollars)
   3. Determine if participant's thought of knowing agreement binding to return in "Questions for discussion"
   4. Discuss plan today of what discussing:
      a) Identify your preferred choices of aerobic, warm-up, and cool-down exercises, and special activity (refer to Appendix O)
      b) Initiate monitoring own activity and exercise
   5. Discuss "Preference of Activities"
   6. Provide to group form to list in writing one indoor and one outdoor preferred aerobic exercise
   7. Provide to participants check-list for participants to note their

first, second, and third preference of warm-up and cool-down activities

8. Discuss "Exercise Monitoring"
9. Discuss examples of monitoring on "Home Monitoring" form (refer to Appendix N):
    a) Exercise or activity accomplished
    b) With whom exercised
    c) Heart rate, RPE achieved
    d) Time of day exercised
    e) Location of exercise activity
    f) Length of time of activity
    g) Thoughts during activity
10. Present to each participant contract to be made with buddy to perform exercise monitoring of what they agree to monitor (for ten dollars)
11. Discuss special gift for all returners of exercise session marking the first month of participation on the Session #4A: Exercise Session

D. Materials Needed:

1. "Exercise Preferences" form (refer to Appendix O)
2. "Behavioral Contract" form (refer to Appendix M)
3. "Home Monitoring" form (refer to Appendix N)

Session #3: Leader Lesson Content

A. Review and Discussion

B. Preference of Activities

C. Exercise Monitoring

Review and Discussion

Welcome back. The previous session we talked about this program and the planned use of behavior modification suggestions. All of us have behaviors we would like to change. Remember a helpful suggestion is one change at a time.

Each of us had a chance to meet another in the group. Are there any questions or comments you wish to bring up about yourself or about the group?

Questions for discussion:

Did you notice any difference of your commitment because of the agreement you signed with your buddy?

Did the agreement affect your thoughts of whether you wanted to return to today's session?

How has your home and program exercise program been going?

Difficulties? Easier than you thought?

Does having a buddy influence your exercise program and attendance? If so, how?

(Allow for discussion time).

Preference of Activities

One consideration when you were introduced to the program we talked about was that we wanted this program to be what was important to you. One way we would like to do more of this is to ask you to identify your preferences of activities. I made a list of activities that are a possibility of aerobic, warm-up and cool-down activities. I'd like you to help us identify what activities you consider your preference for us to include. The first part is to identify what aerobic activities you would like for indoors and outdoors. Then I'd like you to identify from this sheet and please feel free to add others that are not listed, what your first, second and third activities are for warm-up and cool-down.

We will rate these and include them in the next exercise sessions. (Allow time for identification of activities).

Exercise Monitoring

One important aspect of exercise motivation is the ability of each of us to be able to know what our exercise patterns are. Are some patterns easier than others? How does each of our bodies differ from another's in response to activity? Unless each of us knows questions such as these, it makes it more difficult to make changes as we wish. Monitoring our exercise patterns and home activities is meant to be a beginning of developing our exercise habits to continue them.

An example of exercise monitoring is: (give form to each participant). For each activity, just write what it was you did, who you exercised with (if anyone), any special thoughts that came to you during your active time, where you exercised, the length of your activity, what time of day you were active, and your pulse rate or rating of perceived exertion. (Go through example of class participant). For the next week in the exercise sessions we will be using this form to determine your exercise patterns and home activities.

Session #3: Week of Exercise Sessions

Session #3A: Exercise Session

A. Focus:

1. Continue to review with participant pulse taking skills, proper technique of exercises, rating of perceived exertion, and home exercise program
2. Continue to provide individual reinforcement to participant
3. Begin to discuss with participant's buddy staff and buddy observations of participant's attendance, effort, home exercise, energy, abilities, etc.
4. Review with participant monitor exercise:
   a) Exercise or activity accomplished
   b) With whom exercise
   c) Heart rate or RPE achieved
   d) Time of day exercised
   e) Location of exercise session
   f) Length of time of activity
5. Aerobic session of continuous activity for 30 minutes or as tolerated.

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variations and first three preferences included
2. Circuit weight training
   a) Limit 2-pound weights
   b) Limit to 15 repetitions and 30 seconds or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variations and first three preferences included
6. Relaxation session as described in Session #1B: Exercise Session

Session #3B: Exercise Session

A. Focus:

1. Continue to review with participant pulse taking skills, proper technique of exercises, rating of perceived exertion, and home exercise program
2. Continue to provide individual reinforcement of participant
3. Continue to discuss with buddy staff and buddy observations of participant's attendance, effort, home exercise, energy, abilities, etc.
4. Continue to review with individual participants recording exercise monitor of:
   a) Exercise or activity accomplished
   b) With whom exercised
   c) Heart rate, RPE achieved
   d) Time of day exercised
   e) Location of exercise session
   f) Length of time of activity
5. Aerobic session of continuous activity for 30 minutes or as tolerated

B. Exercise Session:
1. Warm-up activities as described in Session #1B: Exercise Session with some variations and first three preferences included
2. Circuit weight training
   a) Limit 2-pound weights
   b) Limit to 15 repetitions and 30 seconds or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variations and first three preferences included
6. Relaxation session as described in Session #1B: Exercise Session

<u>Session #3C: Exercise Session</u>

A. Focus:
1. Continue to review with participant pulse taking skills, proper technique of exercises, rating of perceived exertion, and home exercise program
2. Continue to provide individual reinforcement of participant

3. Continue to discuss with buddy staff and buddy observations of participant's attendance, effort, home exercise, energy, abilities, etc.
4. Continue to review with individual participants recording exercise monitor of:
   a) Exercise or activity accomplished
   b) With whom exercised
   c) Heart rate, RPE achieved
   d) Time of day exercised
   e) Location of exercise session
   f) Length of time of activity

B. Exercise Session:
1. Warm-up activities as described in Session #1B: Exercise Session with some variations and first three preferences included
2. Circuit weight training
   a) Limit 2-pound weights
   b) Limit to 20 repetitions and 30 seconds or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variations and first three preferences included
6. Relaxation session as described in Session #1B: Exercise Session

Session #4: Aerobic Points and Reinforcement Contracts

A. Purpose:
   1. Introduce participant to aerobic points
   2. Relate aerobic points earned to participant behavioral contracts
   3. Introduce fourth exercise session during other than scheduled exercise session

B. Participant Learning Objectives:
   1. Participant will identify in writing aerobic points earned with aerobic exercise session attended prior to education session
   2. Participant will complete behavioral contract of aerobic points to be earned for next week

C. Leader Lesson Plan:
   1. Review contract agreements as described in "Review and Previous Contracts"
   2. Provide ten dollars reward to participant
   3. Provide each participant with copy of Aerobic Points for activities walking and bicycling of appropriate exercise MET level
   4. Verbally describe "Aerobic Points"
   5. Provide opportunity and instruction participants to identify their aerobic points earned from previous exercise session
   6. Present behavioral contracts to participants for using aerobic points
   7. Encourage fourth exercise session other than scheduled exercise time

E. Materials Needed:
   1. "Aerobic Points" for activities walking and bicycling (refer to Appendix P)
   2. "Behavioral Contract" form (refer to Appendix M)

Session #4: Leader Lesson Content

A. Review and Discussion

B. Aerobic Points

Review and Discussion

Welcome back. Last time the group identified their preferred exercise activities. The three most often identified as top preferences were _____ . Would the group like to continue this? Did you find choosing activities made any difference in how you thought about the warm-up and cool-down exercises? I'd like some help finding new warm-up and cool-down activities. Would you remember some of the new ones that you find and show them to either me or the group?

Last time we also discussed different ways to monitor your exercise and home activities.

Questions for discussion:

How did your exercise and activity monitoring progress?

What similarities or new discoveries about yourselves did you make?

Were there problems?

What was helpful for you to know about yourself?

What was not helpful information that you monitored?

(Allow discussion time).

Aerobic Points

There is a way to estimate how much exercise you do each week, by using aerobic points for exercise sessions. (Handout aerobic point totals).

Aerobic point totals are listed for you on the handout. It is a way to determine the amount of exercise you do each session or each week. For some it is more desirable to exercise longer each session and some wish to exercise at a higher exercise level. Using aerobic points, a person can still get exercise benefits either way. It's not always the person who tears off down the street as fast as they can who benefits the most from exercise. Quite the contrary. Long, slow exercise is very beneficial. Aerobic points are awarded differently for activities that are longer and continuous, rather than doing a shorter activity more frequently. (Give example of participant during exercise session with walking).

To help increase your conditioning, I would encourage you to exercise a fourth time out-of-class. Try to choose aerobic point totals that include this fourth day.

Handout contracts for determining aerobic point totals for this week. (Allow time for participants to contract with their buddy for the next session).

Session #4: Week of Exercise Sessions

Session #4A: Exercise Session

A. Focus:

1. Continue to review with participant pulse taking skills and proper technique of exercises if needed
2. Continue to review with participant home exercise program and if fourth exercise session completed
3. Continue to provide individual reinforcement to participant, but with less emphasis than previous sessions. Rather elicit more of participant's impression of own abilities, energy, home exercise, effort, attendance, rating of perceived exertion, etc.
4. Continue to review participant monitoring as described in Session #3C: Exercise Session and aerobic points earned in aerobic activity this session
5. Aerobic session of continuous activity for at least 30 minutes or as tolerated
6. Celebrate first month of program participation and present earned pedometer to participants in presence of other group members. Describe how to use

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit 3-pound weights
   b) Limit circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session #4B: Exercise Session

A. Focus:

1. Minitesting aerobic exercise session
2. Blood chemistry of cholesterol and glucose serum levels by fingerstick
3. Body dimension measurements as described in Session #1A: Participant/Spouse Fitness Assessment
4. Body composition measurements as described in Session #1A: Participant/Spouse Fitness Assessment
5. Flexibility and body weight
6. Provide individual reinforcement of:
   a) Measures attained in this session
   b) Comparison with prior levels

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variations
2. Circuit weight training
   a) Limit 3-pound weights
   b) Limit circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities of minitesting session:
   a) Walk or bicycle for 5 minutes at levels identified as 33%, 50%, and 75% of maximal power output achieved in previous test
   b) Record level and count pulse rates at each level
   c) For rest of 15-minute-period walk or bicycle as previously
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variations
6. Relaxation session as described in Session #1B: Exercise Session
7. Measure flexibility of participant
8. Offer participants option of special meeting arranged to discuss findings of Session #4B: Exercise Session. Written updates will be

distributed next session. See you then

Session #4C: Exercise Session

A. Focus:

1. Continue to review with participant pulse taking skills and proper technique of exercises if needed
2. Continue to review with participant home exercise program and if fourth exercise session completed
3. Continue to provide individual reinforcement to participant, but with less emphasis than previous sessions. Rather elicit more of participant's impression of own abilities, energy, home exercise, effort, attendance, rating of perceived exertion, etc.
4. Continue to review participant monitoring as described in Session #3C: Exercise Session, pedometer mileage, and aerobic points earned in aerobic activity this session
5. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variations
2. Circuit weight training
   a) Limit 3-pound weights
   b) Limit circuit session for 30 seconds each or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variations
6. Relaxation session as described in Session #1B: Exercise Session
7. Distribute participant/spouse record forms (refer to Appendixes R through T)

Session #5: Adaptive Thoughts

A. Purpose:
   1. Introduce lottery reinforcement
   2. Introduce adaptive thoughts

B. Participant Learning Objectives:
   1. Participants will identify two examples of thoughts to use during indoor and outdoor exercise
   2. Participants will complete written contract with a buddy to use one adaptive thought with contracted activity session

C. Leader Lesson Plan:
   1. Discuss "Review and Discussion"
   2. Discuss "Lottery Reinforcement"
   3. Reward one participant lottery money (15 dollars per person) based on (group decision in Session #2: Leader Lesson Content, Deposit System and Contracts) attendance
   4. Discuss "Adaptive Thought"
   5. Provide behavioral contract sheets for contracted exercise behavior based on participant's desires of:
      a) Aerobic points
      b) Exercise time
      c) Exercise frequency
      d) Adaptive thoughts used

E. Materials Needed:
   1. "Behavioral Contract" forms (refer to Appendix M)
   2. Container for lottery drawing
   3. Writing board and utensils

Session #5: Leader Lesson Content

A. Review and Discussion

B. Lottery Reinforcement

C. Adaptive Thought

Review and Discussion

Welcome back. Last time we talked about aerobic points. Aerobic points are a method to measure how long and how fast your exercise session is.

Questions for discussion

Was using the aerobic points helpful information?

Did your pedometer provide you with other information?

What kinds of information?

Did you use it on your errands or other activities with a lot of walking?

Eventually, about 30 points a week is a good amount of exercise to maintain your fitness, but give yourself a little more time. Does that seem possible to you? What comes to mind thinking you can or cannot achieve that level? Were you able to exercise the fourth day to increase your aerobic points? Were you able to fulfill your contracts?

Lottery Reinforcement

If you would remember to the second meeting of our group, the group agreed upon a lottery. Today is the day. Who would like to draw the name of the person who has attended (as determined in Session #2: Leader Lesson Content, "Deposit System and Contracts")? The names of those that qualified and are in the drawing are: ______ . The winner of the (15 dollars per person) is _____ .

There is also another ten dollars in each person's kitty. Would you like another lottery? Would you like to earn it back in another contract? I'd like to hear from the group what you would like to do with the money. (Use this as decided by the group).

Adaptive Thought

When people exercise some seem to find it easier and more enjoyable than others. In the beginning stages of an exercise program, one way that helps is the ability to think of thoughts other than your exercising or what you are doing at the moment. These are called adaptive thoughts. Some the articles indicated that people can exercise faster and not notice the uncomfortable side of beginning exercise by thinking of thoughts other than exercise. For example, listening to the radio or music, talking to others around you of activities that you did last night, or reading may help you while exercising indoors. While outdoors (for your fourth exercise session??) you can notice the nice weather, feel the breeze on your face or on your skin, the flowers, birds, etc. All these are examples to focus on other things. What other examples come to mind that may be helpful to the group? (Allow time for discussion and write on board).

This does take some practice. If your thoughts travel to your exercise routine, allow yourself a short time to notice how you are doing and then begin to think of other things. I would like for you to list two examples of adaptive thoughts that you could use during your next aerobic session. (Allow time for participants to list).

Based on this list, for your next exercise session I'd like you to contract your exercise according to what you feel is important to you. For example, if you want to exercise more frequently, then I'd suggest to contract how many times you are going to exercise this week. Or you might contract to increase your time, your aerobic points or to use an adaptive thought during your exercise. Please do not include distance-type goals until we have had more of a chance to discuss this further in the next session. (Allow time for participants to contract with their buddy for the next session).

Session #5 : Week of Exercise Sessions

Session #5A: Exercise Session

A. Focus:

1. Adaptive thoughts participants used during aerobic session
2. Continue to review with participant pulse taking skills and proper technique of exercises if needed
3. Continue to review with participant home exercise program and if fourth exercise session completed
4. Continue to provide individual reinforcement to participant, but with less emphasis than previous sessions
5. Continue to review participant monitoring as described in Session #3C: Exercise Session and aerobic points earned in aerobic activity this session
6. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit 3-pound weights
   b) Limit circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session #5B: Exercise Session

A. Focus:

1. Continue to explore adaptive thoughts participants used during aerobic session

2. Continue to review with participant home exercise program and if fourth exercise session completed
3. Continue to provide individual reinforcement to participant, but with less emphasis than previous sessions
4. Continue to review participant monitoring as described in Session #3C: Exercise Session and aerobic points earned in aerobic activity this session
5. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
    a) Limit 3-pound weights
    b) Limit circuit session for 30 seconds each without stopping or as tolerated
    c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

<u>Session #5C: Exercise Session</u>

A. Focus:

1. Continue to explore adaptive thoughts participants used during aerobic session
2. Continue to review with participant home exercise program and if fourth exercise session completed
3. Continue to provide individual reinforcement to participant, but with less emphasis than previous sessions
4. Continue to review participant monitoring as described in Session #3C: Exercise Session and aerobic points earned in aerobic activity this session

5. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variations
2. Circuit weight training
    a) Limit 3-pound weights
    b) Circuit session for 30 seconds each without stopping or as tolerated
    c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variations
6. Relaxation session as described in Session #1B: Exercise Session

Session #6: Stimulus Control Measures

A. Purpose:
   1. Introduce participants to stimulus control techniques
   2. Encourage participants to identify own stimulus control suggestions

B. Participant Learning Objectives:
   1. Participant will list in writing one stimulus control measure
   2. Participant will complete behavioral contract to use one stimulus control measure

C. Leader Lesson Plan:
   1. Discuss "Review and Discuss"
   2. Discuss "Stimulus Control"
   3. Encourage group to verbalize stimulus control measures possible in brainstorming
   4. Write brainstorming measure on board
   5. Encourage participants to identify one stimulus control measure he/she wishes to use
   5. Provide time for completion of behavioral contract to use one stimulus control measure this week

E. Materials Needed:
   1. Writing board and utensils
   2. "Behavioral Contract" forms (refer to Appendix M)

Session #6: Leader Lesson Content

A. Review and Discussion

B. Stimulus Control

Review and Discussion

Questions for discussion:

What adaptive thoughts came to your mind when you were exercising?

Did you find it easy to think of adaptive thoughts or did it require an effort?

Do feel you can improve on adaptive thinking? If so, how?

Did these influence your contracts?

Did you fulfill your contracts?

Are you rewarding yourself like you contracted to do?

Stimulus Control

Stimulus control is the use of prompts or suggestions prior to exercising that help you increase your exercise behavior. There are many different kinds of prompts. Some of my ideas are signs, advertizing slogans, radio, or television. Do any of you have any reminders of exercise around your house. Wearing exercise clothes around the house or town, carrying exercise equipment in your car, or spending time with those who exercise more frequently prior to your exercise session can help you. What other ideas come to you?

What do you do when you have a "bad" day and don't feel like exercising? First, recognize that most everyone, even the best athletes have day when they just don't feel like exercising. To some the "bad" days are even more of an incentive to treat yourself to your own "take-care-of-yourself time." Whether you wish to exercise or not, a suggestion of mine is to go to your exercise area. Just by going to the area and relaxing you are going to think more about exercise. Sometimes I get to my exercise area and give myself permission to just do something, even if it is a slow, short walk. The more I get started, the more I feel like exercising and will usually have a much better time than I had anticipated. I do try to be easy on myself if I do exercise just a little. Having a similar spot also encourages the exercise habit. By coming to your spot you are keying yourself to still think of exercise

Having a specified time set aside as your exercise time also helps. Just as eating or sleeping is a part of your day, exercise needs its scheduled time in advance. I emphasize the time in advance. It is so easy to say I'll exercise when I have time and it is put off later and later until the next day. Have any of us done that?

Buddies, you can be helpful also. Telephoning your partner prior to the planned exercise activity, can help encourage exercise. Other stimulus control measures focus on what types of exercise you have planned for that session. For example, exercise plans that are set without any flexibility or freedom to be changed more difficult to continue. Instead of setting a specific distance for that exercise session, focus more of your emphasis on your time that you exercise. It more motivational to actually exercised, not what your pulse rate was or if you went an extra quarter of a mile today. Be easy on yourself when you set you goals is mind. You may have a slower day from time to time.

Question for discussion:

What other stimulus control ideas could fit and be helpful to nay of you (allow time for brainstorming)?

What is one stimulus control idea you wish to use this week?

For this week's contract, I'd like you to keep in mined the guidelines from last week. For example, if you want to exercise more frequently, then I'd suggest to contract how many times you are going to exercise this week. Or you might contract to increase your time, your aerobic points or to use an adaptive thought during your exercise. I'd encourage you for now to avoid distance-type goals. (Allow time for participants to contract with their buddy for the next session).

Session #6: Week of Exercise Sessions

Session #6A: Exercise Session

A. Focus:

1. Stimulus control measures used prior to this session
2. Continue to review adaptive thoughts used during aerobic session
3. Continue to review with participant home exercise program
4. Continue to provide individual reinforcement to participant, but with less emphasis than previous sessions
5. Continue to review participant monitoring as described in Session #3C: Exercise Session and aerobic points earned in aerobic activity this session
6. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit 4-pound weights
   b) Limit circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session #6B: Exercise Session

A. Focus:

1. Continue to review stimulus control measures used prior to this session
2. Continue to review adaptive thoughts used during aerobic session
3. Continue to provide individual reinforcement to participant

4. Continue to review participant monitoring as described in Session #3C: Exercise Session

B. Exercise Session

Physical and physical efficacy evaluation will be conducted on each participant and spouse at eight weeks after coronary incident (approximately week #6 of cardiac rehabilitation program). An appointment time will be arranged for this evaluation The evaluation will include:

1. Body composition measurements as in Session #1A: Participant/Spouse Fitness Assessment
2. Body dimension measurements as in Session #1A: Participant/Spouse Fitness Assessment
3. Blood chemistry as in Session #1A: Participant/Spouse Fitness Assessment
4. Flexibility and body weight
5. Warm-up activities as described in Session #1B: Exercise Session with some variation
6. Maximal physician-directed aerobic exercise test based on Bruce treadmill protocol. This test includes three-minute stages:
   a) Stage I, 1.7 m.p.h. and 10 percent grade
   b) Stage II, 2.5 m.p.h. and 12 percent grade
   c) Stage III, 3.4 m.p.h. and 14 percent grade
   d) Stage IV, 4.2 m.p.h. and 16 percent grade
   e) Stage V, 5.0 m.p.h. and 18 percent grade
   f) Stage VI, 5.5 m.p.h. and 20 percent grade
   g) Stage VII, 6.0 m.p.h. and 22 percent grade

   (Summarized by Pollock et al., 1984)
7. Physical efficacy scale (refer to Appendixes C and D)
8. Discuss aerobic and fitness test results according to:
   a) Aerobic level achieved
   b) Functional capacity of corresponding age group (refer to Appendix U)
   c) Estimation of percentage of body fat
   d) Determined body dimensions

e) Cholesterol, triglyceride, glucose, and high density lipoprotein blood chemistry levels

f) Participant's and spouse's perceived physical efficacy of participant and progress thus far

9. Verbally discuss changes and appropriate exercise level of:
   a) Intensity (heart rate)
   b) Borg's Rating of Perceived Exertion (RPE)
   c) Duration
   d) Frequency
   e) Aerobic activities based on "Aerobic Points" and "Calories Consumed during Exercise" (refer to Appendix P and Q)
10. Present to participant participant/spouse record forms (refer to Appendixes R through T)
   a) Appropriate exercise prescription (as described above #7)
   b) Body dimensions
   c) Estimated percent of body fat
   d) Aerobic fitness level achieved fitness testing
   e) Cholesterol, triglyceride, glucose, and high density lipoprotein blood chemistry levels

Session #6C: Exercise Session

A. Focus:

1. Continue to review stimulus control measures used prior to this session
2. Continue to review adaptive thoughts used during aerobic session
3. Continue to review with participant home exercise program
4. Continue to provide individual reinforcement to participant, but with less emphasis than previous sessions
5. Continue to review participant monitoring as described in Session #3C: Exercise Session and aerobic points earned in aerobic activity this session
6. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit 4-pound weights
   b) Limit circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session #7: Self-statements

A. Purpose:
   1. Introduce to participants positive self-statements
   2. Encourage participants to utilize positive self-statements when considering themselves and their exercise program

B. Participant Learning Objectives:
   1. Participant able to verbalize one negative statement that has said to himself
   2. Participant able to verbalize two positive statements that can say in place of the negative self-statement
   3. Participant continues behavioral contract

C. Leader Lesson Plan:
   1. Discuss "Review and Discussion"
   2. Discuss "Self-statements"
   3. Provide time for completion of behavioral contract to use positive self-statements combined with exercise program

D. Materials Needed:
   1. Paper and writing utensils
   2. "Behavioral Contract" forms (refer to Appendix M)

Session #7: Leader Lesson Content

A. Review and Discussion

B. Self-statements

Review and Discussion

What kind of prompts for your exercise did you use this week?

Did you notice other prompts that were around you that you hadn't noticed before?

Were the prompts helpful?

Did the prompts influence you fulfilling your contracts? If so, how?

