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Factors influencing compliance among cardiac rehabilitation clients

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Robinson, Marian Hildmen, M.S.

San Jose State University, 1989

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FACTORS INFLUENCING COMPLIANCE AMONG
CARDIAC REHABILITATION CLIENTS

A Thesis

Presented to

The Faculty of the Department of Nursing
San Jose State University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

By

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May 1989

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ABSTRACT

FACTORS INFLUENCING COMPLIANCE AMONG CARDIAC REHABILITATION CLIENTS

By Marian H. Robinson

This descriptive study was designed to identify factors influencing continued participation in the cardiac rehabilitation exercise program (CREP). In addition, it attempted to support the applicability of the Health Belief Model (HBM) in predicting continued compliance in the CREP. Thirty-eight men and 1 woman with diagnosed cardiovascular disease who had been enrolled in the CREP for at least 6 months were surveyed. A structured questionnaire developed by the investigator using the HBM as framework was the study instrument. The data were analyzed using descriptive statistics. The HBM demonstrated increased tendencies toward compliance among the participants surveyed, thus supporting the applicability of the HBM in predicting continued participation in the CREP. The most significant factors identified were the perceived benefits from the CREP, a social support network, knowledge of the individual risk factors, motivation toward healthful practices, and belief in one's susceptibility to heart disease.

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Chapter 1

INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of death in the United States. An estimated 15% of the adult population was diagnosed with CVD in 1985. The annual cost of CVD in 1985 was estimated at \$72.1 billion (American Heart Association (AHA) Fact Sheet, 1985). However, it is impossible to place a monetary value on the losses and disruptions in the family lives, careers, and other plans that persons with CVD will experience during the course of their disease. It is, therefore, clear that the significance of CVD to the individual's and the society's health cannot be over emphasized.

There is growing evidence that regular exercise has a positive effect on the cardiovascular system, thereby providing some protection from several CVD risk factors (McMahon & Palmer, 1985). Early ambulation, with a continued gradual increase in exercise in the post myocardial infarction (MI) phase, is a major contributing factor in the return to pre-illness employment as early as 2-3 months post MI in 85% of individuals with uncomplicated MI (Wenger, 1981). A cardiac rehabilitation exercise program (CREP) provides a structured exercise regimen and personnel that supervise the safe execution of the prescribed activities. Compliance with such an exercise

program may significantly facilitate early return to pre-illness activities (Wenger, 1981). In addition, it offers some clinical, physiological, and psychological benefits to clients with CVD (Oldridge & Stoedefalke, 1984). Consequently, the individual's productivity is enhanced as well as medical costs being contained. Therefore, a study focused on identification of factors influencing compliance in participation in a CREP will not only benefit the patient and family, but society as well.

One of the nursing profession's biggest goals is to promote and maintain wellness in order to keep a healthy and productive society. The significance of this study to nursing lies in its effort to identify factors that will promote compliance in an activity that promises health promotion and disease prevention consequences.

Statement of the Problem

Compliance with medical advice and health promotion activities, such as regular exercise, is often a problem among patients. An average of 30% of the client population is noncompliant with health care advice (Haynes, Taylor, & Sackett, 1979, p. 3). A higher percentage of noncompliance was found among clients participating in CREPs. An estimated 50% of these clients drop out of the CREP (Oldridge, 1982).

Several negative occurrences or situations are attributed to noncompliance. A few of these are

(a) generation of additional health care costs; (b) exacerbation of the incidence of many usually preventable illnesses; (c) prolongation of episodes of illness, including increases in severity and number of complications experienced; (d) the necessity for longer, more extensive treatment regimens; and (e) the increased loss of employment days (Baer, 1986, pp. 78-79). Thus, noncompliance generates problems, not only for the sick individual and family, but also affects society as a whole. A survey of the factors that influence compliance in the CREP, derived from the personal experiences of the clients, will provide a very valuable contribution to developing strategies to enhance compliance.

The Health Belief Model (HBM), one of the conceptual frameworks of this study, provides an explanation for the likelihood of an individual complying with recommended health actions. The individual's likelihood to undertake recommended health actions is dependent on perception of the seriousness of a specific disease and perception of susceptibility or re-susceptibility to this disease. In addition, other variables may influence compliance with the recommended health action. These are (a) demographics, i.e. age, sex, ethnicity; (b) sociopsychological, i.e. personality, social class, peer and reference-group pressure; (c) structural variables, i.e. knowledge of risk factors; and (d) other motivating factors such as mass

media campaigns, advice from health personnel, and recommendation from family members (Becker, Drachman, & Kirscht, 1974).

Objectives and Questions

The objectives of this study were to (a) identify factors influencing compliance with participation in the CREP and (b) attempt to demonstrate support for the concepts of the HBM.

The questions raised are:

1. What factors influence compliance with participation in the CREP among clients with cardiovascular disease diagnosis who have been with the program for at least 6 months?

2. Will the identified factors influencing the compliance with participation in the CREP support the concepts of the HBM?

Purpose and Need

The purpose of this study was to explore the factors that enhance compliance in the CREP. Knowledge of these factors will contribute significantly to the maintenance and promotion of compliance in this CREP and other CREPs. In addition, agencies who are planning to open a CREP may refer to these identified factors in planning compliance strategies.

Definition of Terms

Conceptual Definitions

1. Cardiovascular disease (CVD) is a condition with pathology relating to the heart and the blood vessels (AHA Fact Sheet, 1985).
2. Coronary artery disease (CAD) is a specific form of CVD in which fatty deposits build up inside the coronary arteries, the arteries which feed the heart muscle itself (Department of Health, Education, & Welfare, 1971).
3. Compliance is the extent to which a person's behavior (in terms of taking medications, following diets, or executing lifestyle changes) coincides with medical or health advice. The term adherence may be used interchangeably with compliance (Haynes et al., 1979