Self-statements

"Oh, I knew I shouldn't have started to exercise today. I knew the first thing when I got out of bed that it was going to be a terrible day. I can't do anything. George is going so much faster. He makes it look easy. I'll never be like that. I should stay home."

Can you imagine trying to even continue to exercise when saying things like that? Does that sound familiar? That is an example of what is a negative self-statement. During the discussion of stimulus control, what one does, hears, or sees prior to exercise can influence whether a person exercises. There is also an internal prompt that goes on in our minds. Messages that we say to ourselves, self-statements, either prior to, during, or after exercise has a big impact how we see ourselves and whether we view activity as a positive. Self-statements are just as important as engaging in exercise itself. If someone as I described earlier did do their activity, that person probably didn't feel very positive about exercise. More importantly, that person after hearing a few more comments like that, will be less enthused about exercise and probably will not continue.

Questions for discussion:

Do those statements sound familiar to anyone?

What kind of negative statements do any of you say to yourselves?

How many of us have tried something new and sound defeated before we even started?

Fortunately, there are other ways to talk to ourselves while we exercise, and before and after exercising. For some, saying positive self-statements will be unusual. For example, "I've come all this way and I didn't even feel like exercising today." "I'm doing the same exercise as George and by going slower I can notice the flowers and nice weather." "I am going slower today and that is ok with me. I'll say 'hi' to a person who is struggling today."

Questions for discussion:

What kind of positive self-statements have you said in the past to yourself either before, after or during exercise?

What other positive statements can a person say to themselves? (Allow for discussion).

Session #7: Week of Exercise Sessions

Session #7A: Exercise Session

A. Focus:

1. Self-statements said before, during, and after exercise session
2. If negative self-statements identified, how to make positive
3. Continue to review stimulus control measures used and participant monitoring
4. Continue to review participant home exercise program
5. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit 4-pound weights
   b) Circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session #7B: Exercise Session

A. Focus:

1. Continue to identify self-statements said before, during, and after exercise session
2. If negative self-statements identified, how to make positive
3. Continue to review stimulus control measures used and participant monitoring
4. Continue to review participant home exercise program
5. Aerobic session of continuous activity for at least 30 minutes or as

tolerated

B. Exercise Session

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
    a) Limit 4-pound weights
    b) Circuit session for 30 seconds each without stopping or as tolerated
    c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session #7C: Exercise Session

A. Focus:

1. Continue to identify self-statements said before, during, and after exercise session
2. If negative self-statements identified, how to make positive
3. Continue to review stimulus control measures used and participant monitoring
4. Continue to review participant home exercise program
5. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
    a) Limit 4-pound weights
    b) Circuit session for 30 seconds each without stopping or as tolerated
    c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session

4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session # 8: Benefits/Effects of Aerobic Exercise

A. Purpose:
   1. Introduce participant to benefits/effects of aerobic exercise
B. Participant Learning Objectives:
   1. Participant will list in behavioral contract two indoor and two outdoor aerobic activities of their preference.
   2. Participant will verbalize to buddy one change in themselves from their aerobic program that has changed since beginning exercise program.
   3. Participant will estimate the calories that used during previous aerobic session.
C. Leader Lesson Plan:
   1. Discuss "Review and Discussion"
   2. Discuss "Aerobic exercise"
   3. Discuss "Effects of Aerobic Exercise"
   4. Discuss "Weight Control Effects of Aerobic Exercise"
   5. Distribute handouts of "Calories Consumed during Exercise" (refer to Appendix Q)
E. Materials Needed:
   1. "Calories Consumed during Exercise" (refer to Appendix Q)
   2. Paper and writing utensils

Session #8: Leader Lesson Content

A. Aerobic Exercise
B. Effects of Aerobic Exercise
C. Weight Control Effects of Aerobic Exercise

Aerobic Exercise

There are two kinds of exercise: aerobic and anaerobic exercise. The difference between these is the source of energy the body uses. Each kind of exercise has its importance. Anaerobic exercise is important for tasks with strength, sudden and quick types of activities. This source of energy comes from immediate sources. As a result, it "gives off" lactic acid that makes muscles sore. The aerobic exercise is important for our general health and well-being. A good aerobic exercise level helps to provide us with an energy feeling to participate in activities longer than ten minutes. Activities that are considered long, slow, and rhythmic motion are aerobic. With aerobic exercises the body uses oxygen and stored fat for energy.

No doubt you have heard from many how good exercise is for you. Exercise is "just the thing" to make you strong and healthy. But, many do not realize that exercise is like any other treatment or therapy you may receive in the hospital--too much or too little can be troublesome. Exercise must be tailored individually for each person. Your appropriate aerobic level of exercise is based on your treadmill test maximal ability determined by your doctor. Each person's aerobic level at which to exercise is a certain percentage of that test. Do not try to exercise at the same effort as you did during the treadmill test. If you try to exercise faster than that, at a higher heart rate, you are using anaerobic energy. Your condition will not improve as fast as the person who stays in their aerobic level. Higher exercise levels are more dangerous and may cause heart rhythm problems, increased injuries, angina or chest pain, and is not safe. People who try exercise at a higher level tend to have more injuries and probably don't increase their fitness any faster.

The pulse rate guidelines you have received are at your aerobic level. This corresponds to your feeling of exertion (Borg's Rating of Perceived Exertion), and whether you can talk and carry on a conversation comfortably.

These represent your appropriate exercise level. If you are exercising too fast or at too high an intensity, your pulse rate will be higher than recommended and you need to slow down. If you are exercising too slow or at too low an intensity, your pulse rate will be lower than this number and you need to go a little faster.

Aerobic exercise is not the same as working on the job or around the house. Your pulse rate and exercise level must be sustained for a period of time, at least 20 minutes and preferably 30 to 45 minutes. Most jobs, while helpful to burn calories will not aid to condition the heart, blood vessels, and muscles. Your aerobic exercise will help condition for your work, but work will not condition one for exercise. That is not to say that you will not be able to do your work and chores. Rather, to do so causes your heart to work much harder than is needed and possibly more than it is safe and able to do so. This changes as your conditioned arms and legs are able to do more of their "share" and make it easier on your heart.

Another important characteristic of an exercise program is that it be done at least three times per week, nonconsecutive days and four days preferably for weight control. To exercise on consecutive days, a suggestion is to exercise one day longer and another day shorter. One may also alternate different types of exercises. For example, one day walk and another day swim so different muscles are used. This gives your body needed time to repair itself, about 24 hours. Benefits will disappear discouragingly quickly in about 72 hours.

Effects of Aerobic Exercise

There are changes going on in your body as you become more fit.

1. Aerobic exercise increases the efficiency of your heart and lungs. For a certain amount of work your body uses less oxygen and needs to do less work to supply your body with needed oxygen and nutrients. Your pulse rate will be less when you are conditioned and your heart can pump a greater volume of blood with each heart beat. This makes the work of your heart less.

2. Your heart muscle can use oxygen more efficiently and the likelihood of early heart beat irregularities decreases.

3. Blood pressure is lowered during exercise by aerobic training. This

also lowers the work of your heart muscle. A guideline used to measure how much work your heart is doing is reflected by how high your heart rate and blood pressure are. When your heart rate and blood pressure are lower, your heart works less and has more reserves when needed.

4. Exercise improves the circulation to your muscles and body tissues. Your trained muscles have more blood vessels and have a greater ability to get the oxygen it needs. People poorly conditioned are at a disadvantage because their muscles will not take the oxygen it needs from your blood as well as the same person who is conditioned. Again, the workload of your heart is reduced if your body is able to get the oxygen it needs.

5. Aerobic exercise increases muscle size and these muscles have more ability to use fat for its energy. With more muscles the body can burn more calories, even when asleep. More about this later.

6. The effect of exercise only affects the muscles that you exercise. That is one may feel as an accomplished walker, but swimming muscles will still need a gentle training period before they are conditioned. So a word of caution to not anticipate the same abilities when you start a new type of exercise. All the aerobic muscles are good for your heart, but if you use muscles that have not had a chance to be conditioned, your heart will need to work harder.

7. Aerobic exercise causes some increase in the amount of blood volume and the number of blood cells that carry oxygen. There is more blood and more oxygen going to those muscles. This also lessens the amount of work your heart must do to get oxygen to those muscles that need it.

8. Exercise increases the ability of the blood system to break clots that have a tendency to form in blood vessels. This is particularly important as heart attacks are often caused by blood clots.

9. Exercise lowers the cholesterol and triglyceride levels in the blood. One trained to exercise uses more fat for energy and helps to decrease the buildup for fat inside the blood vessels. Where the untrained individual uses more sugars in the muscle and blood for energy, the one physically fit uses more fat.

10. Exercise also provides an outlet for tension and mental fatigue, and

encourages a tranquilizing effect. It improves our reaction to and coping with stress often associated with coronary artery disease.

Weight Control Effects of Aerobic Exercise

Your exercise session can be measured by how long you exercise, your aerobic points earned and how many calories you burn during an activity. Please refer to "Calories Consumed during Exercise." Many of you began burning about 50 calories an exercise session. Gradually, increase this number preferably up to at least 300 an exercise session. For most after a heart problem, this will take several months.

Longer exercise will help to lose extra pounds. Keep in mind that whether you walk the mile or run the mile, you will burn about the same number of calories. How fast you go is not as important as going the distance or time.

Who do you think usually eats more-a person overweight or a person of averaged weight? Most people overweight actually eat less than those normal weight or underweight. Why?

There are two ways to loose weight, by diet control and/or increase one's exercise. Dieting helps to decrease one's weight, but there are some points to consider. More of the weight people lose while only dieting is water and muscle weight. The person exercising looses less of his weight as water and muscle. But the dieter alone loses less fat than the exerciser. That is, the person who looses weight by exercise looses more of his fat weight than the person who tries to reduce his calories. A vicious cycle begins if a person gains that weight again. If the person does not exercise that weight added is fat, while if the person exercises that weight is more likely muscle. Therefore, not only has the dieter only lost muscle reducing weight, but if that weight is gained, which often happens, it is more fat. When a person gains weight without exercise, the weight gained is stored as fat, not muscle. This gives one a greater percentage of body weight being fat than before the initial weight loss. This cycle is repeated each time one loses weight without combining exercise; the percent of body weight being fat continually increases a little each time each time weight is lost and then gained.

Another cycle occurs as a result of weight loss by reducing calories.

When a person restricts the amount of food, the body metabolism will slow down. When they return to a "normal" diet they increase their weight. For a person trying to loose weight, this is just opposite from what one is trying to do. Over a period of time each time a person decrease their food intake greatly they are slowing their body metabolism. Our body has a built survival mechanism in order to conserve our energy. The same happens when someone is lost in the woods with very little food. People survive in part because their body's need for food will slow down.

With exercise, one may not always lose weight as fast as they would like, but they lessen their percent of body fat and increase their percent of muscle. That is why one may notice body dimension decreasing in inches before a change is noted in weight. The increased amount of muscle mass in our bodies actually burns more calories. When the food is there, the muscles do not store calories. Our body starts to use more calories. The object to loose weight is to supply to calories at a reasonable level throughout the day. That means at least three meals of preferably equal calories at each meal.

Exercise helps to encourage our body's "set point" so that our body knows what our normal weight is. Without exercise this set point raises higher and our bodies cannot recognize our appropriate weight.

Spot reducing with exercise does not work. Each of us has a genetically-determined pattern of fat deposition. Fat cannot be "melted away" or "exercised away" from a specific area. One's entire percent of body fat must be considered when wishing to lose body fat.

Session #8: Week of Exercise Sessions

Session #8A: Exercise Session

A. Focus:

1. Continue to review self-statements made, stimulus control measures used and participant monitoring
2. Continue to review participant home exercise program
3. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit 5-pound weights
   b) Circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session #8B: Exercise Session

A. Focus:

1. Continue to review self-statements made, stimulus control measures used and participant monitoring
2. Continue to review participant home exercise program
3. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training

a) Limit 5-pound weights
b) Circuit session for 30 seconds each without stopping or as tolerated
c) Exercises as described in Session #1B: Exercise Session

3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session #8C: Exercise Session

A. Focus:
1. Minitesting aerobic exercise session
2. Blood chemistry of cholesterol and glucose serum levels by fingerstick
3. Body dimensions measurements as described in Session #1A: Participant/Spouse Fitness Assessment
4. Body composition measurements as described in Session #1A: Participant/Spouse Fitness Assessment
5. Flexibility and body weight
6. Provide individual reinforcement of:
   a) Measures attained in this session
   b) Comparison with levels recommended

B. Exercise Session:
1. Warm-up activities as described in Session #1B: Exercise Session with some variations
2. Circuit weight training
   a) Limit 5-pound weights
   b) Limit circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities of minitesting session:
   a) Walk or bicycle for 5 minutes at levels identified as 33%, 50%, and 75% of maximal power output achieved in previous test

b) Record level and count pulse rates at each level
c) For rest of 15-minute-period walk or bicycle as previously

4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variations
6. Relaxation session as described in Session #1B: Exercise Session
7. Offer participants option of special meeting arranged to discuss findings of Session #4B: Exercise Session. Written updates will be distributed and discussed in next discussion session (Session #9: Continued Benefits/Effects of Aerobic Exercise--Self-Evaluation). See you then

Session #9: Continued Benefits/Effects of Aerobic Exercise --Self-Evaluation

A. Purpose:
1. Continue aerobic exercise benefits and effects discussion
2. Identify minitesting results of Session #8B: Exercise Session

B. Participant Learning Objectives:
1. Participant able to identify own lipid levels as low, medium, or high levels
2. Participants able to identify body aerobic changes as determined by minitesting exercise
3. Participants able to identify weight, flexibility, body composition, and/or body dimension changes that have occurred

C. Leader Lesson Plan:
1. Discuss "Review and Discussion"
2. Complete discussion of Session #8: Leader Lesson Content
3. Discuss "Exercise Program Stages"
4. Distribute participant/spouse record forms (refer to Appendixes R through T)
5. Discuss "Self-evaluation"

D. Materials Needed:
1. Copy of each participant's minitesting and aerobic testing results
2. Participant/spouse record forms (refer to Appendixes R through T)
3. Copy of each participant's monitoring sheets

Session #9: Leader Lesson Content

A. Review and Discussion
B. Exercise Program Stages
C. Self-Evaluation

Review and Discussion

Last time we were discussing the benefits and effects of aerobic exercise. Aerobic exercise is different from anaerobic exercise. Aerobic exercises are slow, rhythmic, and over a period of at least ten minutes. Anaerobic activities are short and sudden. The guidelines to know if a person is at their appropriate exercise so that their body is using oxygen and fat for their energy is determined by a treadmill test. There are some tests other than using treadmills, such as bicycles, but for our program we use the treadmill stress test. An exercise program is based on guidelines of the pulse rate, the length of time a person exercises and how many times per week a person exercises.

Aerobic exercise mainly enables our bodies to do more activity with less work for our hearts. Aerobic exercise makes important changes how our bodies use fat for energy and how our bodies use more calories even at rest rather than trying to store them. (If discussion stopped prior to this review, begin discussion where stopped).

Questions for discussion:

What questions do you have about our discussion last time?

Do you see yourself or someone you know in the loose-gain weight cycle or who tries to restrict their calories so much that they gain weight easily when they stop?

Exercise Program Stages

The pulse rate is most frequently used as an aerobic guide. A person's resting and after cool-down pulse rates are at the ends of the plateau. The middle of the plateau represents a person's aerobic exercise. The warm-up and cool-down phases help make that change from resting to the plateau gradually.

This gradual change should take at least five to ten minutes. The body must make adjustments to exercise. Our bodies must increase the body temperature, increase heart rate and blood pressure, lubricate joints and stretch muscles. Muscle injuries, strains, early heart beats, and the heart muscle itself that does not get enough oxygen can occur. In people without heart disease who did not warm-up properly their heart muscle reacted and worked initially as though it were starved for oxygen. This is more likely to happen with a person who already has or had a blockage in their heart artery or heart problems.

Self-Evaluation

Questions for discussion:

What are your reactions looking at your information?

Is you progress path in the direction you want?

What do you see that you like about your test and measurement results and compared with your participant monitoring sheets?

If your buddy looked at these results, what would be their reaction?

I'd like each of you to switch with another. Give them a chance to look at your test and measurement results. Then would you give feedback to the other. (Allow time for discussion and feedback).

Questions for discussion:

Were your opinions similar?

Did you change your view of your progress?

How do you see yourself, your mood, your ability to exercise and do different activities?

What are your expectations about yourself and the program? Have they changed since you first started?

What reactions do you have about some of these issues as compared to when you first started the program?

Do some of you have feedback for the others in the group? If so, what comments would you like to share?

Session #9: Week of Exercise Sessions

Session #9A: Exercise Session

A. Focus:

1. Continue to review self-statements made, stimulus control measures used and participant monitoring
2. Continue to review participant home exercise program
3. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit 5-pound weights
   b) Circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session #9B: Exercise Session

A. Focus:

1. Continue to review self-statements made, stimulus control measures used and participant monitoring
2. Continue to review participant home exercise program
3. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training

a) Limit 5-pound weights
b) Circuit session for 30 seconds each without stopping or as tolerated
c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

<u>Session #9C: Exercise Session</u>

A. Focus:
1. Continue to review self-statements made, stimulus control measures used and participant monitoring
2. Continue to review participant home exercise program
3. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session
1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit 5-pound weights
   b) Circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session #10: Cost/Benefits of Exercise

A. Purpose:
   1. Encourage participants to identify own costs and benefits of an exercise program

B. Participant Learning Objectives:
   1. Each participant will list two costs of continuing exercise program
   2. Each participant will list two benefits of continuing exercise program

C. Leader Lesson Plan:
   1. Discuss "Review and Discussion"
   2. Discuss "Cost and Benefits of Exercise Program"

D. Materials Needed:
   1. "Behavioral Contract" forms (refer to Appendix M)
   2. Paper and writing utensils

Session # 10: Leader Lesson Content

A. Review and Discussion
B. Cost and Benefits of Exercise Program

Review and Discussion

Last week our discussion focused on how we thought of our progress and exercise program. Some comments made were _____ .

Questions for discussion:

What other thoughts came to you after our discussion?

Was this helpful to get other's feedback and to begin looking at how you are progressing?

What other ways would you like to think about you and your exercise? (Allow time for discussion).

Cost and Benefits of Exercise Program

When you are deciding whether to buy a new car, how long does it take to decide whether to buy it or not? Do you consider the cost of buying it and the benefits of whether you need it?

I'd like each of you to consider that at some thought level we think similar thoughts to decide what kind and how much to change after a heart problem. It may not be so clearly thought out, but many do consider options in terms of how a change will help, if one is capable without too much trouble to do it, and how difficult it will be changing.

Does exercise fall in that same category? What I'd like to suggest is to begin to think what costs are involved in an exercise program. That is how much time, energy, finances is it going to take to start an exercise program and to continue with the program? Cost could also be concern and encouragement expressed by your loved ones (some call nagging). The cost initially may be related to equipment and the cost later may be related to time when your work schedules start again.

Questions for discussion:

What costs do you also see in terms of your health and well-being?

What risk (s) do you see to your neighbor if they choose to stopping their exercise program? (Allow discussion time and write results on board).

What is the cost of continuing in an exercise program (because you have already started the exercise program)?

What kinds of situations can interfer with continuing an exercise program? (Allow discussion time and write results on board).

What benefits to your neighbor can occur if they continue to exercise? (Allow discussion time and write results on board).

If you were to give your neighbor advice, what would you suggest to lessen the effects of the cost? (Allow discussion time and write results on board).

Please take a few minutes and write two costs that you believe could apply to you and write one way to lessen the effect of that cost. Next, write two benefits that could happen to you if you did continue in an exercise program. Ask for feedback from participants what they decided and discuss.

Session #10: Week of Exercise Sessions

Session #10A: Exercise Session

A. Focus:

1. Participant's costs and benefits thoughts prior to attendance
2. Continue to review self-statements made, stimulus control measures used and participant monitoring
3. Continue to review participant home exercise program
4. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit 5-pound weights
   b) Circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session #10B: Exercise Session

A. Focus:

1. Continue to determine participant's costs and benefits thoughts prior to attendance
2. Continue to review self-statements made, stimulus control measures used and participant monitoring
3. Continue to review participant home exercise program
4. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit 5-pound weights
   b) Circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

<u>Session #10C: Exercise Session</u>

A. Focus:
1. Maximal lift effort after written physician permission
2. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:
1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Maximal lift effort:
   a) Session must correspond with physician referral for continuation to circuit weight training program
   b) Testing of:
      (1) Shoulder press
      (2) Arm curls
      (3) Side bends
      (4) French curls
      (5) Upright rowing
      (6) Bench press
      (7) Double leg curls
      (8) Double leg extensions
      (9) Heel raises

3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session
7. Offer participants option of special meeting arranged to discuss findings of Session #4B: Exercise Session. Written updates will be distributed and discussed in next discussion session (Session #11: Group Relapse Training).

Session #11: Group Relapse Training

A. Purpose:
1. Introduce group to relapse training

B. Participant Learning Objectives:
1. Participants able to list two personal high risk situations
2. Participants able to list five "should" in lifestyle
3. Participants able to list two "want" activities currently in lifestyle

C. Leader Lesson Plan:
1. Discuss "Review and Discussion"
2. Discuss "Relapse Training"
3. Discuss High Risk Situations"
4. Encourage participants to list two personal high risk situations that would delay continuing their exercise behavior
5. Discuss "Wants and Shoulds"
6. Encourage participants to identify five shoulds and two wants in lifestyle currently

D. Materials Needed:
1. Paper and writing utensils

Session #11: Leader Lesson Content

A. Review and Discussion
B. Relapse Training
C. High Risk Situations
D. Wants and Shoulds

Review and Discussion

Questions for discussion:

During your exercise times, did more cost or benefits of exercise come to mind?

Do you see yourself as actually making a decision about whether to exercise based on what the costs are versus what the benefits of an exercise program are?

During the last exercise session, we did maximal weight lifts. (Give to each participant the maximal weight lifted and a recommended weight to lift for circuit weight training). During the exercise sessions, we will recommend a limit of one pound increase from the previous session with the same lifting speed. As long as your heart rate during your circuit training sessions is still within your target heart rate guidelines, you can continue to add weight.

Relapse Training

How many have tried to make other changes in your life? Did it take much effort or thought? Did you expect a change to happen once you decided what you wanted to do?

If you think of bad habits you have developed those also probably occurred over a period of time. But how many expected yourselves to start this program and continue exercising with no slips? That is very unlikely. It is really rare that a person start an exercise program and continues without at least one slip. Usually developing an exercise habit occurs in a process of trials with a slip here and there. And, how you see yourself and the slip is important.

Questions for discussion:

I am using the word slip, do you think of not exercising a day as a slip or as a failure?

Would you see yourselves as going from a 100 percent participation to zero participation? Or, would you say to yourselves that you had only slipped to 90 percent participation?

What kind of self-statements and messages do you tell yourself when you have not followed through when you intended to exercise? How about other situations? (Allow time for discussion).

High Risk Situations

There are situations in which a person is more likely to slip from their planned exercise. These are called high risk situations. Some examples that I have thought of are:

1. Starting another activity just about your planned exercise time
2. Planning vacations in which exercise and activity will be limited, or
3. Associating with others who do not wish to exercise just prior to your planned session.

What other situations could apply to you? (Allow time for discussion and write list on board). Write two of these that would apply to yourself.

Wants and Shoulds

Another situation that tends to accentuate a slip is the amount of activities that we feel we should do versus want to do in our lives. The should activities are those that we feel obligated to perform. The want activities are those activities that we would like to perform. What kind of activities occupies most of your time during the day? Are they want or should activities? I'd like each of us to take a few minutes and create our list of activities that you consider a want and a should activity. (Allow time for discussion and write list on board).

Later, I am going to suggest we as a group have a slip for about a week with no exercise at all during that time. Between now and next week's session, I'd like each of you to think concerns you will have about following through with a slip. We will spend some more time discussing them.

Session 11: Week of Exercise Sessions

Session #11A: Exercise Session

A. Focus:

1. Encourage participants to consider high risk situations
2. Encourage participants to consider if present exercise session a want or should activity
3. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit increase 1-pound from previous session until at 40 percent of maximal effort
   b) Circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session #11B: Exercise Session

A. Focus:

1. Continue to encourage participants to consider high risk situations
2. Continue to encourage participants to consider if present exercise session a want or should activity
3. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation

2. Circuit weight training
   a) Limit increase 1-pound from previous session until at 40 percent of maximal effort
   b) Circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

<u>Session #11C: Exercise Session</u>

A. Focus:
   1. Continue to encourage participants to consider high risk situations
   2. Continue to encourage participants to consider if present exercise session a want or should activity
   3. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:
   1. Warm-up activities as described in Session #1B: Exercise Session with some variation
   2. Circuit weight training
      a) Limit increase 1-pound from previous session until at 40 percent of maximal effort
      b) Circuit session for 30 seconds each without stopping or as tolerated
      c) Exercises as described in Session #1B: Exercise Session
   3. Aerobic opportunities as described in Session #1B: Exercise Session
   4. Special activity
   5. Cool-down activities as described in Session #1B: Exercise Session with some variation
   6. Relaxation session as described in Session #1B: Exercise Session

Session #12: Continued Group Relapse Training

A. Purpose:
   1. Challenge participants with high risk situations
   2. Provide exercise relapse week in controlled class situation

B. Participant Learning Objectives:
   1. Participant will list in writing two ways to cope with a high risk situation
   2. Participant will omit exercise activity for one week

C. Leader Lesson Plan:
   1. Discuss "Review and Discussion"
   2. Discuss "Coping Methods High Risk Situations" identified previous week
   3. Discuss "Planned Relapse"

E. Materials Needed:
   1. Board and writing utensils
   2. List from previous week of identified high risk situations

Session #12: Leader Lesson Content

A. Review and Discussion

B. Coping Methods of Planned Relapse

Review and Discussion

Last we talked about planning a slip of not exercising for a week.

Questions for discussion:

How did your week go?

What concerns do you have about not exercising at this time?

Does this situation remind you of any other similar situations? If so, how? What, if anything, is different now?

Coping Methods of Planned Relapse

Last week as group, several high risk situations were identified. I'd like to spend some time and as a group brainstorm ways that you would recommend to another how to handle a high risk situation. (Write suggestions on board).

How a person sees himself or herself, influences how a person can handle a slip.

Questions for discussion:

Currently, do you see yourself as an exerciser or nonexerciser?

What characteristics remind you of an exerciser and a nonexerciser? (Write on board characteristics identified).

How do you perceive a week of not exercising?

When you do a slip week, will you consider your exercise program at 90 percent, rather than zero percent? If at zero, what thoughts influence your decision? (Allow for discussion).

To clarify, the next three exercise sessions will be considered a slip week for everyone. Is everyone agreeable to this? (If not, further discussion or possibly continue same plan for next week with exercise this week).

Session #12: Week of Exercise Sessions

Session #12A: Exercise Session

Exercise relapse, no exercise sessions for participants

Session #12B: Exercise Session

Exercise relapse, no exercise sessions for participants

Session #12C: Exercise Session

Exercise relapse, no exercise sessions for participants

Session #13: Follow-up of Group Relapse Training

A. Purpose:
   1. Discuss participant's experience of exercise relapse
   2. Encourage participant's focus of own abilities to engage in exercise slip without stopping exercise behavior

B. Participant Learning Objectives:
   1. Encourage participant to verbalize own experience of exercise relapse

C. Leader Lesson Plan:
   1. Discuss "Review and Discussion"

D. Materials Needed:
   1. None

Session #13: Leader Lesson Content

A. Review and Discussion

Review and Discussion

There is a lot of mental thinking about ourselves that enters in the dealing of an exercise slip.

Questions for discussion:

How did your week go?

Did you talk to yourself? What thoughts did you tell yourself during the week?

How did you feel you handled the slip?

Any easier or difficult situations that came up during your week?

Was it a learning experience for you?

Any suggestions for the group that you discovered this week?

How could you be more supportive to yourself?

Do you sense of the feeling "I know I can do it?" (Allow discussion time).

Session 13: Week of Exercise Sessions

Session #13A: Exercise Session

A. Focus:

1. Continue to encourage participants to consider high risk situations
2. Continue to encourage participants to consider if present exercise session a want or should activity
3. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit increase 1-pound from previous session until at 40 percent of maximal effort
   b) Circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session #13B: Exercise Session

A. Focus:

1. Continue to encourage participants to consider high risk situations
2. Continue to encourage participants to consider if present exercise session a want or should activity
3. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation

2. Circuit weight training
    a) Limit increase 1-pound from previous session until at 40 percent of maximal effort
    b) Circuit session for 30 seconds each without stopping or as tolerated
    c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session #13C: Exercise Session

A. Focus:
1. Minitesting aerobic exercise session
2. Blood chemistry of cholesterol and glucose serum levels by fingerstick
3. Body dimensions measurements as described in Session #1A: Participant/Spouse Fitness Assessment
4. Body composition measurements as described in Session #1A: Participant/Spouse Fitness Assessment
5. Flexibility and body weight
6. Provide individual reinforcement of:
    a) Measures attained in this session
    b) Comparison with levels recommended

B. Exercise Session:
1. Warm-up activities as described in Session #1B: Exercise Session with some variations
2. Circuit weight training
    a) Limit increase 1-pound from previous session until at 40 percent of maximal effort
    b) Circuit session for 30 seconds each without stopping or as tolerated
    c) Exercises as described in Session #1B: Exercise Session

3. Aerobic opportunities of minitesting session:
   a) Walk or bicycle for 5 minutes at levels identified as 33%, 50%, and 75% of maximal power output achieved in previous test
   b) Record level and count pulse rates at each level
   c) For rest of 15-minute-period walk or bicycle as previously
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variations
6. Relaxation session as described in Session #1B: Exercise Session
7. Offer participants option of special meeting arranged to discuss findings of Session #4B: Exercise Session. Written updates will be distributed and discussed in next discussion session. See you then

Session #14: Exercise Generalized to Other Activities

A. Purpose:
   1. Introduce individuals to other activities and active lifestyle

B. Participant Learning Objectives:
   1. Participant identify two behaviors possible in daily lifestyle that are considered active and energy consuming (based on "Aerobic Points" and/or "Calories Consumed during Exercise")
   2. Participant identify an additional type of exercise that is aerobic exercise for indoor and another for outdoor activity

C. Leader Lesson Plan:
   1. Discuss "Review and Discussion"
   2. Handout copies of "Calories Consumed during Exercise"
   3. Discuss "Active Lifestyle"

D. Materials Needed:
   1. "Aerobic Points" (refer to Appendix P)
   2. "Calories Consumed during Exercise" (refer to Appendix Q)

Session #14: Leader Lesson Plan

A. Review and Discussion
B. Active Lifestyle

Review and Discussion

Questions for discussion:

What questions do you have at present?

Are there topics that we have not discussed that would be of interest to you?

How do you feel the program is meeting concerns you have had?

Active Lifestyle

Much of the discussion thus far has been suggestions to help begin and continue with an exercise program. An exercise program is usually a specific time set aside for exercise. The topic today will include ways to help compliment your exercise program and suggestions to expand your exercise program.

"Aerobic Points" describes many other activities other than walking or bicycling that are just as healthful and help keep a person active. Referring to the handout "Calories Consumed during Exercise", there are many activities that burn calories, but may be hidden in our daily activities. There are ways to become more physically active that supplement your routine exercise program. For example, when driving or taking a bus, stop a few blocks from your destination and walk the rest of the way. Use stairs instead of the elevators or escalators either up and/or down can supplement your routine. Attending a class or reading magazine articles exercise-related can help maintain your interest. What other ideas can you think of that will help supplement your exercise schedule? (Write on board ideas). Would any of these fit for you?

Session 14: Week of Exercise Sessions

Session #14A: Exercise Session

A. Focus:

1. Continue to encourage participants to focus on enjoyable aspects of activity
2. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit increase 1-pound from previous session until at 40 percent of maximal effort
   b) Circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Session #14B: Exercise Session

A. Focus:

1. Continue to encourage participants to focus on enjoyable aspects of activity
2. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit increase 1-pound from previous session until at 40 percent

of maximal effort

b) Circuit session for 30 seconds each without stopping or as tolerated

c) Exercises as described in Session #1B: Exercise Session

3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

<u>Session #14C: Exercise Session</u>

A. Focus:

1. Continue to encourage participants to focus on enjoyable aspects of activity
2. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
    a) Limit increase 1-pound from previous session until at 40 percent of maximal effort
    b) Circuit session for 30 seconds each without stopping or as tolerated
    c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Sessions #15, #17, #18, #19, #21, #22, and #23

As a process of gradually lessening the contact with a formalized group, the discussion session will change in format and the times they are offered. There will be no discussion sessions for Sessions #15, #17, #18, #19, #21, #22, and #23. The exercise sessions for each corresponding session will continue as described for Session #14: Exercise Sessions:

A. Focus:

1. Continue to encourage participants to focus on enjoyable aspects of activity
2. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:

1. Warm-up activities as described in Session #1B: Exercise Session with some variation
2. Circuit weight training
   a) Limit increase 1-pound from previous session until at 40 percent of maximal effort
   b) Circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities as described in Session #1B: Exercise Session
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variation
6. Relaxation session as described in Session #1B: Exercise Session

Sessions #16 and #20: Continued Group Support

During these sessions, an informal discussion will be offered to participants for discussion of concerns of maintaining their exercise program. Concerns will be related to exercise and influences of self-esteem after a heart-related problem. The focus of the discussion would include areas such as beliefs of abilities, distortions and misinformation clarification, fears, family and/or friends perception of participant, conflicts of dependency versus control, anger, sadness, or anxieties. This would be a nonstructured time for participants to share their concerns, and obtain feedback and support from other participants.

Sessions #16 and #20: Exercise Sessions

The exercise sessions for each corresponding session will continue as described for Session #14: Exercise Sessions.

Session #16A, #16C, #20 A, #20C: Exercise Sessions:

A. Focus:
   1. Continue to encourage participants to focus on enjoyable aspects of activity
   2. Aerobic session of continuous activity for at least 30 minutes or as tolerated

B. Exercise Session:
   1. Warm-up activities as described in Session #1B: Exercise Session with some variation
   2. Circuit weight training
      a) Limit increase 1-pound from previous session until at 40 percent of maximal effort
      b) Circuit session for 30 seconds each without stopping or as tolerated
      c) Exercises as described in Session #1B: Exercise Session
   3. Aerobic opportunities as described in Session #1B: Exercise Session
   4. Special activity
   5. Cool-down activities as described in Session #1B: Exercise Session with some variation
   6. Relaxation session as described in Session #1B: Exercise Session

Session #16B, #20B: Exercise Sessions:

One session during each week of #16 and #20 will be devoted to the minitesting as described in Session #13C: Exercise Session.

A. Focus:
   1. Minitesting aerobic exercise session
   2. Blood chemistry of cholesterol and glucose serum levels by fingerstick
   3. Body dimensions measurements as described in Session #1A: Participant/Spouse Fitness Assessment

4. Body composition measurements as described in Session #1A: Participant/Spouse Fitness Assessment
5. Flexibility and body weight
6. Provide individual reinforcement of:
   a) Measures attained in this session
   b) Comparison with levels recommended

B. Exercise Session:
1. Warm-up activities as described in Session #1B: Exercise Session with some variations
2. Circuit weight training
   a) Limit increase 1-pound from previous session until at 40 percent of maximal effort
   b) Circuit session for 30 seconds each without stopping or as tolerated
   c) Exercises as described in Session #1B: Exercise Session
3. Aerobic opportunities of minitesting session:
   a) Walk or bicycle for 5 minutes at levels identified as 33%, 50%, and 75% of maximal power output achieved in previous test
   b) Record level and count pulse rates at each level
   c) For rest of 15-minute-period walk or bicycle as previously
4. Special activity
5. Cool-down activities as described in Session #1B: Exercise Session with some variations
6. Relaxation session as described in Session #1B: Exercise Session
7. Offer participants option of special meeting arranged to discuss findings.

Session #24: Final Evaluation

Physical and physical efficacy evaluation will be conducted on each participant and spouse at six months after an acute coronary incident (approximately week #24 of cardiac rehabilitation program). An appointment will be arranged for this evaluation. The evaluation will include:

1. Body composition measurements as in Session #1A: Participant/Spouse Fitness Assessment
2. Body dimension measurements as in Session #1A: Participant/Spouse Fitness Assessment
3. Blood chemistry as in Session #1A: Participant/Spouse Fitness Assessment
4. Flexibility and body weight
5. Warm-up activities as described in Session #1B: Exercise Session with some variation
6. Maximal lift effort of:
   a) Shoulder press
   b) Arm curls
   c) Side bends
   d) French curls
   e) Upright rowing
   f) Bench press
   g) Double leg curls
   h) Double leg extensions
   i) Heel raises
7. Maximal physician-directed aerobic exercise test based on Bruce treadmill protocol. This test includes three-minute stages:
   a) Stage I, 1.7 m.p.h. and 10 percent grade
   b) Stage II, 2.5 m.p.h. and 12 percent grade
   c) Stage III, 3.4 m.p.h. and 14 percent grade
   d) Stage IV, 4.2 m.p.h. and 16 percent grade
   e) Stage V, 5.0 m.p.h. and 18 percent grade
   f) Stage VI, 5.5 m.p.h. and 20 percent grade

g) Stage VII, 6.0 m.p.h. and 22 percent grade

(Summarized by Pollock et al., 1984)

8. Participant Questionnaire and Spouse Perception Questionnaire (refer to Appendixes E and F)
9. Participant Physical Efficacy Scale and Spouse Physical Efficacy Scale (refer to Appendixes C and D)
10. Follow-up discussion of tests and questionnaire according to:
    a) Aerobic level achieved
    b) Functional capacity of corresponding age group
    c) Estimation of percentage of body fat
    d) Determined body dimensions
    e) Cholesterol, triglyceride, glucose, and high density lipoprotein blood chemistry levels
    f) Participant's and spouse's perceived physical efficacy of participant
11. Verbally discuss changes and appropriate exercise level of:
    a) Intensity (heart rate)
    b) Borg's Rating of Perceived Exertion (RPE)
    c) Duration
    d) Frequency
    e) Aerobic activities based on "Aerobic Points" and "Calories Consumed during Exercise"
12. Present to participant participant/spouse record forms (refer to Appendixes R through T):
    a) Appropriate exercise prescription (as described above #7)
    b) Body dimensions
    c) Estimated percent of body fat
    d) Aerobic fitness level achieved fitness testing
    e) Cholesterol, triglyceride, glucose, and high density lipoprotein blood chemistry levels

CHAPTER VII

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary

A review of the literature indicated no cardiac rehabilitation exercise therapy programs had been described using many behavioral modification and motivational approaches. The focus of this paper was to conduct a review of the literature in the areas of the psychological healing process in coronary artery disease, behavior compliance and modification, exercise principles in the presence of coronary artery disease, and legal considerations as applied to a cardiac rehabilitation exercise therapy. Based on this information, an exercise program was developed for individuals with coronary artery disease.

Conclusion

In conclusion, guidelines were developed for an exercise program for individuals with coronary artery disease. Psychological aspects promoting motivation and compliance, and principles of cardiac exercise therapy were described and applied to a cardiac rehabilitation exercise therapy program. Based on this author's literature review, few legal cases were identified that related to cardiac rehabilitation exercise therapy programs. Legal responsibilities of professional staff that were identified were limited to general applications applied to cardiac exercise therapy. This cardiac rehabilitation exercise therapy program developed with a behavioral modification and motivational emphasis represents a pioneer program designed, organized and fully described for further evaluation.

Recommendations

Based on the results of the literature review and this developed program, the following recommendations for further examination and research are proposed:

1. Identify by factor analysis characteristics of this program important to modify or retain specific methods for further study;
2. Utilize a pilot study to determine if the assessment and evaluation questionnaire tools are applicable to the population intended;
3. Examine the influence of a shortened versus the complete program described on the different assessment and evaluation tools;
4. Research the influence of this program on a person's exercise compliance behavior at different time periods after the acute episode of coronary artery disease;
5. Study population characteristics, such as male or female, or different manifestations of coronary artery disease, as potentially influenced differently by this program;
6. Examine if a person's length of time since the first coronary artery disease manifestation influences differently the assessment and evaluation tools;
7. Analyze the influence of this program using different evaluative tools, such as those examining quality of life, anxiety, or depression after a coronary artery disease episode;
8. Explore the effects of this program on spouse and participant's perception of participant's efficacy at differing time periods during program attendance;
9. Determine the relationship between each participant and spouse self-efficacy changes as influenced by program attendance;
10. Research the effects of this exercise program on other lifestyle habits and changes after a coronary artery disease episode;
11. Examine the potential effects of this exercise program on participant's and spouse's attitudes and beliefs toward exercise and healthy lifestyle changes;
12. Analyze the potential interactions of the described recommendations.

Appendix A- Participant Informed Consent for Cardiac Rehabilitation Exercise Program

Name_________________________

1. Purpose and Explanation of Procedure

In order to improve my physical exercise capacity and generally aid in my medical treatment for heart disease, I hereby consent to be placed in a rehabilitation program that will include cardiovascular monitoring, physical exercises, health exercise education activities, and behavior modification techniques. The levels of exercise which I will perform will be based upon the condition of my heart and circulation as determined through a laboratory graded exercise evaluation given at the beginning of the program. I will be given exact instructions regarding the amount and kind of exercise I should do. A physician will be present at each session and professionally trained clinical personnel will provide leadership to direct my activities and monitor my electrocardiogram and blood pressure to be certain that I am exercising at the prescribed level. I agree to participate three times per week for a period of six months in the rehabilitation program. I understand that I am expected to attend every session and to follow physician and staff instructions with regard to any medications which may have been prescribed, as well as instructions for exercise. If I am taking prescribed medications, I have already so informed the program staff and further agree to so inform them promptly of any changes which my doctor or I have made with regard to use of these, I will be given the opportunity for periodic re-evaluation with laboratory evaluations at 2 and 6 months after the start of my rehabilitation program. Should I remain in the program beyond 6 months, less frequent evaluations will also be provided. The program physicians may change the foregoing schedule of evaluations for myself, if it is considered necessary for medical management.

I have been informed behavior modification methods will be suggested to me. These techniques are designed to help me learn different motivational strategies that may assist me to continue an exercise program as a continued part of my lifestyle. These strategies are designed to assist myself, not control, to choose the type of exercise I desire, whether I wish to continue an exercise program as part of my lifestyle, and under what conditions I choose to continue to exercise. The staff may assist me, but I am the person responsible to decide my conditions whether to continue exercise.

I have been informed that in the course of my participation in exercise, I will be asked to complete the activities unless such symptoms as fatigue, shortness of breath, chest discomfort, dizziness, lightheadedness, angina pectoris sensations or similar occurrences appear. At that point, I have been advised it is my complete right to stop exercise and that it is my obligation to inform the program personnel of my symptoms and sensations. I recognize and hereby state that I have been advised that I should immediately upon experiencing any such symptoms or if I so choose, reduce or stop exercise and inform the program personnel of my symptoms. If at any time, I wish to discontinue this exercise program and/or the motivational educational program, I will inform the program personnel of my wishes.

I understand that during the performance of exercise, a trained observer will periodically monitor my performance and perhaps take my electrocardiogram, pulse, blood pressure or make other observations for the purposes of monitoring my progress and/or condition. I also understand that the observer may reduce or stop my exercise program, when findings indicate that this should be done for my safety and benefit.

2. Risks

It is my understanding and I have been informed that there exists the possibility during exercising of adverse changes including abnormal blood pressure, fainting, disorders of heart rhythm, and very rare instances of heart attack or even death. Every effort I have been told, will be made to minimize these occurrences by proper staff assessment of my condition before each exercise session, staff supervision during exercise and my own careful control of exercise effort. I have also been informed that emergency equipment and personnel are readily available to deal with unusual situations should these occur. I understand that there is a risk of injury, heart attack or even death as a result of my exercise, by knowing those risk, it is my desire to participate as herein indicated.

3. Benefits to be Expected

I understand that this medical treatment may or may not benefit my health status or physical fitness. Generally, participation will help determine what recreational and occupational activities I can safely and comfortably perform. Many individuals in such programs also show improvements on their capacity for physical work. For those who are overweight, this program may also aid in achieving appropriate weight reduction and control.

4. Confidentiality and Use of Information

I have been informed that the information which is obtained in this rehabilitation program will be treated as privileged and confidential and will consequently not be released or revealed to any person without my express written consent. I do however agree to the use of any information which is not personally identifiable with me for research and statistical purposes so long as same does not identify my person or provide facts which could lead to my identification. Any other information obtained however, will be used only by the program staff in the course of prescribing exercise for me, planning my rehabilitation program, or advising my personal physician of my progress.

5. Inquiries and Freedom of Consent

I have been given an opportunity to ask certain questions as to the procedures of this program. Generally these requests which have been noted by the interviewing staff member and his/her responses are as follows:

I further understand that there are also other remote risks that may be associated with this program.

I acknowledge that I have read this document in its entirety or that it has been read to me if I have been unable to read same.

I consent to the rendition of all services and procedures as explained herein by all program personnel.

Date________________________ ________________________
Participant's Signature

________________________ ________________________
Witness' Signature Program Supervisor's Signature

(Herbert & Herbert, 1984)

Appendix B- Spouse Participation Informed Consent for Cardiac Rehabilitation Exercise Program

Name______________________

1. Purpose and Explanation of Procedure

I hereby consent to voluntarily engage in an acceptable plan of exercise conditioning, health exercise education activities, and motivational suggestions. The levels of exercise which I will perform will be based upon my cardiorespiratory (heart and lungs) fitness as determined through my laboratory graded exercise evaluation. I will be given instructions regarding the amount and kind of exercise I should do. I agree to participate three times per week for a period of six months in the formal program sessions. Professionally trained personnel will provide leadership to direct my activities, monitor my performance, and otherwise evaluate my effort. Depending upon my health status, I may or may not be required to have my blood pressure and heart rate evaluated during these sessions to regulate my exercise within desired limits. I understand that I am expected to attend every session and to follow staff instructions with regard to exercise. If I am taking prescribed medications, I have already so informed the program staff and further agree to so inform them promptly of any changes which my doctor or I have made with regard to use of these. I will be given the opportunity for periodic fitness assessments with laboratory evaluations at 6 months after the start of my program. Should I remain in the program thereafter, additional evaluations will generally be given at 12 month intervals. The program may change the foregoing schedule of evaluations, if this is considered desirable for health reasons.

I have been informed behavior modification methods will be suggested to me. These techniques are designed to help me learn different motivational strategies that may assist me to continue an exercise program as a continued part of my lifestyle. These strategies are designed to assist myself, not control, to choose the type of exercise I desire, whether I wish to continue an exercise program as part of my lifestyle, and under what conditions I choose to continue to exercise. The staff may assist me, but I am the person responsible to decide my conditions whether to continue exercise.

I have been informed that during my participation in exercise, I will be asked to complete the physical activities unless such symptoms as fatigue, shortness of breath, dizziness, lightheadedness, chest discomfort or similar occurrences appear. At that point, I have been advised it is my complete right to decrease or stop exercise and that it is my obligation to inform the program personnel of my symptoms. I hereby state that I have been so advised and agree to inform the program personnel of my symptoms, should any develop.

I understand that during the performance of exercise, a trained observer will periodically monitor my performance and, perhaps measure my pulse, blood pressure or assess my feelings of effort for the purpose of monitoring my progress. I also understand that the observer may reduce or stop my exercise program, when any of these findings so indicate that this should be done for my safety and benefit.

2. Risks

It is my understanding and I have been informed that there exists the remote possibility during exercise of adverse changes including abnormal blood pressure, fainting, disorders of heart rhythm, and very rare instances of heart attack or even death. Every effort I have been told, will be made to minimize these occurrences by proper staff assessment of my condition before each exercise session, staff supervision during exercise and by my own careful control of exercise efforts. I have also been informed that emergency equipment and personnel are readily available to deal with unusual situations should these occur. I understand that there is a risk of injury, heart attack or even death as a result of my exercise, but knowing those risks, it is my desire to participate as herein indicated.

3. Benefits to be Expected and Alternatives Available to Exercise

I understand that this program may or may not benefit my physical fitness or general health. I recognize that involvement in the exercise sessions will allow me to learn proper ways to perform conditioning exercises, use fitness equipment and regulate physical effort. These experiences should benefit me by indicating how my physical limitations my affect my ability to perform various physical activities. I further understand that, if I closely follow the program instructions, that I will likely improve my exercise capacity after a period of 3-6 months.

4. Confidentiality and Use of Information

I have been informed that the information which is obtained in this exercise program will be treated as privileged and confidential and will consequently not be released or revealed to any person without my express written consent. I do however agree to the use of any information which is not personally identifiable with me for research and statistical purposes so long as same does not identify my person or provide facts which could lead to my identification. Any other information obtained however, will be used only by the program staff in the course of prescribing exercise for me and evaluating my progress in the program.

5. Inquiries and Freedom of Consent

I have been given an opportunity to ask certain questions as to the procedures of this program. Generally these requests which have been noted by the interviewing staff member and his/her responses are as follows:

I further understand that there are also other remote risks that may be associated with this program.

I acknowledge that I have read this document in its entirety or that it has been read to me if I have been unable to read same.

I consent to the rendition of all services and procedures as explained herein by all program personnel.

Date________________________

____
Participant's Signature

____
Witness' Signature

____
Program Supervisor's Signature

(Herbert & Herbert, 1984)

Appendix C- Participant Physical Efficacy Scale

This scale is designed to estimate what is your current belief or your estimate of your ability to perform the following activities. I understand there may some items that you do not know, please estimate to the best of your ability. It is ok to mark the lowest or highest scale if you feel it is appropriate.

On a scale from "1" (your lowest belief) to 10 (your highest belief), please circle the number on the scale of your estimation to perform the following activities:

1. Walk 350 yards (.2 mile) without stopping:

1 2 3 4 5 6 7 8 9 10

2. Walk 700 yards (.4 mile) without stopping:

1 2 3 4 5 6 7 8 9 10

3. Walk 1400 yards (.8 mile) without stopping:

1 2 3 4 5 6 7 8 9 10

4. Walk 2400 yards (1.4 miles) without stopping:

1 2 3 4 5 6 7 8 9 10

5. Walk or run 3.2 miles without stopping:

1 2 3 4 5 6 7 8 9 10

6. Walk or run 5 miles without stopping:

1 2 3 4 5 6 7 8 9 10

(please continue on next page)

7. Walk or run 7 miles without stopping:

1 2 3 4 5 6 7 8 9 10

8. Bicycle 0.5 mile without stopping:

1 2 3 4 5 6 7 8 9 10

9. Bicycle 1 mile without stopping:

1 2 3 4 5 6 7 8 9 10

10. Bicycle 2 miles without stopping:

1 2 3 4 5 6 7 8 9 10

11. Bicycle 5 miles without stopping:

1 2 3 4 5 6 7 8 9 10

12. Bicycle 10 miles without stopping:

1 2 3 4 5 6 7 8 9 10

13. Bicycle 15 miles without stopping:

1 2 3 4 5 6 7 8 9 10

14. Bicycle 20 miles without stopping:

1 2 3 4 5 6 7 8 9 10

(please continue on next page)

15. Carry a 10-pound suitcase 100 yards (at 1.5 mph) without stopping:

1 2 3 4 5 6 7 8 9 10

16. Carry a 20-pound suitcase 100 yards (at 1.5 mph) without stopping:

1 2 3 4 5 6 7 8 9 10

17. Carry a 30-pound suitcase 100 yards (at 1.5 mph) without stopping:

1 2 3 4 5 6 7 8 9 10

18. Carry a 30-pound suitcase 200 yards (at 1.9 mph) without stopping:

1 2 3 4 5 6 7 8 9 10

19. Carry a 40-pound box for 3 minutes (at 1.9 mph) without stopping:

1 2 3 4 5 6 7 8 9 10

20. Carry a 50-pound box for 2 minutes (at 1.9 mph) without stopping:

1 2 3 4 5 6 7 8 9 10

21. Your heart is able to beat 110 beats per minute or less:

1 2 3 4 5 6 7 8 9 10

22. Your heart is able to beat 111 to 120 beats per minute:

1 2 3 4 5 6 7 8 9 10

(please continue on next page)

23. Your heart is able to beat 121 to 130 beats per minute:

1 2 3 4 5 6 7 8 9 10

24. Your heart is able to beat 131 to 140 beats per minute:

1 2 3 4 5 6 7 8 9 10

25. Your heart is able to beat above 141 beats per minute:

1 2 3 4 5 6 7 8 9 10

Thank you.

Appendix D- Spouse Physical Efficacy Scale

This scale is designed to estimate what is your current belief or estimate OF YOUR HUSBAND'S OR WIFE'S ABILITY to perform the following activities after his/her heart problem. I understand there may be some items that you do not know, please estimate to the best of your ability. It is ok to mark the lowest or highest scale if you feel it is appropriate.

On a scale from 1 (your lowest belief) to 10 (your highest belief), please circle the number on the scale of your estimation of your spouse's ability to perform the following activities:

1. Walk 350 yards (.2 mile) without stopping:

   1 2 3 4 5 6 7 8 9 10

2. Walk 700 yards (.4 mile) without stopping:

   1 2 3 4 5 6 7 8 9 10

3. Walk 1400 yards (.8 mile) without stopping:

   1 2 3 4 5 6 7 8 9 10

4. Walk 2400 yards (1.4 miles) without stopping:

   1 2 3 4 5 6 7 8 9 10

5. Walk or run 3.2 miles without stopping:

   1 2 3 4 5 6 7 8 9 10

6. Walk or run 5 miles without stopping:

   1 2 3 4 5 6 7 8 9 10

(please continue on next page)

7. Walk or run 7 miles without stopping:

1 2 3 4 5 6 7 8 9 10

8. Bicycle 0.5 mile without stopping:

1 2 3 4 5 6 7 8 9 10

9. Bicycle 1 mile without stopping:

1 2 3 4 5 6 7 8 9 10

10. Bicycle 2 miles without stopping:

1 2 3 4 5 6 7 8 9 10

11. Bicycle 5 miles without stopping:

1 2 3 4 5 6 7 8 9 10

12. Bicycle 10 miles without stopping:

1 2 3 4 5 6 7 8 9 10

13. Bicycle 15 miles without stopping:

1 2 3 4 5 6 7 8 9 10

14. Bicycle 20 miles without stopping:

1 2 3 4 5 6 7 8 9 10

(please continue on next page)

15. Carry a 10-pound suitcase 100 yards (at 1.5 mph) without stopping:

1 2 3 4 5 6 7 8 9 10

16. Carry a 20-pound suitcase 100 yards (at 1.5 mph) without stopping:

1 2 3 4 5 6 7 8 9 10

17. Carry a 30-pound suitcase 100 yards (at 1.5 mph) without stopping:

1 2 3 4 5 6 7 8 9 10

18. Carry a 30-pound suitcase 200 yards (at 1.9 mph) without stopping:

1 2 3 4 5 6 7 8 9 10

19. Carry a 40-pound box for 3 minutes (at 1.9 mph) without stopping:

1 2 3 4 5 6 7 8 9 10

20. Carry a 50-pound box for 2 minutes (at 1.9 mph) without stopping:

1 2 3 4 5 6 7 8 9 10

21. Your spouse's heart is able to beat 110 beats per minute or less:

1 2 3 4 5 6 7 8 9 10

22. Your spouse's heart is able to beat 111 to 120 beats per minute:

1 2 3 4 5 6 7 8 9 10

(please continue on next page)

23. Your spouse's heart is able to beat 121 to 130 beats per minute:

1 2 3 4 5 6 7 8 9 10

24. Your spouse's heart is able to beat 131 to 140 beats per minute:

1 2 3 4 5 6 7 8 9 10

25. Your spouse's heart is able to beat above 141 beats per minute:

1 2 3 4 5 6 7 8 9 10

Thank you.

Appendix E- Participant Questionnaire

As a new participant in the cardiac rehabilitation program, we wish to better understand you, and your thoughts and concerns. This questionnaire is to help us begin to know and assist you. All information will be kept confidential.

Please answer the questions as best you can. YOU MAY WISH TO CHECK MORE THAN ONE ANSWER.

You will be given an opportunity to discuss further your thoughts and concerns with your orientation staff member.

1. My main medical reason for participating was because I had:

____a. a heart attack, scarring of my heart muscle.

____b. a blockage of my heart artery that was opened with a balloon (angioplasty treatment) by the doctor.

____c. heart surgery, the heart bypass procedure.

____d. chest pains or chest discomfort.

____e. a dye procedure (heart catherization) to look at my heart arteries.

____f. other. Please describe: ______________________________

____

2. I believe my heart problem was caused because I:

____a. smoked too much.

____b. have too much stress in my life.

____c. have other family members who have had heart problems.

____d. have diabetes (mellitus).

____e. eat a diet too high in fats and/or cholesterol.

____f. have (or had) high blood pressure.

____g. don't get enough exercise.

____i. other. Please describe: ______________________________

____

3. My heart problem occurred because:

____a. It was just my luck.

____b. I didn't do what I should have done to take care of myself.

____c. I had a problem but it is all taken care of now. Everything is ok.

____d. other. Please describe: ________________________________

____

4. Since being discharged from the hospital, for the most part (everyone has a "bad" day at times), my life has been:

____a. going smoothly with no difficulties.

____b. going as well as can be expected with some adjusting needed.

____c. going as well as can be expected, but I do have times when I am depressed and/or upset.

____d. turned around completely. I can't do anything and I don't know what to do.

____e. other. Please describe ________________________________

____

5. Since being discharged from the hospital, for the most part, my spouse has been:

____a. very supportive and understanding.

____b. sometimes supportive and understanding.

____c. difficult to talk to at times and does not understand what I am going through.

____d. other. Please describe: ________________________________

____

6. In the future, I believe:

____a. what will happen, will happen and there is not much I can do stop further heart problems.

____b. I need to make some changes, but they are so time consuming and confusing that it is not worth my time.

____c. there are some changes I can make, but I am not sure I can make them.

____d. there are some definite changes I can make and I intend to do what I need to do.

____e. other. Please describe: ______________________________

____

7. Any change (or changes) that I would like to make in my life are to:

____a. Stop smoking.

____b. Reduce stress in my life.

____c. Eat the right kinds of foods.

____d. Lower my blood pressure.

____e. Get more exercise.

____f. None at this time.

____g. Other. Please describe: ______________________________

____

8. My experience with hospital and staff was:

____a. one of the worst situations I ever experienced. No one heard what I said nor told me what was happening.

____b. tolerable because a few people were helpful and interested in what I said.

____c. just super even though I was so sick. Everyone was so nice and helpful.

____d. other. Please describe: ______________________________

____

9. My doctor and I can:

____a. not talk about what is bothering me.

____b. talk about some things that bother me if my doctor talks about it first.

____c. talk about what is bothering me, but my doctor is alway too busy and I don't want to be a bother.

____d. talk about whatever I need to talk about. My doctor will initiate talking of difficult topics and spend time listening to my questions.

____e. other. Please describe: ______________________________

____

10. After what happened, I anticipate that I:

____a. will be back to normal soon. You won't see me feeling sorry for myself.

____b. will need a few weeks to get over this thing and then I should be able to do what I want.

____c. doubt that I will ever totally recover. My heart problem has ruined my entire life.

____d. other. Please describe: ______________________________

____

11. My reason (or reasons) for participating in this program is (are) because:

____a. my doctor ordered it.

____b. my spouse wanted me to come.

____c. I am not sure, but thought I would give it a try.

____d. I wanted to come because I thought it would be good for me.

____e. other. Please describe: ______________________________

____

12. What expectations do you have by participating in this program?

____a. I don't know what to expect.

____b. improve my fitness or conditioning.

____c. learn what I can do.

____d. help me get back on my feet (recover faster) after my heart problem.

____e. help my heart.

____f. help me feel more comfortable when I do activities or exercise.

____g. nothing for me, but this will help my spouse know what to do.

____h. other. Please describe: ______________________________

____

13. To participate in this program, possible difficulties that may interfer with my ability to continue would be:

____a. there is not enough time during my day to take time out to exercise.

____b. the time of day the program is offered is inconvenient.

____c. when I return to work, this program will conflict with my work schedule.

____d. the cost of the program is too much at present.

____e. I do not have insurance coverage for this program

____f. I prefer to do things (including exercise) by myself, rather than in a group.

____g. my spouse does not believe that I need a program like this.

____h. I don't believe that I need a program like this.

____i. I get enough exercise through my work and don't need an exercise program.

____j. after a day of work, I usually have little or no energy to exercise and prefer to take it easy when I get home.

____k. none, I don't believe I'll have any difficulties.

____l. other. Please describe: ________________________________

____

14. My present questions and concerns are:

____

____

____

____

____

____
Signature

Thank you.

Appendix F- Spouse Perception Questionnaire

Your husband or wife is a new participant in the cardiac rehabilitation program. We wish to better understand your perceptions of what happened to your spouse, and your thoughts and concerns. This questionnaire is to help us begin to know and assist you. All information will be kept confidential.

Please answer the questions as best you can. YOU MAY WISH TO CHECK MORE THAN ONE ANSWER.

You will be given an opportunity to discuss further your thoughts and concerns with your orientation staff member.

1. The main medical reason for your husband or wife participating was because he/she had:

____a. a heart attack, scarring of his/her heart muscle.

____b. a blockage of his/her heart artery that was opened with a balloon (angioplasty treatment) by the doctor.

____c. heart surgery, the heart bypass procedure.

____d. chest pains or chest discomfort.

____e. a dye procedure (heart catherization) to look at his/her heart arteries.

____f. other. Please describe: ________________________________

____

2. I believe my husband's or wife's heart problem was caused because he/she:

____a. smoked too much.

____b. has too much stress in his/her life.

____c. has other family members who have had heart problems.

____d. has diabetes (mellitus).

____e. eats a diet too high in fats and/or cholesterol.

____f. has (or had) high blood pressure.

____g. doesn't get enough exercise.

____i. other. Please describe: ________________________________

____

3. I would describe my husband's or wife's heart problem occurred because:

____a. It was just luck.

____b. He/she didn't do what should have been done to take care of him/herself.

____c. There was a problem but it is all taken care of now. Everything is ok.

____d. other. Please describe: ________________________________

____

4. Since my spouse has been discharged from the hospital, for the most part (everyone has a "bad" day at times), my spouse's life has been:

____a. going smoothly with no difficulties.

____b. going as well as can be expected with some adjusting needed.

____c. going as well as can be expected, but there are times when he/she is depressed and/or upset.

____d. turned around completely. My spouse doesn't feel it is possible do anything and doesn't know what to do.

____e. other. Please describe:________________________________

____

5. Since my spouse's discharge from the hospital, I have been to my spouse:

____a. very supportive and understanding.

____b. sometimes supportive and understanding.

____c. difficult to talk to at times. I do not understand what he/she is going through.

____d. other. Please describe: ________________________________

____

6. In the future, I believe:

____a. what will happen, will happen and there is not much that can be done to stop further heart problems.

____b. my spouse needs to make some changes, but they are so time consuming and confusing that it is not worth time.

____c. there are some changes that can be made, but I am not sure he/she can make them.

____d. there are some definite changes my spouse can make and he/she intends to do what is needed.

____e. other. Please describe: ______________________________

____

7. Changes that I would like my spouse to make are:

____a. Stop smoking.

____b. Reduce stress in his/her life.

____c. Eat the right kinds of foods.

____d. Lower his/her blood pressure.

____e. Get more exercise.

____f. none of the above.

____g. other. Please describe: ______________________________

____

8. My impression of my spouse's experience with hospital and staff was:

____a. one of the worst situations my spouse had ever experienced. No one heard what he/she said nor told what was happening.

____b. tolerable because a few people were helpful and interested in what he/she said.

____c. just super even though he/she was so sick. Everyone was so understanding and helpful.

____d. other. Please describe: ______________________________

____

9. My spouse and spouse's doctor can:

____a. not talk about what is bothering my spouse.

____b. talk about some things that bothering if the doctor talks about it first.

____c. talk about what is bothering my spouse, but the doctor is always too busy and my spouse does not want to be a bother.

____d. talk about whatever my spouse needs to talk about. My spouse's doctor will initiate talking of difficult topics and spend time listening to questions from my spouse.

____e. other. Please describe: ________________________________

____

10. After what happened, I anticipate that my spouse:

____a. will be back to normal soon. You won't see him/her feeling sorry for himself/herself.

____b. will need a few weeks to get over this thing and then should be able to do what he/she wants to do.

____c. doubts that he/she will ever totally recover. This heart problem has ruined my spouse's entire life.

____d. other. Please describe: ________________________________

____

11. My spouse's reason (or reasons) for participating in this program is (are) because:

____a. the doctor ordered it.

____b. I (as the spouse) wanted him/her to come.

____c. My spouse is not sure, but thought it should be given a try.

____d. My spouse wanted to come because he/she thought it would be good for him/her.

____e. other. Please describe: ________________________________

____

12. What expectations do you have for your spouse by participating in this program?

____a. I don't know what to expect.

____b. improve his/her fitness or conditioning.

____c. learn what can be done.

____d. help my spouse get back on his/her feet (recover faster) after this heart problem.

____e. help my spouse's heart.

____f. help my spouse feel more comfortable when he/she does activities or exercise.

____g. my spouse does not believe anything will happen for himself/herself, but does believe this program will helpful for me know what to do.

____h. other. Please describe: ________________________________

____

13. To participate in this program, possible difficulties that may interfer with my spouse's ability to continue would be:

____a. there is not enough time during my day to take time out to exercise.

____b. the time of day the program is offered is inconvenient.

____c. when he/she returns to work, this program will conflict with his/her work schedule.

____d. the cost of the program is too much at present.

____e. there is no insurance coverage for this program

____f. my spouse prefers to do things (including exercise) by himself/herself, rather than in a group.

____g. I personally do not believe that my spouse needs a program like this.

____h. my spouse does not believe that a program like this is needed.

____i. my spouse gets enough exercise through his/her work and does not need an exercise program.

____j. after a day of work, my spouse usually has little or no energy to exercise and prefers to take it easy when home.

____k. none, I don't believe my spouse will have any difficulties.

____l. other. Please describe: ________________________________

____

14. My present questions and concerns are:

____

____

____

____

____
Signature

Thank you.

Appendix G-Percentage of Body Fat Estimation for Men from Age and The Sum of Chest, Abdominal, and Thigh Skinfolds

Sum of Skinfolds (mm)	under 22	23 to 27	28 to 32	33 to 37	38 to 42	43 to 47	48 to 52	53 to 57	over 58
		Age to the Last Year							
8-10	1.3	1.8	2.3	2.9	3.4	3.9	4.5	5.0	5.5
11-13	2.2	2.8	3.3	3.9	4.4	4.9	5.5	6.0	6.5
14-16	3.2	3.8	4.3	4.8	5.4	5.9	6.4	7.0	7.5
17-19	4.2	4.7	5.3	5.8	6.3	6.9	7.4	8.0	8.5
20-22	5.1	5.7	6.2	6.8	7.3	7.9	8.4	8.9	9.5
23-25	6.1	6.6	7.2	7.7	8.3	8.8	9.4	9.9	10.5
26-28	7.0	7.6	8.1	8.7	9.2	9.8	10.3	10.9	11.4
29-31	8.0	8.5	9.1	9.6	10.2	10.7	11.3	11.8	12.4
32-34	8.9	9.4	10.0	10.5	11.1	11.6	12.2	12.8	13.3
35-37	9.8	10.4	10.9	11.5	12.0	12.6	13.1	13.7	14.3
38-40	10.7	11.3	11.8	12.4	12.9	13.5	14.1	14.6	15.2
41-43	11.6	12.2	12.7	13.3	13.8	14.4	15.0	15.5	16.1
44-46	12.5	13.1	13.6	14.2	14.7	15.3	15.9	16.4	17.0
47-49	13.4	13.9	14.5	15.1	15.6	16.2	16.8	17.3	17.9
50-52	14.3	14.8	15.4	15.9	16.5	17.1	17.6	18.2	18.8
53-55	15.1	15.7	16.2	16.8	17.4	17.9	18.5	19.1	19.7
56-58	16.0	16.5	17.1	17.7	18.2	18.8	19.4	20.0	20.5
59-61	16.9	17.4	17.9	18.5	19.1	19.7	20.2	20.8	21.4
62-64	17.6	18.2	18.8	19.4	19.9	20.5	21.1	21.7	22.2
65-67	18.5	19.0	19.6	20.2	20.8	21.3	21.9	22.5	23.1
68-70	19.3	19.9	20.4	21.0	21.6	22.2	22.7	23.3	23.9
71-73	20.1	20.7	21.2	21.8	22.4	23.0	23.6	24.1	24.7
74-76	20.9	21.5	22.0	22.6	23.2	23.8	24.4	25.0	25.5
77-79	21.7	22.2	22.8	23.4	24.0	24.6	25.2	25.8	26.3
80-82	22.4	23.0	23.6	24.2	24.8	25.4	25.9	26.5	27.1
83-85	23.2	23.8	24.4	25.0	25.5	26.1	26.7	27.3	27.9
86-88	24.0	24.5	25.1	25.7	26.3	26.9	27.5	28.1	28.7
89-91	24.7	25.3	25.9	26.5*	27.1	27.6	28.2	28.8	29.4
92-94	25.4	26.0	26.6	27.2	27.8	28.4	29.0	29.6	30.2
95-97	26.1	26.7	27.3	27.9	28.5	29.1	29.7	30.3	30.9
98-100	26.9	27.4	28.0	28.6	29.2	29.8	30.4	31.0	31.6
101-103	27.5	28.1	28.7	29.3	29.9	30.5	31.1	31.7	32.2
104-106	28.2	28.8	29.4	30.0	30.6	31.2	31.8	32.4	33.0
107-109	28.9	29.5	30.1	30.7	31.3	31.9	32.5	33.1	33.7
110-112	29.6	30.2	30.8	31.4	32.0	32.6	33.2	33.8	34.4
113-115	30.2	30.8	31.4	32.0	32.6	33.2	33.8	34.5	35.1
116-118	30.9	31.5	32.1	32.7	33.3	33.9	34.5	35.1	35.7
119-121	31.5	32.1	32.7	33.3	33.9	34.5	35.1	35.7	36.4
122-124	32.1	32.7	33.1	33.9	34.5	35.1	35.8	36.4	37.0
125-127	32.7	33.3	33.9	34.5	35.1	35.8	36.4	37.0	37.6

(summarized by Pollock et al., 1984)

Appendix H- Percentage of Body Fat Estimation for Women from Age and Triceps, Suprailium, and Thigh Skinfolds

	Age to the Last Year								
Sum of Skinfolds (mm)	under 22	23 to 27	28 to 32	33 to 37	38 to 42	43 to 47	48 to 52	53 to 57	over 58
23-25	9.7	9.9	10.2	10.4	10.7	10.9	11.2	11.4	11.7
26-28	11.0	11.2	11.5	11.7	12.0	12.3	12.5	12.7	13.0
29-31	12.3	12.5	12.8	13.0	13.3	13.5	13.8	14.0	14.3
32-34	13.6	13.8	14.0	14.3	14.5	14.8	15.0	15.3	15.5
35-37	14.8	15.0	15.3	15.5	15.8	16.0	16.3	16.5	16.8
38-40	16.0	16.3	16.5	16.7	17.0	17.2	17.5	17.7	18.0
41-43	17.2	17.4	17.7	17.9	18.2	18.4	18.7	18.9	19.2
44-46	18.3	18.6	18.8	19.1	19.3	19.6	19.8	20.1	20.3
47-49	19.5	19.7	20.0	20.2	20.5	20.7	21.0	21.2	21.5
50-52	20.6	20.8	21.1	21.3	21.6	21.8	22.1	22.3	22.6
53-55	21.7	21.9	22.1	22.4	22.6	22.9	23.1	23.4	23.6
56-58	22.7	23.0	23.2	23.4	23.7	23.9	24.2	24.4	24.7
59-61	23.7	24.0	24.2	24.5	24.7	25.0	25.2	25.5	25.7
62-64	24.7	25.0	25.2	25.5	25.7	26.0	26.2*	26.4	26.7
65-67	25.7	25.9	26.2	26.4	26.7	26.9	27.2	27.4	27.7
68-70	26.6	26.9	27.1	27.4	27.6	27.9	28.1	28.4	28.6
71-73	27.5	27.8	28.0	28.3	28.5	28.8	29.0*	29.3	29.5
74-76	28.4	28.7	28.9	29.2	29.4	29.7	29.9	30.2	30.4
77-79	29.3	29.5	29.8	30.0	30.3	30.5	30.8	31.0	31.3
80-82	30.1	30.4	30.6	30.9	31.1	31.4	31.6	31.9	32.1
83-85	30.9	31.2	31.4	31.7	31.9	32.2	32.4	32.7	32.9
86-88	31.7	32.0	32.2	32.5	32.7	32.9	33.2	33.4	33.7
89-91	32.5	32.7	33.0	33.2	33.5	33.7	33.9	34.2	34.4
92-94	33.2	33.4	33.7	33.9	34.2	34.4	34.7	34.9	35.2
95-97	33.9	34.1	34.4	34.6	34.9	35.1	35.4	35.6	35.9
98-100	34.6	34.8	35.1	35.3	35.5	35.8	36.0	36.3	36.5
101-103	35.3	35.4	35.7	35.9	36.2	36.4	36.7	36.9	37.2
104-106	35.8	36.1	36.3	36.6	36.8	37.1	37.3	37.5	37.8
107-109	36.4	36.7	36.9	37.1	37.4	37.6	37.9	38.1	38.4
110-112	37.0	37.2	37.5	37.7	38.0	38.2	38.5	38.7	38.9
113-115	37.5	37.8	38.0	38.2	38.5	38.7	39.0	39.2	39.5
116-118	38.0	38.3	38.5	38.8	39.0	39.3	39.5	39.7	40.0
119-121	38.5	38.7	39.0	39.2	39.5	39.7	40.0	40.2	40.5
122-124	39.0	39.2	39.4	39.7	39.9	40.2	40.4	40.7	40.9
125-127	39.4	39.6	39.9	40.1	40.4	40.6	40.9	41.1	41.4
128-130	39.8	40.0	40.3	40.5	40.8	41.0	41.3	41.5	41.8

(summarized by Pollock et al., 1984).
*number is estimated in place of assumed typographical error

Appendix I-Body Girth Measurements.
Conversion Constants to Predict Body Fat for Older Women*

Abdomen		Thigh		Calf	
Inches	Constant A	Inches	Constant B	Inches	Constant C
25.00	29.69	14.00	17.31	10.00	14.46
25.25	29.98	14.25	17.62	10.25	14.82
25.50	30.28	14.50	17.93	10.50	15.18
25.75	30.58	14.75	18.24	10.75	15.54
26.00	30.87	15.00	18.55	11.00	15.91
26.25	31.17	15.25	18.86	11.25	16.27
26.50	31.47	15.50	19.17	11.50	16.63
26.75	31.76	15.75	19.47	11.75	16.99
27.00	32.06	16.00	19.78	12.00	17.35
27.25	32.36	16.25	20.09	12.25	17.71
27.50	32.65	16.50	20.40	12.50	18.08
27.75	32.95	16.75	20.71	12.75	18.44
28.00	33.25	17.00	21.02	13.00	18.80
28.25	33.55	17.25	21.33	13.25	19.16
28.50	33.84	17.50	21.64	13.50	19.52
28.75	34.14	17.75	21.95	13.75	19.88
29.00	34.44	18.00	22.26	14.00	20.24
29.25	34.73	18.25	22.57	14.25	20.61
29.50	35.03	18.50	22.87	14.50	20.97
29.75	35.33	18.75	23.18	14.75	21.33
30.00	35.62	19.00	23.49	15.00	21.69
30.25	35.92	19.25	23.80	15.25	22.05
30.50	36.22	19.50	24.11	15.50	22.41
30.75	36.51	19.75	24.42	15.75	22.77
31.00	36.81	20.00	24.73	16.00	23.14
31.25	37.11	20.25	25.04	16.25	23.50
31.50	37.40	20.50	25.35	16.50	23.86
31.75	37.70	20.75	25.66	16.75	24.22
32.00	38.00	21.00	25.97	17.00	24.58
32.25	38.30	21.25	26.28	17.25	24.94
32.50	38.59	21.50	26.58	17.50	25.31
32.75	38.89	21.75	26.89	17.75	25.67
33.00	39.19	22.00	27.20	18.00	26.03
33.25	39.48	22.25	27.51	18.25	26.39
33.50	39.78	22.50	27.82	18.50	26.75
33.75	40.08	22.75	28.13	18.75	27.11
34.00	40.37	23.00	28.44	19.00	27.47
34.25	40.67	23.25	28.75	19.25	27.84
34.50	40.97	23.50	29.06	19.50	28.20
34.75	41.26	23.75	29.37	19.75	28.56
35.00	41.56	24.00	29.68	20.00	28.92
35.25	41.86	24.25	29.98	20.25	29.28

(continued)

Appendix I-Body Girth Measurements (continued).
Conversion Constants to Predict Body Fat for Older Women*

Abdomen		Thigh		Calf	
Inches	Constant A	Inches	Constant B	Inches	Constant C
35.50	42.15	24.50	30.29	20.50	29.64
35.75	42.45	24.75	30.60	20.75	30.00
36.00	42.75	25.00	30.91	21.00	30.37
36.25	43.05	25.25	31.22	21.25	30.73
36.50	43.34	25.50	31.53	21.50	31.09
36.75	43.64	25.75	31.84	21.75	31.45
37.00	43.94	26.00	32.15	22.00	31.81
37.25	44.23	26.25	32.46	22.25	32.17
37.50	44.53	26.50	32.77	22.50	32.54
37.75	44.83	26.75	33.08	22.75	32.90
38.00	45.12	27.00	33.38	23.00	33.26
38.25	45.42	27.25	33.69	23.25	33.62
38.50	45.72	27.50	34.00	23.50	33.98
38.75	46.01	27.75	34.31	23.75	34.34
39.00	46.31	28.00	34.62	24.00	34.70
39.25	46.61	28.25	34.93	24.25	35.07
39.50	46.90	28.50	35.24	24.50	35.43
39.75	47.20	28.75	35.55	24.75	35.79
40.00	47.50	29.00	35.86	25.00	36.15
40.25	47.79	29.25	36.17		
40.50	48.09	29.50	36.48		
40.75	48.39	29.75	36.79		
41.00	48.69	30.00	37.09		
41.25	49.98	30.25	37.40		
41.50	49.28	30.50	37.71		
41.75	49.58	30.75	38.02		
42.00	49.87	31.00	38.33		
42.25	50.17	31.25	38.64		
42.50	50.47	31.50	38.95		
42.75	50.76	31.75	39.26		
43.00	51.06	32.00	39.57		
43.25	51.36	32.25	39.88		
43.50	51.65	32.50	40.19		
43.75	51.95	32.75	40.49		
44.00	52.25	33.00	40.80		
44.25	52.54	33.25	41.11		
44.50	52.84	33.50	41.42		
44.75	53.14	33.75	41.73		
45.00	53.44	34.00	42.04		

*Note: Percent Fat = Constant A + Constant B - Constant C - 18.4.

(copied from McArdle et al., 1986)

Appendix J-Body Girth Measurements. Conversion Constants to Predict Body Fat for Older Men*

Buttocks		Abdomen		Forearm	
Inches	Constant A	Inches	Constant B	Inches	Constant C
28.00	29.34	25.50	22.84	7.00	21.01
28.25	29.60	25.75	23.06	7.25	21.76
28.50	29.87	26.00	23.69	7.50	22.52
28.75	30.13	26.25	23.51	7.75	23.26
29.00	30.39	26.50	23.73	8.00	24.02
29.25	30.65	26.75	23.96	8.25	24.76
29.50	30.92	27.00	24.18	8.50	25.52
29.75	31.18	27.25	24.40	8.75	26.26
30.00	31.44	27.50	24.63	9.00	27.02
30.25	31.70	27.75	24.85	9.25	27.76
30.50	31.96	28.00	25.08	9.50	28.52
30.75	32.22	28.25	25.29	9.75	29.26
31.00	32.49	28.50	25.52	10.00	30.02
31.25	32.75	28.75	25.75	10.25	30.76
31.50	33.01	29.00	25.97	10.50	31.52
31.75	33.27	29.25	26.19	10.75	32.27
32.00	33.54	29.50	26.42	11.00	33.02
32.25	33.80	29.75	26.64	11.25	33.77
32.50	34.06	30.00	26.87	11.50	34.52
32.75	34.32	30.25	27.09	11.75	35.27
33.00	34.58	30.50	27.32	12.00	36.02
33.25	34.84	30.75	27.54	12.25	36.77
33.50	35.11	31.00	27.76	12.50	37.53
33.75	35.37	31.25	27.98	12.75	38.27
34.00	35.63	31.50	28.21	13.00	39.03
34.25	35.89	31.75	28.43	13.25	39.77
34.50	36.16	32.00	28.66	13.50	40.53
34.75	36.42	32.25	28.88	13.75	41.27
35.00	36.68	32.50	29.11	14.00	42.03
35.25	36.94	32.75	29.33	14.25	42.77
35.50	37.20	33.00	29.55	14.50	43.53
35.75	37.46	33.25	29.78	14.75	44.27
36.00	37.73	33.50	30.00	15.00	45.03
36.25	37.99	33.75	30.22	15.25	45.77
36.50	38.25	34.00	30.45	15.50	46.53
36.75	38.51	34.25	30.67	15.75	47.28
37.00	38.78	34.50	30.89	16.00	48.03
37.25	39.04	34.75	31.12	16.25	48.78
37.50	39.30	35.00	31.25	16.50	49.53
37.75	39.56	35.25	31.57	16.75	50.28
38.00	39.82	35.50	31.79	17.00	51.03
38.25	40.08	35.75	32.02	17.25	51.78
38.50	40.35	36.00	32.24	17.50	52.54

(continued)

Appendix J-Body Girth Measurements (continued).
Conversion Constants to Predict Body Fat for Older Men*

Buttocks		Abdomen		Forearm	
Inches	Constant A	Inches	Constant B	Inches	Constant C
38.75	40.61	36.25	32.46	17.75	53.28
39.00	40.87	36.50	32.69	18.00	54.04
39.25	41.13	36.75	32.91	18.25	54.78
39.50	41.39	37.00	33.14		
39.75	41.66	37.25	33.36		
40.00	41.92	37.50	33.58		
40.25	42.18	37.75	33.81		
40.50	42.44	38.00	34.03		
40.75	42.70	38.25	34.26		
41.00	42.97	38.50	34.48		
42.25	43.23	38.75	34.70		
41.50	43.49	39.00	34.93		
41.75	43.75	39.25	35.15		
42.00	44.02	39.50	35.38		
42.25	44.28	39.75	35.59		
42.50	44.54	40.00	35.82		
42.75	44.80	40.25	36.05		
43.00	45.06	40.50	36.27		
43.25	45.32	40.75	36.49		
43.50	45.59	41.00	36.72		
43.75	45.85	41.25	36.94		
44.00	46.12	41.50	37.17		
44.25	46.37	41.75	37.39		
44.50	46.64	42.00	37.62		
44.75	46.89	42.25	37.87		
45.00	47.16	42.50	38.06		
42.25	47.42	42.75	38.28		
45.50	47.68	43.00	38.51		
45.75	47.94	43.25	38.73		
46.00	48.21	43.50	38.96		
46.25	48.47	43.75	39.18		
46.50	48.73	44.00	39.41		
46.75	48.99	44.25	39.63		
47.00	49.26	44.50	39.85		
47.25	49.52	44.75	40.08		
47.50	49.78	45.00	40.30		
47.75	50.04				
48.00	50.30				
48.25	50.56				
48.50	50.83				
48.75	51.09				
49.00	51.35				

* Note: Percent Fat = Constant A + Constant B - Constant C - 15.0.
(copied from McArdle et al., 1986)

Appendix K-Home Exercise Guidelines

This is designed to be a guideline for your home exercise program. These guidelines may change periodically. These guidelines will change after your next stress test. We will give you new guidelines in 4 weeks.

Currently, we suggest your exercise heart rate (pulse) while walking or bicycling is _____ beats per minute or _____ beats per 10 seconds. If your heart rate is faster than _____ beats per minute, then slow your exercise or stop until it slows to your recommended level.

WEEK	ACTIVITY	TIME GOAL	PER DAY	PER WEEK
1st	Walking or bicycling	10 minutes	3	6-7
1st	Walking or bicycling	15 minutes	3	6-7
2nd	Walking or bicycling	15 minutes	3	6-7
3rd	Walking or bicycling	25 minutes	2	5
4th	Walking or bicycling	30 minutes	2	4

Keep in mind:

1. Helpful Hints and Exercise Precautions (on attached page).
2. This exercise should feel _____on the Perceived Exertion Scale.
3. Do your warm-up and cool-down exercises before and after your activity.
4. Walk or bicycle at a comfortable pace. You should be able to talk and carry on a comfortable conversation during your exercise.
5. Plan your exercise at least two hours after meals.
6. Avoid exercising in temperatures less than 40 degrees or above 80 degrees unless your physician indicates differently.
7. Please record your home exercise on your Home Monitoring Form.

PERCEIVED EXERTION SCALE

6
7-very, very light
8
9-very light
10
11-fairly light
12
13-somewhat difficult
14
15-difficult
16
17-very difficult
18
19-very, very difficult
20

Appendix L- Helpful Hints and Exercise Precautions

STOP EXERCISING-and check with your doctor if you experience:

1. chest pain or discomfort
2. dizziness, lightheadedness fainting
3. nausea or vomiting
4. cold sweats
5. difficulty breathing
6. persistent rapid heartbeat
7. palpitations, fluttering or abnormal heart rhythm

SLOW DOWN-your may be exercising too hard if you experience:

1. angina
2. muscle cramps or "stitch" in your side
3. excessive shortness of breath lasting more than 10 minutes
4. excessive fatigue up to 24 hours after exercising
5. a rapid heart rate throughout 5-10 minutes of recovery after exercise

REMEMBER-

1. Begin slowly. It took many years of inactivity to get where you are today. Don't expect miracles in one week. Just exercising on a regular basis slowly and for a short time may be plenty in the beginning.

2. Avoid exercising during illness. The heart and lungs are already working harder to get well and do not need more work. Other infections and problems more serious may occur as a result of exercising when ill.

3. Allow time to warm-up and cool-down. If less time is available, the aerobic session should be shortened, not the warm-up or cool-down time. Your muscles, joints and heart need that time.

4. Dress appropriately for warm or cold weather (refer to handout).

5. Avoid hot or cold showers after exercise. Blood pooling tends to occur after exercise normally. A hot shower may increase this so the blood pressure may actually decrease. It is suggested to cool off for at least 20 minutes before taking a lukewarm or cool shower.

6. During warm-up or cool-down stretching, DO NOT BOUNCE OR STRAIN. Hold a STEADY stretch and use the correct form.

7. To increase exercise fitness, exercise longer but not more intensely (higher heart rate) at first. ALWAYS listen to your body. If you feel tired, you are tired. If you feel pain, then stop. Your body is giving you messages for a reason. Please do not ignore them.

8. Avoid exercising immediately after eating. Wait at least two hours after eating a heavy meal and one to two hours after eating a light snack.

9. Keep a log of your exercising. This can be a great motivator, especially on those slow days.

10. And keep in mind that even the best athletes have good and bad days.

Appendix M- Behavioral Contract

I, ______________________________, agree for the next one week period ending at the next meeting, dated ________________ to do the following activity: ____________________________________ for _____ times this week.

Upon completion of my above agreement, I will receive (what) ____ from (whom) ________________________________. If I choose not to complete my agreement, I agree to pay and/or forfeit (what) ____________ ____.

If I do an extra _______________________________________ for______ times more, I will receive an extra (what)________________ ____ from (whom)____.

____
Signature

____
Date

____
Signature of Buddy Witness

Appendix N- Home Monitoring Form

			Heart Rates							
Date	Activity	Time of Day	Before	During	After	RPE	Minutes of Activity	Where Did Activity	With Whom	Comments

Appendix O- Exercise Preferences**

Please identify your first preference for an indoor activity (Mark "I") and an outdoor activity (Mark "O"). Also, put a "*" by one activity that is new but you might like to try.

_____walk
_____bicycle
_____swim
_____row on machine
_____jump rope
_____jog
_____other
_____jump on minitrampoline
_____dance
_____cross country ski
_____nordic track (indoor ski)
_____ice skating
_____arm bicycle

Please identify your first three preferences (1, 2, and 3) for each warm-up and cool-down activity.

WARM-UP

_____neck rotation
_____shoulder shrugs
_____double arm circles
_____partial knee bends
_____heel raises
_____hip raises
_____bicycling (on floor)
_____jumping jacks
_____front/back elbow thrusts
_____side twister
_____knee lifts
_____ankle rolls
_____leg raises (on floor)
_____side leg raises
_____flutter kick
_____back roll
_____short arm circles

COOL-DOWN

_____calf stretches
_____hamstring stretches
_____front thigh stretches (standing)
_____hurdler stretch (on floor)
_____shin (front leg) stretches
_____groin stretches
_____side bender
_____side twister
_____forward bend and stretch
_____toe touch
_____cross leg over stretch
_____reach and stretch
_____ankle stretches
_____knee to chest
_____side tilts (on floor)

** This author would prefer diagrams of each warm-up and cool-down activity for increase clarification of activities about which referring.

(please continue on next page)

Appendix O- Exercise Preferences (continued)

Please identify your first three preferences (1, 2, and 3) for each activity.

_____ Pass balloon with knees to others
_____ Hula hoop demonstrations by participants and staff
_____ Pass balloon with feet while sitting to others
_____ Bounce pass ball to others
_____ Nerf ball basketball game
_____ Balloon volleyball
_____ Pass balloon with hands, feet, or head to others
_____ Others_______________________________

____

Thank you.

Appendix P- Aerobic Points

Walking/Running

Time (min: sec)	Point Value	Time (min: sec)	Point Value	Time (min:sec)	Point Value
1.0 mile		**1.6 miles**		**2.2 miles**	
over 20:01	0.0	over 48:01	0.0	over 44:01	1.2
20:00- 15:01	1.0	48:00- 32:01	0.6	44:00- 33:01	3.4
15:00- 12:01	2.0	32:00- 24:01	2.2		
12:00- 10:01	3.0	24:00- 19:13	3.8		
1.1 miles		**1.7 miles**		**2.3 miles**	
over 33:01	0.0	over 51:01	0.0	over 46:01	1.3
33:00- 22:01	0.1	51:00- 34:01	0.7	46:00- 34:31	3.6
22:00- 16:31	1.2	34:00- 25:31	2.4		
16:30- 13:13	2.3	25:30- 20:25	4.1		
13:12- 11:01	3.4				
1.2 miles		**1.8 miles**		**2.4 miles**	
over 36:01	0.0	over 54:01	0.0	over 48:01	1.4
36:00- 24:01	0.2	54:00- 36:01	0.8	48:00- 36:01	3.8
24:00- 18:01	1.4	36:00- 27:01	2.6		
18:00- 14:25	2.6	27:00- 21:37	4.4		
14:24- 12:01	3.8				
1.3 miles		**1.9 miles**		**2.5 miles**	
over 39:01	0.0	over 57:01	0.0	over 50:01	1.5
39:00- 26:01	0.3	57:00- 38:01	0.9	50:00- 37:31	4.0
26:00- 19:31	1.6	38:00- 28:31	2.8		
19:30- 15:37	2.9	28:30- 22:49	4.7		
15:36- 13:01	4.2				
1.4 miles		**2.0 miles**		**2.6 miles**	
over 42:01	0.0	over 40:01	1.0	over 52:01	1.6
42:00- 28:01	0.4	40:00- 30:01	3.0	52:00- 39:01	4.2
28:00- 21:01	1.8				
21:00- 16:49	3.2				
1.5 miles		**2.1 miles**			
over 45:01	0.0	over 42:01	1.1		
45:00- 30:01	0.5	42:00- 31:31	3.2		
30:00- 22:31	2.0				
22:30- 18:01	3.5				

(continue on next page)
(copied from Cooper, 1977)

Appendix P- Aerobic Points(continued)

Bicycling*

Time (min: sec)		Point Value	Time (min: sec)		Point Value	Time (min:sec)		Point Value
	2.0 miles			5.0 miles			8.0 miles	
over	12:01	0.0	over	30:01	2.0	over	48:01	4.1
12:00-	8:01	0.5	30:00-	20:01	3.5			
8:00-	6:01	1.5						
under	6:00	2.5						
	3.0 miles			6.0 miles			9.0 miles	
over	18:01	0.0	over	36:01	2.7	over	54:01	4.8
18:00-	12:01	1.5	36:00-	24:01	4.5			
12:00-	9:01	3.0						
under	9:00	4.5						
	4.0 miles			7.0 miles				
over	25:01	0.0	over	42:01	3.4			
24:00-	16:01	2.5	42:00-	28:01	5.5			
16:00-	12:01	4.5						

* Note: Points are determined considering an equal uphill and downhill course, and considering an equal time with and against the wind. For cycling a one-way course against a wind exceeding 5 mph, add 1/2 point per mile to the total point value.

(continue on next page)

Appendix P- Aerobic Points (continued)

Stationary Bicycling*

Time (min:sec)	15 mph (55rpm)	17.5 mph (65 rpm)	20 mph (75 rpm)	25 mph (90 rpm)
3:00	---	---	---	---
4:00	0.5	---	1.0	---
5:00	---	---	1.3	2.0
6:00	0.8	---	1.5	2.1
7:00	---	1.0	1.8	2.3
8:00	1.0	1.3	2.0	2.5
9:00	---	1.4	2.3	2.8
10:00	1.3	---	2.5	3.0
11:00	---	1.5	2.6	3.3
12:00	1.4	1.6	2.8	3.5
13:00	1.6	1.9	2.9	3.8
14:00	1.8	2.0	3.0	4.0
15:00	1.9	2.1	3.1	4.1
16:00	2.0	2.3	3.3	4.5
17:00	2.1	2.4	3.4	4.8
18:00	2.3	2.6	3.6	5.0
19:00	2.4	2.8	3.8	---
20:00	2.5	2.9	3.9	---
22:30	3.0	3.1	4.5	---
25:00	3.3	3.8	5.0	---
27:30	3.5	4.5	---	---
30:00	3.8	5.0	---	---
35:00	4.8	---	---	---

*Note: Add enough resistance so that the pulse rate counted for 10 seconds during exercise is equal to your target heart rate. Stationary cycling is awarded approximately half the points for regular cycling.

(continue on next page)

Appendix P- Aerobic Points(continued)

Walking or Running One Mile on a Motorized Treadmill*

Time (min:sec)	Speed (mph)	Point Values 0% Grade	5% Grade	10% Grade	15% Grade	20% Grade
13:30	4.5	2	---	---	---	---
14:30	4.1	2.1	2.4	3.0	4.3	---
15:00	4.0	1	---	---	---	---
17:30	3.5	1	---	---	---	---
20:00	3	1	1.1	1.4	2.0	3.0
25:00	2.4	0.4	0.4	0.6	0.8	1.2

*These numbers have been rounded to nearest decimal point.

(taken from Cooper, 1977)

Appendix Q- Calories Consumed during Exercise*

Activity	Body Weight 152 lbs-196 lbs.
Archery	5.2 - 6.7
Badminton	
(recreation)	5.6 - 7.4
Baseball	
(player)	4.7 - 6.1
(pitcher)	6.0 - 7.8
Basketball	
(half-court)	4.9 - 6.4
(moderate)	7.1 - 9.2
Bicycling	
(level) 5.5 MPH	5.1 - 6.5
(level) 13 MPH	10.8 - 14.0
Bowling (nonstop)	6.7 - 8.7
Calisthenics	5.1 - 6.5
Canoeing	
2.5 MPH	3.0 - 3.9
4.0 MPH	7.1 - 9.2
Dance	
modern (moderate)	4.2 - 5.4
modern (vigorous)	5.7 - 7.4
fox-trot	4.5 - 5.8
rumba	7.0 - 9.0
square	6.9 - 8.9
waltz	5.2 - 6.7
Football	
(moderate)	5.1 - 6.5
(vigorous)	8.4 - 10.8
Golf	
(twosome)	5.5 - 7.1
(foursome)	4.1 - 5.3
Handball	9.9 - 12.7
Hiking (40 lb. pack/3 MPH)	6.9 - 8.9
Horseback riding	
(walk)	3.3 - 4.3
(trot)	6.8 - 8.8
Horseshoe pitching	3.6 - 4.6
Judo, karate	13.0 - 16.7
Paddle/racquetball	9.9 - 12.7
Pool/billiards	1.8 - 2.4
Rope jumping	
(110 rpm)	9.7 - 12.6
(130 rpm)	8.8 - 11.3
Rowing (recreation)	5.1 - 6.5
(machine)	13.8 - 17.8
Running	
(11min/mile)	10.8 - 14.0
Sailing	3.0 - 3.9
Skating	5.8 - 7.4
Skiing	
(downhill)	9.8 - 12.6
(level, 5 MPH)	11.8 - 15.2
Snowshoeing (2.3 MPH)	6.3 - 8.1
Soccer	9.0 - 11.6
Squash	10.5 - 13.5
Stair (climb & descend)	
25 steps/min	6.8 - 8.8
36 steps/min	8.1 - 10.4
50 steps/min	10.2 - 13.1
Swimming	
(pleasure, 25 yds/min)	6.1 - 7.8
(back, 20 yds/min)	3.9 - 5.0
(back, 40 yds/min)	8.5 - 10.9
(breast, 20 yds/min)	4.9 - 6.3
(breast, 40 yds/min)	9.7 - 12.5
(crawl, 20 yds/min)	4.9 - 6.3
(crawl, 50 yds/min)	10.7 - 13.9
Table tennis	3.9 - 5.0
Tennis	
(recreation)	7.0 - 9.0
Volleyball	
(moderate)	5.8 - 7.4
Walking	
(2.0 MPH)	3.5 - 4.6
(4.5 MPH)	6.7 - 8.6
(110-120 steps/min)	5.3 - 6.8

*This chart has been modified (summarized by McGlynn et al., 1987).

Appendix R- Male Participant/Spouse Record Form

Measurement	Assess	4 wk mini	6 wk	8 wk mini	13 wk mini	16 wk mini	20 wk mini	final eval
Body Composition								
Chest								
Abdomen								
Thigh								
Body Composition								
Buttocks								
Abdomen								
Right forearm								
Weight								
Chest Dimension								
Hip Dimension								
Waist Dimension								
Thigh Dimension								
Calf Dimension								
Arm Dimension								
Cholesterol								
Triglyceride								
HDL								
Glucose								
Flexibility								
Heart Rate Rest								
Heart Rate Maximum								
Blood Pressure Rest								
Blood Pressure Max								
THR supervised								
THR unsupervised								
Functional Capacity								
Treadmill Stage								
Treadmill Minutes								
33% of Treadmill								
50% of Treadmill								
75% of Treadmill								

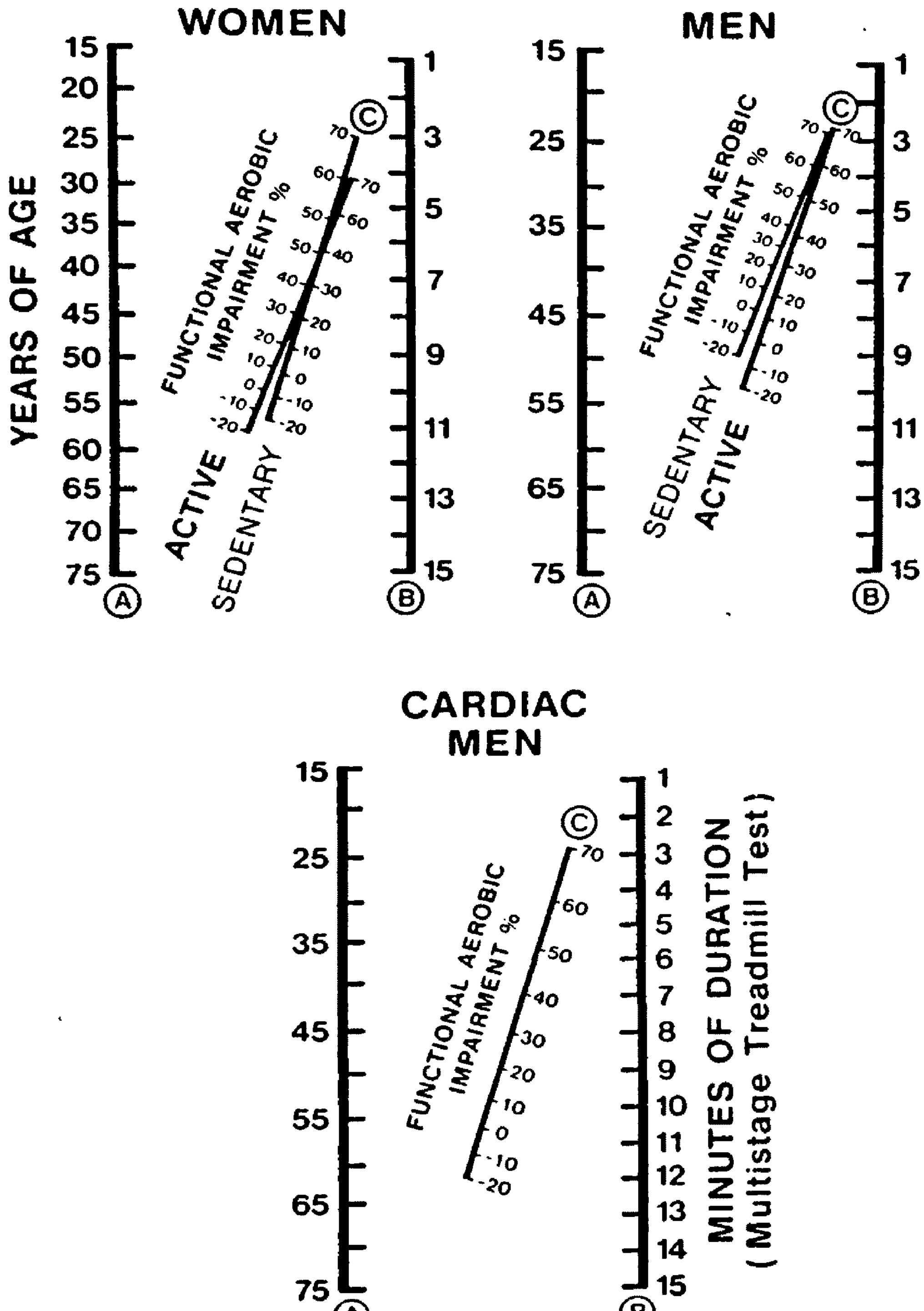
Appendix S- Female Participant/Spouse Record

Measurement	Assess	4 wk mini	6 wk	8 wk mini	13 wk mini	16 wk mini	20 wk mini	final eval
Body Composition								
Ilium								
Triceps								
Thigh								
Body Composition								
Right thigh								
Abdomen								
Right Calf								
Weight								
Chest Dimension								
Hip Dimension								
Waist Dimension								
Thigh Dimension								
Calf Dimension								
Arm Dimension								
Cholesterol								
Triglyceride								
HDL								
Glucose								
Flexibility								
Heart Rate Rest								
Heart Rate Maximum								
Blood Pressure Rest								
Blood Pressure Max								
THR supervised								
THR unsupervised								
Functional Capacity								
Treadmill Stage								
Treadmill Minutes								
33% of Treadmill								
50% of Treadmill								
75% of Treadmill								

Appendix T- Circuit Weight Training
Participant/Spouse Record Form

Week of Program	Shoulder Press	Arm Curls	Side Bends	French Curls	Upright Row	Bench Press	Double Leg Curls	Double Leg Extensions	Heel Raises	Heart Rate
Week #1										
Week #2										
Week #3										
Week #4										
Week #5										
Week #6										
Week #8										
Week #10 (Max)										
Week #11										
Week #12										
Week #13										
Week #14										
Week #15										
Week #16										
Week #17										
Week #18										
Week #19										
Week #20										
Week #21										
Week #22										
Week #23										
Week #24 (Max)										

Appendix U- Functional Capacity



(Bruce et al., 1973)

BIBLIOGRAPHY

Alderman, M. Kay. (1980). Self-responsibility in health care/promotion: Motivational factors. The Journal of School Health, 50, 22-25.

American College of Sports Medicine. (1986). Guidelines for Exercise Testing and Prescription (3rd ed.). Philadelphia, Pa.: Lea & Febiger.

American Heart Association. (1987). Heart Facts. Dallas, Texas: American Heart Association.

American Heart Association The Committee on Exercise. (1975). Exercise Testing and Training of Individuals with Heart Disease or at High Risk for its Development: A Handbook for Physicians. Dallas, Texas: American Heart Association.

American Heart Association Subcommittee on Rehabilitation. (1977). Cardiac Rehabilitation Program Guide. Dallas, Texas: American Heart Association.

American Psychological Association. (1983). Publication Manual of the American Psychological Association (3rd ed.). Washington, D.C.: American Psychological Association.

Andrew, G. M., Oldridge, N. B., Parker, J. O., Cunningham, D. A., Rechnitzer, P. A., Jones, N. L., Buck, C., Kavanagh, T., Shephard, R. J., & Sutton, J. R. (1981). Reasons for dropout from exercise programs in post-coronary patients. Medicine and Science in Sports and Exercise, 13, 164-168.

Arnett, III, R. H., Mc Kusick, D. R., Sonnefeld, S. T., & Cowell, C. S. (1986). Projections of health care spending to 1990. Health Care Financing Review, 7, 1-36.

Baile, W. F., & Engel, B. T. (1978). A behavioral strategy for promoting treatment compliance following myocardial infarction. Psychosomatic Medicine, 40, 413-419.

Bandura, A. & Adams, N. E. (1977). Analysis of self-efficacy theory of behavioral change. Cognitive Therapy and Research, 1, 287-310.

Bandura, A., Adams, N. E., & Beyer, J. (1977). Cognitive processes mediating behavioral change. Journal of Personality and Social Psychology, 35, 125-139.

Bandura, A. & Cervone, D. (1983). Self-evaluative and self-efficacy mechanisms governing the motivational effects of goal systems. Journal of Personality and Social Psychology, 45, 1017-1028.

Bandura, A., Jeffery, R. W., & Gajdos, E. (1975). Generalizing change through participant modeling with self-directed mastery. Behaviour Research and Therapy, 13, 141-152.

Bandura, A. & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. Journal of Personality and Social Psychology, 41, 586-598.

Bandura, Albert. (1982). Self-efficacy mechanism in human agency. American Psychologist, 37, 122-147.

Bandura, Albert. (1981). Self-referent thought: A developmental analysis of self-efficacy. In J. H. Flavell & L. Ross (Eds.), Social Cognitive Development (pp. 200-239). Cambridge, Ma.: Cambridge University Press.

Bandura, Albert. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84, 191-215.

Barofsky, Ivan. (1976). Behavioral therapeutics and the management of therapeutic regimens. In D. L. Sackett & R. B. Haynes (Eds.), Compliance with Therapeutic Regimens (pp. 100-109). Baltimore: Johns Hopkins University Press.

Beck, K. H. & Lund, A. K. (1981). The effects of health threat seriousness and personal efficacy upon intentions and behavior. Journal of Applied Social Psychology, 11, 401-415.

Becker, M. H. & Maiman, L. A. (1975). Sociobehavioral determinants of compliance with health and medical care recommendations. Medical Care, 13, 10-24.

Becker, M. H., Maiman, L. A., Kirscht, J. P., Haefner, D. P., Drachman, R. H., & Taylor, D. W. (1979). Patient perceptions and compliance: Recent studies of the health belief model. In R. B. Haynes, D. W. Taylor, & D. L. Sackett (Eds.), Compliance in Health Care (pp. 78-109). Baltimore, Md.: Johns Hopkins University Press.

Becker, Marshall H. (1976). Sociobehavioral determinants of compliance. In D. L. Sackett & R. B. Haynes (Eds.), Compliance with Therapeutic Regimens (pp. 40-50). Baltimore, Md.: Johns Hopkins University Press.

Bedsworth, J. A. & Molen, M. T. (1982). Psychological stress in spouses of patients with myocardial infarction. Heart & Lung, 11, 450-456.

Ben-Ari, E., Kellerman, J. J., Fisman, E. Z., Pines, A., Peled B., & Drory, Y. (1986). Benefits of long-term physical training in patients after coronary artery bypass grafting. A 58-month follow-up and comparison with a nontrained group. Journal of Cardiopulmonary

Rehabilitation, 6, 165-170.

Bengsston, Kristina. 1983. Rehabilitation after myocardial infarction. Scandinavian Journal of Rehabilitation Medicine, 15, 1-9.

Berra, Kathy. (1979). The role of other professionals in exercise testing and training. In R. M. Levenson, M. Maxon, & B. L. Altom (Eds.), Alternatives in Cardiac Care: Prevention and Rehabilitation Conference (pp. 28-29). Dallas, Texas: American Heart Association.

Blanchard, Edward B. (1982). Behavioral medicine: Past, present, and future. Journal of Consulting and Clinical Psychology, 50, 795-796.

Blessey, Raymond. (1985). Epidemiology, risk factors, and pathophysiology of ischemic heart disease. Physical Therapy, 65, 1796-1805.

Blumenthal, J. A., Califf, R., Williams, S., Hindman, M. (1983). Continuing medical education cardiac rehabilitation: A new frontier for behavioral medicine. Journal of Cardiac Rehabilitation, 3, 637-656.

Blumenthal, J. A., Williams, R. S., Wallace. A. G., Williams, Jr., R. B., & Needles, T. L. (1982). Physiological and psychological variables predict compliance to prescribed exercise therapy in patients recovering from myocardial infarction. Psychosomatic Medicine, 44, 519-527.

Borg, Gunnar A. V. (9182). Psychophysical bases of perceived exertion. Medicine and Science in Sports and Exercise, 14, 377-381.

Borhani, Nemat O. (1986). Clinical trials on preventing CHD--Implications for the practitioner. Cardiovascular Medicine, 11, 10-11.

Bramoweth, Ellen R. (1983). Psychologic considerations. In R. G. Sanderson & C. L. Kurth (Eds.), The Cardiac Patient. A Comprehensive Approach (pp. 483-504). Philadelphia: W. B. Saunders Company.

Brownell, Kelly D. (1982). Behavioral medicine. Annual Review of Behavior Therapy: Theory & Practice, 8, 156-207.

Brownell, K. D., Stunkard, A. J., & Albaum, J. M. (1980). Evaluation and modification of exercise patterns in the natural environment. American Journal of Psychiatry, 137, 1540-1545.

Bruce, E. H., Frederick, R., Bruce, R. A., & Fisher, L. D. (1976). Comparison of active participants and dropouts in CAPRI cardiopulmonary rehabilitation programs. American Journal of Cardiology, 37, 53-60.

Burke, E. J. & Collins, M. L. (1984). Using perceived exertion for the prescription of exercise in healthy adults. In R. C. Cantu (Ed.), Clinical Sports Medicine (pp. 93-105). Lexington, Ma.: Collamore Press.

Byrne, D. G. (1982). Psychological responses to illness and outcome after survived myocardial infarction: A long term follow-up. Journal of Psychosomatic Research, 26, 105-112.

Byrne, D. G. (1984). The stability of illness behavior after myocardial infarction. The International Journal of Psychiatry in Medicine, 14, 285-291.

Carleton, Richard A. (1979). Patients in exercise testing and training--Post MI patients. In R. M. Levenson, M. Maxon, & B. L. Altom (Eds.), Alternatives in Cardiac Care: Prevention and Rehabilitation Conference (pp. 65-69). Dallas, Texas: American Heart Association.

Carmody, T. P., Senner, J. W., Malinow, M. R., & Matarazzo, J. D. (1980). Physical exercise rehabilitation: Long-term dropout rate in cardiac patients. Journal of Behavioral Medicine, 3, 163-168.

Carver, C. S., Coleman, A. E., & Glass, D. C. (1976). The coronary-prone behavior pattern and the suppression of fatigue on a treadmill test. Journal of Personality and Social Psychology, 33, 460-466.

Cass Principal Investigators and their Associates. (1983). Coronary artery surgery study (CASS): A randomized trial of coronary artery bypass surgery. Circulation, 68, 951-960.

Cay, E. L. (1982). Psychological problems in patients after a myocardial infarction. Advances in Cardiology, 29, 108-112.

Cay, E. L., Vetter, N., Philip, A. E., & Dugard, P. (1972). Psychological status during recovery from an acute heart attack. Journal of Psychosomatic Research, 16, 425-435.

Cervone, D. & Peake, P. K. (1986). Anchoring, efficacy, and action: The influence of judgmental heuristics on self-efficacy judgments and behavior. Journal of Personality and Social Psychology, 50, 492-501.

Clausen, Jan P. (1976). Circulatory adjustments to dynamic exercise and effect of physical training in normal subjects and in patients with coronary artery disease. Progress In Cardiovascular Disease, 18, 459-495.

Cobb, L. A., & Weaver, W. D. (1986). Exercise: A risk for sudden death in patients with coronary heart disease. Journal of the American College of Cardiology, 7, 215-219.

Cohen, Frances. (1984). Coping. In J. D. Matarazzo, S. M. Weiss, J. A. Herd, N. E. Miller, & S. M. Weiss (Eds.), Behavioral Health--A Handbook of Health Enhancement and Disease Prevention (pp. 261-274). New York: John Wiley & Sons.

Coleman, J. C. & Broen, Jr., W. E. (1972). Abnormal Psychology and Modern

Life. Glenview, Il.: Scott, Foresman and Company.

Conrad, Peter. (1985). The meaning of medications: Another look at compliance. Social Science and Medicine, 20, 29-37.

Cook, Rosa Lee. (1979). Psychosocial responses to myocardial infarction. Heart & Lung, 8, 130-135.

Cooper, Kenneth H. (1977). The Aerobics Way. New York: Bantam Books.

Council on Scientific Affairs. (1981). Physician-supervised exercise programs in rehabilitation of patients with coronary heart disease. The Journal of the American Medical Association, 245,1463-1466.

Cousins, Norman. (1983). The Healing Heart. New York: W. W. Norton and Company.

Crate, Marjorie A. (1965). Nursing functions in adaptation to chronic illness. American Journal of Nursing, 65, 72-76.

Daltroy, Lawren H. (1985a). Improving cardiac patient adherence to exercise regimens: A clinical trial of health education. Journal of Cardiac Rehabilitation, 5, 40-49.

Daltroy, Lawren H. (1985b). Improving attendance at cardiac exercise program. Patient Education Newsletter, 8, 1-3.

Davidson, Dennis M. (1979). The family and cardiac rehabilitation. The Journal of Family Practice, 8, 253-261.

Davidson, D. M. & Maloney, C. A. (1985). Recovery after cardiac events. Physical Therapy, 65, 1820-1827.

DeBusk, R. F., Blomquist, C. G., Kouchoukos, N. T., Luepker, R. V., Miller, H. S., Moss, A. J., Pollock, M. J., Reeves, T. J., Selvester, R. J., Stason, W. B., Wagner, G. S., & Willman, V. L. (1986). Identification and treatment of low-risk patients after acute myocardial infarction and coronary-artery bypass graft surgery. The New England Journal of Medicine, 314, 161-166.

Degre-Coustry, C. & Grevisse, M. (1982). Psychological problems in rehabilitation after myocardial infarction: Non-institutional approach. Advances in Cardiology, 29, 126-131.

DiMatteo, M. R. & DiNicola, D. D. (1982). Achieving Patient Compliance. The Psychology of the Medical Practitioner's Role. New York: Pergamon Press.

Dishman, R. K. & Ickes, W. (1981). Self-motivation and adherence to therapeutic exercise. Journal of Behavioral Medicine, 4, 421-438.

Dishman, R. K., Ickes, W., & Morgan, W. P. (1980). Self-motivation and adherence to habitual physical activity. Journal of Applied Social Psychology, 10, 115-132.

Dishman, Rod K. (1982). Compliance/adherence in health-related exercise. Health Psychology, 1, 237-267.

Dunbar, J. M., Marshall, G. D., & Hovell, M. F. (1979). Behavioral strategies for improving compliance. In R. B. Haynes, D. W. Taylor, & D. L. Sackett (Eds.), Compliance in Health Care (pp. 174-190). Baltimore, Md.: Johns Hopkins University Press.

Ehsani, A. A., Heath, G. W., Hagberg, J. M., Sobel, B. E., & Holloszy, J. O. (1981). Effects of 12 months of intense exercise training on ischemic ST-segment depression in patients with coronary artery disease. Circulation, 64, 1116-1124.

Ehsani, A. A., Martin, III, W. H., Heath, G. W., & Coyle, E. F. (1982). Cardiac effects of prolonged and intense exercise training in patients with coronary artery disease. American Journal of Cardiology, 50, 246-254.

Edelman, Paul S. (1987). The cases of Tart v. McGann: Legal implications associated with exercise stress testing. The Exercise Standards and Malpractice Reporter, 1, 21-26.

Ell, K. & Haywood, L. J. (1984). Social support and recovery from myocardial infarction: A panel study. Journal of Social Service Research, 7, 1-19.

Epstein, L. H., & Wing, R. R. (1979). Behavioral contracting: Health behaviors. Clinical Behavior Therapy Review, 1, 1-22.

Epstein, L. H., Wing, R. R., Thompson, J. K., & Griffen, W. (1980). Attendance and fitness in aerobics exercise. The effects of contract and lottery procedures. Behavior Modification, 4, 465-479.

Eraker, S. A., Kirscht, J. P., & Becker, M. H. (1984). Understanding and improving patient compliance. Annuals of Internal Medicine, 100, 258-268.

Erb, B. D., Fletcher, G. F., & Sheffield, L. T. (1979). Standards for cardiovascular exercise treatment programs. In The Exercise Standards Book (pp. 29-40). American Heart Association: Dallas, Texas.

Ewart, C. K., Stewart, K. J., Gillilan, R.E., Kelemen, M. H., Valenti, S. A., Manley, J. D., & Kelemen, M. D. (1986). Usefulness of self-efficacy in predicting overexertion during programmed exercise in coronary artery disease. The American Journal of Cardiology, 57, 557-561.

Ewart, C. K., Taylor, C. B., Reese, L. B., & DeBusk, R. F. (1983). Effects of early postmyocardial infarction exercise testing on self-perception and subsequent physical activity. The American Journal of Cardiology, 51, 1076-1080.

Falvo, Donna R. (1985). Making the patient a partner in care. In D. R. Falvo, Effective Patient Education. A Guide to Increased Compliance (pp. 157-191). Rockville, Md.: Aspen Systems Corporation.

Fardy, Paul S. (1980a). Introduction. In P. S. Fardy, J. L. Bennett, N. L. Reitz, & M. A. Williams (Eds.), Cardiac Rehabilitation--Implications for the Nurse and Other Health Professionals (pp. 3-5). St. Louis, Mo.: The C. V. Mosby Company.

Fardy, Paul S. (1980b). Exercise physiology for cardiac rehabilitation. In: P. S. Fardy, J. L. Bennett, N. L. Reitz, & M. A. Williams (Eds.), Cardiac Rehabilitation--Implications for the Nurse and Other Health Professionals (pp. 39-51). St. Louis, Mo.: The C. V. Mosby Company.

Fardy, Paul S. (1979). Cardiac rehabilitation for the outpatient: A hospital-based program. In M. L. Pollock & D. H. Schmidt (Eds.), Heart Disease and Rehabilitation (pp. 463-479). Boston, Ma.: Houghton Mifflin Professional Publishers.

Faulkner, John A. (1979). Cardiac rehabilitation: Major concerns in basic physiology. In: M. L. Pollock & D. H. Schmidt (Eds.), Heart Disease and Rehabilitation (pp. 663-677). Boston, Ma.: Houghton-Mifflin Professional Publishers.

Fink, Donald L. (1976). Tailoring the consensual regimen. In D. L. Sackett & R. B. Haynes (Eds.), Compliance with Therapeutic Regimens (pp. 110-118). Baltimore: Johns Hopkins University Press.

Finnegan, D. L. & Suler, J. R. (1985). Psychological factors associated with maintenance of improved health behaviors in postcoronary patients. The Journal of Psychology, 119, 87-94.

Fisch, R. Z. & Nesher, G. (1986). Masked depression. Help for the hidden misery. Postgraduate Medicine, 80, 165-169.

Fishbein, M. & Ajzen, I. (1975). Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research. Reading, Ma.: Addison-Wesley Publishing Company.

Fletcher, Gerald F. (1984). Long-term exercise in coronary artery disease and other chronic disease states. Heart & Lung, 13, 28-46.

Fletcher, Gerald F. (1982). Exercise in secondary prevention and rehabilitation of subjects with coronary disease. In: G. F. Fletcher (Ed.), Exercise in the Practice of Medicine (pp. 147-252). Mount Kisco, New York: Futura Publishing Company.

Fontana, A. F., Kerns, R. D., Rosenberg, R. L., Marcus, J. L., & Colonese, K. L. (1986). Exercise training for cardiac patients: Adherence, fitness, and benefits. Journal of Cardiopulmonary Rehabilitation, 6, 4-15.

Foster, C., Pollock, M. L., Anholm, J. D., Squires, R. W., Ward, A., Dymond, D. S., Rod, J. L., Saichek, R. P., & Schmidt, D. H. (1984). Work capacity and left ventricular function during rehabilitation after myocardial revascularization surgery. Circulation, 69, 748-755.

Franklin, B. A., Hellerstein, H. K., Gordon, S., & Timmis, G. C. (1986). Exercise prescription for the myocardial infarction patient. Journal of Cardiopulmonary Rehabilitation, 6, 62-79.

Franklin, B. A., Wrisley, D., Johnson, S., Mitchell, M., & Rubenfire, M. (1984). Chronic adaptations to physical conditioning in cardiac patients. Implications regarding exercise trainability. Clinics in Sports Medicine, 3, 471-512.

Franklin, Barry A. (1983). The role of electrocardiographic monitoring in cardiac exercise programs. Journal of Cardiac Rehabilitation, 3, 806-810.

Franklin, Barry A. (1978). Motivating and educating adults to exercise. Journal of Physical Education and Recreation, 49, 13-16.

Friis, R. & Taff, G. A. (1986). Social support and social networks, and coronary heart disease and rehabilitation. Journal of Cardiopulmonary Rehabilitation, 6, 132-147.

Froelicher, Victor F. (1983). Exercise Testing and Training. Chicago: Year Book Medical Publishers, Inc.

Froelicher, V. F., & Brown, P. (1981). Exercise and coronary heart disease. Journal of Cardiac Rehabilitation, 1, 277-288.

Froelicher, V., Jensen, D., & Sullivan, M. (1985). A randomized trial of the effects of exercise training after coronary artery bypass surgery. Archives of Internal Medicine, 145, 689-692

Fox, Samuel M. (1979a). Keynote speech. In R. M. Levenson, M. Maxon, & B. L. Altom (Eds.), Alternatives in Cardiac Care: Prevention and Rehabilitation Conference (pp. 2-8). Dallas, Texas: American Heart Association.

Fox, Samuel M. (1979b). Post coronary rehabilitation--Is it worth the effort and cost? In R. M. Levenson, M. Maxon, & B. L. Altom (Eds.), Alternatives in Cardiac Care: Prevention and Rehabilitation Conference (pp. 75-79). Dallas, Texas: American Heart Association.

Gale, J. B., Eckhoff, W. T., Mogel, S. F., & Rodnick, J. E. (1984). Factors related to adherence to an exercise program for healthy adults. Medicine and

Science in Sports and Exercise, 16, 544-549.

Garrity T. F., & Klein R. F. (1975). Emotional response and clinical severity as early determinants of six-month mortality after myocardial infarction. Heart & Lung, 4, 730-736.

Garrity, Thomas. (1973). Vocational adjustment after first myocardial infarction; Comparative assessment of several variables suggested in the literature. Social Science and Medicine, 7, 705-717.

Gentry, W. Doyle. (1979). Psychosocial concerns and benefits in cardiac rehabilitation. In M. L. Pollock & D. H. Schmidt (Eds.), Heart Disease and Rehabilitation (pp. 690-700). Boston, Ma.: Houghton Mifflin Professional Publishers.

Gentry, W. D., Baider, L., Oude-Weme, J. D., Musch, F., & Gary, Jr., H. E. (1983). Type A/B differences in coping with acute myocardial infarction: Further considerations. Heart & Lung, 12, 212-214.

Gentry, W. D. & Haney, T. (1975). Emotional and behavioral reaction to acute myocardial infarction. Heart & Lung, 4, 738-745.

Gettman, L. R., Ward, P., & Hagan, R. D. (1982). A comparison of combined running and weight training with circuit weight training. Medicine and Science in Sports and Exercise, 14, 229-234.

Gibson, C. F. & Loop, F. D. (1986). How different are CABG results in women and men? Cardiovascular Medicine, 11, 53-55.

Gibson, Edward S. (1979). Compliance and the organization of health services. In R. B. Haynes, D. W. Taylor, & D. L. Sackett (Eds.), Compliance in Health Care (pp. 278-285). Baltimore, Md.: Johns Hopkins University Press.

Given, C. W., Given, B. A., & Coyle, B. W. (1984). The effects of patient characteristics and beliefs on responses to behavioral interventions for control of chronic diseases. Patient Education and Counseling, 6, 131-140.

Godin, G. & Shephard, R. J. (1985). Gender differences in perceived physical self-efficacy among older individuals. Perceptual and Motor Skills, 60, 599-602.

Goff, D., & Dimsdale, J. E. (1985). The psychologic effects of exercise. Journal of Cardiac Rehabilitation, 5, 234-240.

Goldberg, L. I., White, D. J., & Pandolf, K. B. (1982). Cardiovascular and perceptual responses to isometric exercise. Archives of Physical Medicine and Rehabilitation, 63, 221-216.

Goldman, L. & Cook, E. F. (1984). The decline in ischemic heart disease mortality rates. Annals of Internal Medicine, 101, 825-836.

Gordis, Leon. (1976). Methodologic issues in the measurement of patient compliance. In D. L. Sackett & R. B. Haynes (Eds.), Compliance with Therapeutic Regimens (pp. 51-66). Baltimore: Johns Hopkins University Press.

Gulledge, A. Dale. (1979). Psychological aftermaths of myocardial infarction. In W. D. Gentry & R.B. Williams, Jr. (Eds.), Psychological Aspects of Myocardial Infarction and Coronary Care (pp. 113-120). 2nd ed. St. Louis, Mo.: C.V. Mosby.

Gundle, M. J., Reeves, B. R., Tate, S., Raft, D., & McLaurin, L. P. (1980). Psychosocial outcome after coronary artery surgery. American Journal of Psychiatry, 137, 1591-1594.

Hackett, T. P. & Cassem, N. H. (1982). Coping with cardiac disease. Advances in Cardiology, 31, 212-217.

Hackett, T. P. & Cassem, N. H. (1979). Psychological intervention in myocardial infarction. In W. D. Gentry & Williams, Jr., R. B. (Eds.), Psychological Aspects of Myocardial Infarction and Coronary Care (pp. 149-161). St. Louis, Mo.: C. V. Mosby.

Hackett, T. P. & Cassem, N. H. (1973). Psychological adaptation to convalescence in myocardial infarction patients. In J. Naughton & H. K. Hellerstein (Eds.), Exercise Testing and Exercise Training in Coronary Heart Disease (pp. 253-262). New York: Academic Press.

Hackett, Thomas P. (1979). Patients in exercise testing and training--patient psychology. In R. M. Levenson, M. Maxon, & B. L. Altom (Eds.), Alternatives in Cardiac Care: Prevention and Rehabilitation Conference (pp. 75-79). Dallas, Texas.: American Heart Association.

Hagberg, J. M., Ehsani, A.A., & Holloszy, J. O. (1983). Effect of 12 months of intense exercise training on stroke volume in patients with coronary artery disease. Circulation, 67, 1194-1199.

Hakki, A-H., DePace, N. O., & Iskandrian, A. S. (1983). Effect of age on left ventricular function during exercise in patients with coronary artery disease. Journal of American College of Cardiology, 2, 645-651.

Hamburg, David A. (1981). Changing behavior for health. The American Journal of Cardiology, 47, 736-740.

Hammond, H. Kirk. (1985). Exercise for coronary heart disease patients: Is it worth the effort? Journal of Cardiopulmonary Rehabilitation, 5, 531-539.

Hartung, G. H. & Rangel, R. (1981). Exercise training in post-myocardial infarction patients: Comparison of results with high risk coronary and post-bypass patients. Archives of Physical Medicine and Rehabilitation, 62, 147-150.

Haskell, William L. (1984). Safety of outpatient cardiac exercise programs--Issues regarding medical supervision. Clinics in Sports Medicine, 3, 455-469.

Haskell, William L. (1979). Mechanisms by which physical activity may enhance the clinical status of cardiac patients. In M. L. Pollock & D. H. Schmidt (Eds.), Heart Disease and Rehabilitation (pp. 276-296). Boston, Ma.: Houghton-Mifflin Professional Publishers.

Haskell, William L. (1978). Cardiovascular complications during exercise training of cardiac patients. Circulation, 57, 920-924.

Haynes, R. Brian. (1984). Compliance with health advice: An overview with special reference to exercise programs. Journal of Cardiac Rehabilitation, 4, 120-123.

Haynes, R. Brian. (1979a). Introduction. In R. B. Haynes, D. W. Taylor, & D. L. Sackett (Eds.), Compliance in Health Care (pp. 1-7). Baltimore, Md.: Johns Hopkins University.

Haynes, R. Brian. (1979b). Determinants of compliance: The disease and mechanics of treatment. In R. B. Haynes, D. W. Taylor, & D. L. Sackett (Eds.), Compliance in Health Care (pp. 49-62). Baltimore, Md.: Johns Hopkins University.

Haynes, R. Brian. (1979c). Strategies to improve compliance with referrals, appointments, and prescribed medical regimens. In R. B. Haynes, D. W. Taylor, & D. L. Sackett (Eds.), Compliance in Health Care (pp. 121-143). Baltimore, Md.: Johns Hopkins University.

Haynes, R. Brian. (1976d). Strategies for improving compliance: A methodologic analysis and review. In D. L. Sackett & R. B. Haynes (Eds.), Compliance with Therapeutic Regimens (pp. 69-82). Baltimore: Johns Hopkins University Press.

Haynes, R. Brian. (1976b). A critical review of the 'determinants' of patient compliance with therapeutic regimens. In D. L. Sackett & R. B. Haynes (Eds.), Compliance with Therapeutic Regimens (pp. 26-39). Baltimore, Md.: Johns Hopkins University Press.

Hedback, B., Perk, J., & Perski, A. (1985). Effect of a post-myocardial infarction rehabilitation program on mortality, morbidity, and risk factors. Journal of Cardiopulmonary Rehabilitation, 5, 576-583.

Heinzelmann, F. & Bagley R. W. (1970). Response of physical activity programs and their effects on health behavior. Public Health Reports, 85, 905-911.

Heinzelmann, Fred. (1973). Social and psychological factors that influence the effectiveness of exercise programs. In J. Naughton, & H. K. Hellerstein (Eds.), Exercise Testing and Exercise Training in Coronary Heart Disease. New York: Academic Press.

Herbert, David L. (1987). Who will judge your professional conduct in court? The Exercise Standards and Malpractice Reporter, 1, 14-16.

Herbert, William G. (1987). New perspectives on professional practices in cardio-pulmonary rehabilitation: The A.A.C.V.P.R evaluation statement. The Exercise Standards and Malpractice Reporter, 1, 28-29.

Herbert, D. L. & Herbert, W. G. (1984). Legal aspects of preventive and rehabilitative exercise programs. Canton, Ohio: Professional & Executive Reports & Publications.

Hijek, Thomas W. (1984). The health belief model and cardiac rehabilitation. Nursing Clinics of North America, 19, 449-457.

Hilbert, Gail A. (1985). Spouse support and myocardial infarction patient compliance. Nursing Research, 34, 217-220.

Hirzel, H. O., Leutwyler, R., & Krayenbuehl, H. P. (1985). Silent myocardial ischemia: Hemodynamic changes during dynamic exercise in patients with proven coronary artery disease despite absence of angina pectoris. Journal of the American College of Cardiology, 6, 275-284.

Holahan, C. K., Holahan, C. J., & Belk, S. S. (1984). Adjustment in aging: The roles of life stress, hassles, and self-efficacy. Health Psychology, 3, 315-328.

Holub, N., Eklund, P., & Keenan, P. (1975). Family conferences as an adjunct to total coronary care. Heart & Lung, 4, 767-769.

Hoskins, T. A., & Habasevich, R. A. (1978). Cardiac rehabilitation. An overview. Physical Therapy, 58, 1183-1190.

Hossack, Kenneth F. (1982). Cardiac arrest during cardiac rehabilitation. Identification of high risk patients (abstracts). The American Journal of Cardiology, 49, 915.

Hossack, K. F., & Hartwig, R. (1982). Cardiac arrest associated with supervised cardiac rehabilitation. Journal of Cardiac Rehabilitation, 2, 402-408.

Ice, Randolph. (1985). Long-term compliance. Physical Therapy, 65, 1832-1839.

Isaac, S., & Michael, W. B. (1980). Handbook in Research and Evaluation. San Diego, Ca.: Edits Publishers.

Iskandrian, A. S., & Heo, J. (1986). Left ventricular pressure/volume relationship in coronary artery disease. American Heart Journal, 112, 375-381.

Jenkins, C. D., Stanton, B. A., Savageau, J. A., Denlinger, P., & Klein, M. D. (1983). Coronary artery bypass surgery. Physical, psychological, social, and economic outcomes six months later. The Journal of the American Medical Association, 250, 782-788.

Jenkins, C. David. (1979). The coronary-prone personality. In W. D. Gentry & R. B. Williams, Jr. (Eds.). Psychological Aspects of Myocardial Infarction and Coronary Care. 2nd ed. St. Louis, Mo.: C.V. Mosby.

Jillings, Carol Rossman. (1978). Phases of recovery from open-heart surgery. Heart & Lung, 7, 987-994.

Jones, G. E., Jones, K. R., Cunningham, R. A., & Caldwell, J. A. (1985). Cardiac awareness in infarct patients and normals. Psychophysiology, 22, 480-487.

Kallio, V., Hamalainen, H., Hakkila, J., & Lurrila, O. J. (1979). Reduction in sudden deaths by a multifactorial intervention programme after acute myocardial infarction. The Lancet, 2, 1091-1094.

Kanfer, Frederick H. (1980). Self-management methods. In F. H. Kanfer, A. P. Goldstein (Eds.), Helping People Change. New York: Pergamon Press.

Kannel, W. B. (1981). Prospects for risk factor modification to reduce risk of reinfarction and premature death. Journal of Cardiac Rehabilitation, 1, 63-71.

Kaplan, R. M., Atkins C. J. & Reinsch, S. (1984). Specific efficacy expectations mediate exercise compliance in patients with COPD. Health Psychology, 3, 223-242.

Kau, M. L., Fischer, J. (1984). Self-modification of exercise behavior. Journal of Behavior Therapy and Experimental Psychiatry, 5, 213-214.

Kaufmann, M. W., Pasacreta, J., Cheney, R. & Arcuni, O. (1985-1986). Psychosomatic aspects of myocardial infarction and implications for treatment. The International Journal of Psychiatry in Medicine, 15, 371-380.

Kavanagh, D. J. & Bower, G. H. (1985). Mood and self-efficacy: Impact of joy and sadness on perceived capabilities. Cognitive Therapy and Research, 9, 507-525.

Kavanagh, T. & Shephard, R. J. (1980). Exercise for postcoronary patients: An assessment of infrequent supervision. Archives of Physical Medicine and Rehabilitation, 61, 114-118.

Keefe, F. J., & Blumenthal, J. A. (1980). The life fitness program: A behavioral approach to making exercise a habit. Journal of Behavior Therapy and Experimental Psychiatry, 11, 31-34.

Kelemen, M. H., & Stewart, K. J., (1985). Circuit weight training. A new direction for cardiac rehabilitation. Sports Medicine, 2, 385-388.

Kelemen, M. H., Stewart, K. J., Gillilan, R. E., Ewart, C. K., Valenti, S. A., Manley, J. D., & Kelemen, M. D. (1986). Circuit weight training in cardiac patients. Journal of American College of Cardiology, 7, 38-42.

Kimball, Chase P. (1969). Psychological responses to the experience of open heart surgery: I. American Journal of Psychiatry, 126, 348-359.

King, A. C., & Frederiksen, L. W. (1984). Low-cost strategies for increasing exercise behavior. Behavior Modification, 8, 3-21.

Kispert, C. P., & Nielsen, D. H. (1985). Normal cardiopulmonary responses to acute-and chronic-strengthening and endurance exercises. Physical Therapy, 65, 1828-1831.

Konig, K. (1978). Organization of rehabilitation centres. Advances in Cardiology, 24, 136-145.

Kornfeld, D. S., Heller, S. S., Frank, K. A., Wilson. S. N., & Malm, J. R. (1982). Psychological and behavioral responses after coronary artery bypass surgery. Circulation, 66, III-24-III-28.

Krantz, David S. (1980). Cognitive processes and recovery from heart attack: A review and theoretical analysis. Journal of Human Stress, 6, 27-38.

LaMendola, W. F. & Pellegrini, R. V. (1979). Quality of life and coronary artery bypass surgery patients. Social Science and Medicine, 13 A, 457-461.

Lamkin, Randy. (1983). Helping patients accept personal responsibility. Patient Education Newsletter, 6, 5-6.

Laslett, L. J., Paumer, L., & Amsterdam, E. A. (1985). Increase in myocardial oxygen consumption indexes by exercise training at onset of ischemia in patients with coronary artery disease. Circulation, 71, 958-962.

Leech, Peter. (1976). Emotional responses in the newly disabled adult. Unpublished manuscript.

Lee, Christina. (1985). Efficacy expectations as predictors of performance:

Meaningful measures of microanalytic match. Cognitive Therapy and Research, 9, 367-370.

Leon, Arthur S. (1985) Physical activity levels and coronary heart disease. Analysis of epidemiologic and supporting studies. Medical Clinics of North America, 69, 3-20.

Leventhal, H., & Cleary, P. D. (1979). Behavioral modification of risk factors: Technology or science? In M. L. Pollock & D. H. Schmidt (Eds.), Heart Disease and Rehabilitation (pp. 297-313). Boston, Ma.: Houghton Mifflin Professional Publishers.

Leventhal, Howard. (1973). Changing attitudes and habits to reduce risk factors in chronic disease. The American Journal of Cardiology, 31, 571-580.

Levinson, Daniel J. (1978). The Seasons of a Man's Life. New York: Ballantine Books.

Levit, K. R., Lazenby, H., Waldo, D. R., & Davidoff, L. M. (1985). National health expenditures, 1984. Health Care Financing Review, 7, 1-35.

Libb, J. W., & Clements, C. B. (1969). Token reinforcement in an exercise program for hospitalized geriatric patients. Perceptual and Motor Skills, 28, 957-958.

Loebel, J. P., & Eisdorfer, C. (1984). Psychological and psychiatric factors in the rehabilitation of the elderly. In T. F. Williams (Ed.), Rehabilitation in the Aging (pp. 41-57). New York: Raven Press.

Mackey v. Greenview Hospital Inc. 587 S. W. 2d 249.

Maddux, J. E. & Rogers, R. W. (1983). Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change. Journal of Experimental Social Psychology, 19, 469-479.

Maresh, C. M., Harbrecht, J. J., Flick, B. L., & Hartzler, G. O. (1985). Comparison of rehabilitation benefits after percutaneous transluminal coronary angioplasty and coronary artery bypass graft surgery. Journal of Cardiac Rehabilitation, 5, 124-130.

Marlatt, G. A., & Gordon, J. R. (1980). Determinants of relapse: Implications for the maintenance of behavior change. In P. O. Davidson, & S. M. Davidson (Eds.), Behavioral Medicine: Changing Health Lifestyles. New York: Brunner/ Mazel, Publishers.

Marshall, Julie A. Rovtar. (1985). Rehabilitation of the coronary bypass patient. CardioVascular Nursing, 21, 19-23.

Martin, J. E., & Dubbert, P. M. (1985). Adherence to exercise. Exercise and

Sport Science Reviews, 13, 137-167.

Martin, J. E., Dubbert, P. M. (1984). Behavioral management strategies for improving health and fitness. Journal of Cardiac Rehabilitation, 4, 200-208.

Martin, J. E., & Dubbert, P. M. (1982). Exercise applications and promotion in behavioral medicine: Current status and future directions. Journal of Consulting and Clinical Psychology, 50, 1004-1017.

Martin, J. E., Dubbert, P. M., Katell, A. D., Thompson, J. K., Raczynski, J. R., Lake, M., Smith, P. O., Webster, J. S., Sikora, T., Cohen, R. E. (1984b). Behavioral control of exercise in sedentary adults: Studies 1 through 6. Journal of Consulting and Clinical Psychology, 52, 795-811.

Maseri, Attilio. (1985). Treatment in the first year after MI. Cardiovascular Medicine, 10, 10-11.

Massie, J. F. & Shephard, R. J. (1971). Physiological and psychological effects of training. Medicine and Science in Sports, 3, 110-117.

Mathews, D. K., & Fox, E. L. (1976). The Physiological Basis of Physical Education and Athletics. Philadelphia, Pa.: W. B. Saunders Company.

May, Rollo. (1981). Freedom and Destiny. New York: Dell Publishing Co.

May, Rollo. (1953). Man's Search For Himself. New York: Dell Publishing Co.

Mayou, Richard. (1981). Effectiveness of cardiac rehabilitation. Journal of Psychosomatic Research, 25, 423-427.

Mayou, Richard A. (1983). A controlled trial of early rehabilitation after myocardial infarction. Journal of Cardiac Rehabilitation, 3, 397-402.

Mayou, R., Foster, A., & Williamson, B. (1978a). Psychosocial adjustment in patients one year after myocardial infarction. Journal of Psychosomatic Research, 22, 447-453.

Mayou, R., Williamson, B., & Foster, A. (1978b). Outcome two months after myocardial infarction. Journal of Psychosomatic Research, 22, 439-445.

Mayou, R., Foster, A., & Williamson, B. (1978c). Psychological and social effects of myocardial infarction on wives. British Medical Journal, 1, 699-701.

McArdle, W. D., Katch, F. I., & Katch, V. L. (1986). Exercise Physiology. Energy, Nutrition, and Human Performance (2nd Ed.). Philadelphia, Pa.: Lea & Febiger (pp. 151-152).

McAuley, E. & Gill, D. (1983). Reliability and validity of the physical self-efficacy scale in a competitive sport setting. Journal of Sport Psychology, 5, 410-418.

McAuley, Edward. (1985). Modeling and self-efficacy: A test of Bandura's model. Journal of Sport Psychology, 7, 283-295.

McGlynn, George. (1987). Dynamics of Fitness. Dubuque, Iowa: Wm. C. Brown Publishers.

McMahon, M., Miller, Sr., P., Wikoff, R., Garrett, M. J., & Ringel, K. (1986). Life situations, health beliefs, and medical regimen adherence of patients with myocardial infarction. Heart & Lung, 15, 82-86.

Meier, B., Gruentzig, A. R., Siegenthaler, W. E., & Schlumpf, M. (1983). Long-term exercise performance after percutaneous transluminal coronary angioplasty and coronary artery bypass grafting. Circulation, 68, 796-802.

Merwin, S. L. & Abram, H. S. (1977). Psychologic response to coronary artery bypass. Southern Medical Journal, 70, 153-155.

Metier, C. P., Pollock, M. L., & Graves, J. E. (1986). Exercise prescription for the coronary artery bypass graft surgery patient. Journal of Cardiopulmonary Rehabilitation, 6, 85-103.

Meyer, G. C., & Hensel, P. K. (1983). Cardiac rehabilitation. State of the art cardiac treatment centers. Journal of Cardiac Rehabilitation, 3, 130-132.

Meyer, G. Curt. (1984). Telemetry electrocardiographic monitoring in cardiac rehabilitation: How long? How often? In L. K. Hall, G. C. Meyer, H. K. Hellerstein (Eds.), Cardiac Rehabilitation: Exercise Testing and Prescription (pp. 393-402). New York: Spectrum Publications, Inc.

Meyer, G. Curt. (1985). Cardiovascular rehabilitation: A discipline in need of a new direction? Journal of Cardiopulmonary Rehabilitation, 5, 507-509.

Miller, Miriam D. (1984). Chronic illness intervention model applied to the cardiac client. In L. K. Hall, G. C. Meyer, & H. K. Hellerstein (Eds.), Cardiac Rehabilitation: Exercise Testing and Prescription (pp. 305-319). New York: Spectrum Publications, Inc.

Miller, N. H., Haskell, W. L., Berra, K., & DeBusk, R. F. (1984). Home versus group exercise training for increasing functional capacity after myocardial infarction. Circulation, 70, 645-649.

Miller, P., Sr., Johnson, N. L., Garrett, M. J., Wickoff, R. & McMahon, M. (1982a). Health beliefs of and adherence to the medical regimen by patients with ischemic heart disease. Heart & Lung, 11, 332-339.

Miller, P., Sr., Johnson, N. L., Wikoff, R., McMahon, M. F., & Garrett, M. J.

(1983). Attitudes and regimen adherence of myocardial infarction and cardiac bypass patients. Journal of Cardiac Rehabilitation, 3, 541-548.

Miller, P., Sr., McMahon, M., Garrett, M. J., & Johnson, N. L. (1982b). Values of regimen compliance as perceived by ischemic heart disease patients. Health Values: Achieving High Level Wellness, 6, 7-12.

Miller, P., Sr., Wikoff, R. L., McMahon, M., Garrett, M. J., & Ringel, K. (1985). Indicators of medical regimen adherence for myocardial infarction patients. Nursing Research, 34, 268-272.

Naughton, John. (1985). Role of physical activity as a secondary intervention for healed myocardial infarction. American Journal of Cardiology, 55, 21D-26D.

Naughton, John. (1977). Cardiac rehabilitation: Principles, techniques and applications. In E. A. Amsterdam, J. H. Wilmore, & A. N. DeMaria (Eds.), Exercise in Cardiovascular Health and Disease. (p. 364-376). New York: Yorke Medical Books.

Neufeld, Victor R. (1976). Patient education: A critique. In D. L. Sackett & R. B. Haynes (Eds.), Compliance with Therapeutic Regimens (pp. 83-92). Baltimore: Johns Hopkins University Press.

Newton, K. M., Sivarajan, E. S., & Clarke, J. L. (1985). Patient perceptions of risk factor changes and cardiac rehabilitation outcomes after myocardial infarction. Journal of Cardiac Rehabilitation, 5, 159-168.

Nutter, Donald O. (1979). Exercise and the heart. In J. W. Hurst (Ed.), The Heart, Update I (pp. 235-258). New York: Mc Graw-Hill Book Company.

Nygaard, G. & Boone, T. H. (1981). Law for physical educators and coaches. Salt Lake City, Utah: Brighton Publishing Company.

Okwumabua, T. M., Meyers, A. W., Schleser, R., Cooke, C. J. (1983). Cognitive strategies and running performance: An exploratory study. Cognitive Therapy and Research, 7, 363-370.

Oldridge, N. B. (1984c). Adherence to adult exercise fitness programs. In J. D. Matarazzo, S. M. Weiss, J. A. Herd, N. E. Miller, S. M. Weiss (Eds.), Behavioral Health--A Handbook of Health Enhancement and Disease Prevention (pp. 467-487). New York: John Wiley & Sons.

Oldridge, N. B. (1979b). Compliance with exercise programs. In M. L. Pollock & D. H. Schmidt (Eds.), Heart Disease and Rehabilitation (pp. 619-629). Boston, Ma.: Houghton-Mifflin Professional Publishers.

Oldridge, N. B., Donner, A. P., Buck, C. W., Jones, N. L., Andrew, G. M., Parker, J. O., Cunningham, D. A., Kavanagh, T., Rechnitzer, P. A., & Sutton, J. R. (1983a). Predictors of dropout from cardiac exercise rehabilitation. Ontario Exercise-Heart Collaborative Study. American Journal of Cardiology, 51, 70-74.

Oldridge, N. B. & Jones, N. L. (1983b). Improving patient compliance in cardiac exercise rehabilitation: Effects of written agreement and self-monitoring. Journal of Cardiac Rehabilitation, 3, 257-262.

Oldridge, N. B. & Spencer, J. (1985). Exercise habits and perceptions before and after graduation or dropout from supervised cardiac exercise rehabilitation. Journal of Cardiopulmonary Rehabilitation, 5, 313-319.

Oldridge, N. B. & Stoedefalke, K. G. (1984). Compliance and motivation in cardiac exercise programs. Clinics in Sports Medicine, 3, 443-454.

Oldridge, N. B., Wicks J. R. , Hanley C., Sutton J. R., & Jones N. L. (1978). Noncompliance in an exercise rehabilitation program for men who have suffered a myocardial infarction. Canadian Medical Association Journal, 118, 361-364.

Oldridge, Neil B. (1986). Cardiac rehabilitation, self-responsibility, and quality of life. Journal of Cardiopulmonary Rehabilitation, 6, 153-156.

Oldridge, Neil B. (1984a). Efficacy and effectiveness: Critical issues in exercise and compliance. Journal of Cardiac Rehabilitation, 4, 119.

Oldridge, Neil B. (1984b). Compliance and dropout in cardiac exercise rehabilitation. Journal of Cardiac Rehabilitation, 4, 166-177.

Oldridge, Neil B. (1982). Compliance and exercise in primary and secondary prevention of coronary heart disease: A review. Preventive Medicine, 11, 56-70.

Oldridge, Neil B. (1979a). The role of physiologists in exercise testing and training. In R. M. Levenson, M. Maxon, B. L. Altom (Eds.), Alternatives in Cardiac Care: Prevention and Rehabilitation Conference (pp. 23-27). Dallas, Texas: American Heart Association.

O'Leary, Ann. (1985). Self-efficacy and health. Behaviour Research and Therapy, 23, 437-451.

Painter, P. L. & Hanson, P. (1984). Isometric exercise: Implications for cardiac rehabilitation. In L. K. Hall, G. C. Meyer, H. K. Hellerstein (Eds.), Cardiac Rehabilitation: Exercise Testing and Prescription. New York: Spectrum Publications, Inc. (pp. 223-242).

Paris, Stanley V. & Patla, C. (1986). Introduction to extremity dysfunction & manipulation. Atlanta, Ga.: Institute Press.

Peck, Carl C. (1980). Should we improve patient compliance with therapeutic regimens, and, if so, how? In L. Lasagna (Ed.), Controversies in

Therapeutics (pp. 559-566). Philadelphia: W. B. Saunders Company.

Pender, N. J. & Pender A. R. (1986). Attitudes, subjective norms, and intentions to engage in health behaviors. Nursing Research, 35, 15-18.

Pennebaker, J. W., & Lightner, J. M. (1980). Competition of internal and external information in an exercise setting. Journal of Personality and Social Psychology, 39, 165-174.

Plotnick, G. D., Becker, L. C., & Fisher, M. L. (1986). Changes in left ventricular function during recovery from upright bicycle exercise in normal persons and patients with coronary artery disease. American Journal of Cardiology, 58, 247-251.

Pollock, Michael L. (1985). Exercise regimens after myocardial revascularization surgery: Rationale and results. Cardiovascular Clinics, 15, 159-174.

Pollock, M. L., Wilmore, J. H., & Fox, III, S. M. (1984). Exercise in Health and Disease. Evaluation and Prescription for Prevention and Rehabilitation. Philadelphia: W. B. Saunders Company.

Pollock, M. L., Wilmore, J. H., & Fox, S. M. (1978). Health and Fitness Through Physical Activity. New York: John Wiley and Sons.

Pomerleau, O., Bass, F., & Crown V. (1975). Role of behavior modification in preventive medicine. The New England Journal of Medicine, 292, 1277-1282.

Porter, L. W. & Lawler, III, E. E. (1968). Managerial Attitudes and Performance. Homewood, Ill.: Richard D. Irwin, Inc.

Pratt, C. M., Welton, D. E., Squires, W. G., Kirby, T. E., Hartung, G. H., & Miller, R. R. (1981). Demonstration of training effect during chronic beta-adrenergic blockade in patients with coronary artery disease. Circulation, 64, 1125-1129.

Prosser, G., Carson, P., Phillips, R., Gelson, A., Buch, N., Tucker, H., Neophytou, M., Lloyd, M., & Simpson, T. (1981). Morale in coronary patients following an exercise programme. Journal of Psychosomatic Research, 25, 587-593.

Pyfer, H. R., & Doane, B. L. (1973). Aspects of community exercise programs--Economic aspects of cardiac rehabilitation programs. In J. Naughton & H. K. Hellerstein (Eds.), Exercise Testing and Exercise Training in Coronary Heart Disease (pp. 365-369). New York: Academic Press.

Radley, A. & Green, R. (1985). Styles of adjustment to coronary graft surgery. Social Science and Medicine, 20, 461-472.

Ramshaw, J. E. & Stanley, G. (1981). Individual differences in life-style response to coronary artery bypass surgery. British Journal of Medical Psychology, 54, 83-89.

Raymond, M., Conklin, C., Schaeffer, J., Newstadt, G., Matloff, J. M., & Gray, R. J. (1984). Coping with transient intellectual dysfunction after coronary bypass surgery. Heart & Lung, 13, 531-539.

Rechnitzer, P. A., Pickard, H. A., Paivio, A. U., Yuhasz, M. S., & Cunningham, D. (1972). Long-term follow-up study of survival and recurrence rates following myocardial infarction in exercising and control subjects. Circulation, 45, 853-857.

Redd, W. H., Porterfield, A. L., & Andersen, B. L. (1979). Behavior Modification: Behavioral Approaches to Human Problems. New York: Random House.

Reith, Catherine A. (1984). Warm-up and cool-down. In L. K. Hall, G. C. Meyer, H. K. Hellerstein (Eds.), Cardiac Rehabilitation: Exercise Testing and Prescription (pp. 243-254). New York: Spectrum Publications, Inc.

Rejeski, W. J., Morley, D., & Miller, Jr., H. S. (1984). The Jenkins Activity Survey: Exploring its relationship with compliance to exercise prescription and MET gain within a cardiac rehabilitation setting. Journal of Cardiac Rehabilitation, 4, 90-94.

Rejeski, W. J., Morley, D., & Sotile, W. (1985). Cardiac rehabilitation: A conceptual framework for psychologic assessment. Journal of Cardiac Rehabilitation, 5, 172-180.

Rigotti, N. A., Thomas, G. S., & Leaf, A. (1983). Exercise and coronary heart disease. In W. P. Creger, A. H. Coggons, & B. W. Hancock (Eds.), Annual Review of Medicine: Selected Topics in the Clinical Sciences (pp. 391-412). Palo Alto, Ca.: Annual Reviews, Inc.

Rinke, Charlotte M. (Ed.). (1986). Standards and guidelines for cardiopulmonary resuscitation (CPR) and emergency cardiac care (ECC) (Special Issue). The Journal of the American Medical Association, 255 (21).

Robinson, G., Froelicher, V. F., & Utley, J. R. (1984). Rehabilitation of the coronary artery bypass graft surgery patient. Journal of Cardiac Rehabilitation, 4, 74-86.

Roman, Oscar. (1985). Do randomized trials support the use of cardiac rehabilitation? Journal of Cardiac Rehabilitation, 5, 93-96.

Rosenman, Ray H. (1982). Role of type A behavior pattern in the pathogenesis and prognosis of ischemic heart disease. Advances in

Cardiology, 29, 77-84.

Roviaro, S., Holmes, D. S., & Holmsten, R. D. (1984). Influence of a cardiac rehabilitation program on the cardiovascular, psychological, and social functioning of cardiac patients. Journal of Behavioral Medicine, 7, 61-81.

Ryckman, R. M., Robbins, M. A., Thorton, B., & Cantrell, P. (1982). Development and validation of a physical self-efficacy scale. Journal of Personality and Social Psychology, 42, 891-900.

Sackett, D. L. (1980). Is there a patient compliance problem? If so, what do we do about it? In L. Lasagna (Ed.), Controversies in Therapeutics (pp. 552-558). Philadelphia: W. B. Saunders Company.

Sackett, D. L., & Snow, J. C. (1979). The magnitude of compliance and noncompliance. In R. B. Haynes, D. W. Taylor, & D. L. Sackett (Eds.), Compliance in Health Care (pp. 11-22). Baltimore, Md.: Johns Hopkins University Press.

Sackett, David L. (1976). Introduction. In D. L. Sackett & R. B. Haynes (Eds.), Compliance with Therapeutic Regimens (pp. 1-6). Baltimore, Md.: Johns Hopkins University Press.

Salminen, Simo. (1985). Perceived health and exercise: A cross-lagged panel correlation. Perceptual and Motor Skills, 60, 637-638.

Sanne, Harald. (1978). Physiology of training in normals and coronary patients. Advances in Cardiology: Cardiac Rehabilitation, 24, 57-66.

Savin, W. M., Haskell, W. L., Miller, N. H., DeBusk, R. F. (1981). Improvement in aerobic capacity soon after myocardial infarction. Journal of Cardiac Rehabilitation, 1, 337-342.

Scheuer, James. (1982). Effects of physical training on myocardial vascularity and perfusion. Circulation, 66, 491-495.

Schunk, D. H. & Carbonari, J. P. (1984). Self-efficacy models. In J. D. Matarazzo, S. M. Weiss, J. A. Herd, N. E. Miller & S. Weiss (Eds.). Behavioral Health--A Handbook of Health Enhancement and Disease Prevention (pp. 230-247). New York: John Wiley & Sons.

Sharkey, Brian J. (1979). Physiology of Fitness. Champaign, Il.: Human Kinetics Publishers.

Shaw, Lawrence W. (1981). Effects of a prescribed supervised exercise program on mortality and cardiovascular morbity in patients after a myocardial infarction. The National Exercise and Heart Disease Project. The American Journal of Cardiology, 48, 39-46.

Shaw, R. E., Cohen, F., Doyle, B., & Palesky, J. (1985). The impact of denial and repressive style on information gain and rehabilitation outcomes in myocardial infarction patients. Psychosomatic Medicine, 47, 262-273.

Sheldahl, L. M., Wilke, N. A., Tristani, F. E., & Kalbfleisch, J. H. (1983). Response of patients after myocardial infarction to carrying a graded series of weight loads. American Journal of Cardiology, 52, 698-703.

Shephard, R. J., Corey, P., & Kavanagh T. (1981). Exercise compliance and the prevention of a recurrence of myocardial infarction. Medicine and Science in Sports and Exercise, 13, 1-5.

Shephard, R. J., Kavanagh, T., & Klavora, P. (1985). Mood state during postcoronary cardiac rehabilitation. Journal of Cardiopulmonary Rehabilitation, 5, 480-484.

Shephard, Roy J. (1985a). The impact of exercise upon medical costs. Sports Medicine, 2, 133-143.

Shephard, Roy J. (1985b). Motivation: The key to fitness compliance. The Physician and Sportsmedicine, 13, 88-101.

Shephard, Roy J. (1983). The value of exercise in ischemic heart disease: A cumulative analysis. Journal of Cardiac Rehabilitation, 3, 294-298.

Shephard, Roy J. (1979). Cardiac rehabilitation in prospect. In M. L. Pollock & D. H. Schmidt (Eds.), Heart Disease and Rehabilitation (pp. 521-547). Boston, Ma.: Houghton-Mifflin Professional Publishers.

Sikorski, Joseline Maria. (1985). Knowledge, concerns, and questions of wives of convalescent coronary artery bypass graft surgery patients. Journal of Cardiac Rehabilitation, 5, 74-85.

Soloff, Paul H. (1978-1979). Medically and surgically treated coronary patients in cardiovascular rehabilitation: A comparative study. The International Journal of Psychiatry in Medicine, 9, 93-106.

Soloff, Paul H. (1977-1978). Denial and rehabilitation of the post-infarction patient. The International Journal of Psychiatry in Medicine, 8, 125-132.

Solomon, Harold S. (1980). How to improve patient compliance. In L. Lasagna (Ed.), Controversies in Therapeutics (pp. 567-572). Philadelphia: W. B. Saunders Company.

Smith, L. Kent. (1986). Cardiac rehabilitation: Nice but not necessary? Journal of Cardiopulmonary Rehabilitation, 6, 83-84.

Spicer, Myrna R. (1983). Cardiac rehabilitation. In R. G. Sanderson & C. L. Kurth (Eds.), The Cardiac Patient. A Comprehensive Approach (pp.

505-531). Philadelphia: W. B. Saunders Company.

Spokane Cardiac Rehabilitation. (1986). Spokane Cardiac Rehabilitation Cardiogram, 8, Spokane, Wa.: Spokane Cardiac Rehabilitation.

Springer, James R. (1985). The family with a chronically ill adult. Family Therapy Collections, 13, 83-104.

Stanton, B. A., Jenkins, C. D., Savageau, J. A., Harken, D. E., & Aucoin, R. (1984). Perceived adequacy of patient education and fears and adjustments after cardiac surgery. Heart & Lung, 13, 525-531.

Steinhart, Melvin J. (1984). Emotional Aspects of Coronary Artery Disease. Kalamazoo, MI.: Upjohn Company.

Stern, M. J., & Cleary, P. (1982). The National Exercise and Heart Disease Project. Long-term psychosocial outcome. Archives of Internal Medicine, 142, 1093-1097.

Stern, M. J., Pascle, L., & Ackerman, A. (1977). Life adjustment postmyocardial infarction. Archives of Internal Medicine, 137, 1680-1685.

Stone, John R. (Lecture). (1987). Cardiac physiology. Missoula, Montana: Saint Patrick Hospital.

Stotlar, David. (1986). Applying legal concepts in strength and conditioning programs. National Strength and Conditioning Association Journal, 8, 77-78.

Suinn, Robert M. (1980). Psychology in Sports, Methods and Applications. Minneapolis, Mn.: Burgess Publishing Company.

Taylor, C. B., Bandura, A., Ewart, C. K., Miller, N. H., & DeBusk, R. F. (1985). Exercise testing to enhance wives' confidence in their husbands' cardiac capability soon after clinically uncomplicated acute myocardial infarction. American Journal of Cardiology, 55, 635-638.

Temkin, Lawrence P. (1983). Isometric exercise--A danger or a benefit? Arizona Medicine, 40, 380-383.

Thomas, S. A., Sappington, E., Gross, H. S., Noctor, M., Friedmann, E., Lynch, J. J. (1983). Denial in coronary care patients--An objective reassessment. Heart & Lung, 12, 74-80.

Thompson, C. E., & Wankel, L. M. (1980). The effects of perceived activity choice upon frequency of exercise behavior. Journal of Applied Social Psychology, 10, 436-443.

Thompson, Paul D. (1985). The cardiovascular risks of cardiac rehabilitation.

Journal of Cardiopulmonary Rehabilitation, 5, 321-324.

Thurer, S., Levine, F., & Thurer, R. (1980-1981). The psychodynamic impact of coronary bypass surgery. The International Journal of Psychiatry in Medicine, 10, 273-290.

Tirrell, B. E., & Hart, L. K. (1980). The relationship of health beliefs and knowledge to exercise compliance in patients after coronary bypass. Heart & Lung, 9, 487-493.

Ulmer, Raymond A. (1982). Patient noncompliance documentation: A tactic for successful medical malpractice prevention and defense. Medical Trial Technique Quarterly, 28, 361-374.

Vaisrub, Samuel. (1975). You can lead a horse to water.... The Journal of the American Medical Association, 234, 80-81.

Vedin, A., Wilhelmsson, C., Tibblin, G., & Wilhelmsen, L. (1976). The postinfarction clinic in Goteborg, Sweden. Acta Medica Scandinavia, 200, 453-456.

Velasco, J. A. & Tormo, V. (1982). Influence of duration of cardiac rehabilitation on myocardial infarction patients. Journal of Cardiac Rehabilitation, 2, 243-246.

Vermueulen, A., Lie, K. I., & Durrer, D. (1983). Effects of cardiac rehabilitation after myocardial infarction: Changes in coronary risk factors and long-term prognosis. American Heart Journal, 105, 798-801.

Walker, Weldon J. (1983). Changing U. S. lifestyle and declining vascular mortality--A retrospective. New England Journal of Medicine, 308, 649-651.

Wankel, Leonard M. (1984). Decision-making and social support strategies for increasing exercise involvement. Journal of Cardiac Rehabilitation, 4, 124-135.

Wankel, L. M., & Thompson, C. (1977). Motivating people to be physically active: Self-persuasion vs. balanced decision making. Journal of Applied Social Psychology, 7, 332-340.

Ward, A. & Morgan, W. P. (1984). Adherence patterns of healthy men and women enrolled in an adult exercise program. Journal of Cardiac Rehabilitation, 4, 143-152.

Weinstein, Milton C. (1985). Cost-effectiveness of interventions to prevent or treat coronary heart disease. Annual Review in Public Health, 6, 41-63.

Wenger, N. K. & Fletcher, G. F. (1985). Rehabilitation of the patient with atherosclerotic coronary heart disease. In J. W. Hurst (Ed.), The Heart (pp. 1025-1037). New York: McGraw-Hill.

Wenger, N. K., Mattson, M. E., Furberg, C. D., & Elinson, J. (1984). Assessment of quality of life in clinical trails of cardiovascular therapies. American Journal of Cardiology, 54, 908-913.

Wenger, Nanette Kass. (1984). Cardiovascular status: Changes with aging. In T. F. Williams (Ed.), Rehabilitation in the Aging (pp. 1-11). New York: Raven Press.

Wenger, Nanette K. (1979). Rehabilitation after myocardial infarction. The Journal of the American Medical Association, 242, 2879-2881.

Wiklund, I., Sanne, H., Elmfeldt, D., Vedin, A., & Wilhelmsson, C. (1984a). Emotional reaction, health preoccupation and sexual activity two months after a myocardial infarction. Scandinavian Journal of Rehabilitation Medicine, 16, 47-56.

Wiklund, I., Sanne, H., Vedin, A., & Wilhelmsson, C. (1984b). Sick-role and attitude towards disease and working life two months after a myocardial infarction. Scandinavian Journal of Rehabilitation Medicine, 16, 57-64.

Wilhelmsen, L., Sanne, H., Elmfeldt, D., Grimby, G., Tibblin, G., & Wedel, H. (1975). A controlled trial of physical training after myocardial infarction--Effects on risk factors, nonfatal reinfarction, and death. Preventive Medicine, 4, 491-508.

Wilke, N. A., Sheldahl, L. M., Tristani, F. E., Hughes, C. V., & Kalbfleisch, J. H. (1985). The safety of static-dynamic effort soon after myocardial infarction. American Heart Journal, 110, 542-545

Williams, Alan. (1985). Economics of coronary artery bypass grafting. British Medical Journal, 291, 326-329.

Williams, R. S., McKinnis, R. A., Cobb., F. R., Higginbotham, M. B., Wallace, A. G., Coleman, R. E., & Calliff, R. M. (1984). Effects of physical conditioning on left ventricular ejection fraction in patients with coronary artery disease. Circulation, 70, 69-75.

Wysocki, T., Hall, G., Iwata, B., & Riordan, M. (1979). Behavioral management of exercise: Contracting for aerobic points. Journal of Applied Behavior Analysis, 12, 55-64.

Zisook, S. & Gammon, E. (1980-1981). Medical noncompliance. The International Journal of Psychiatry in Medicine, 10, 291-303.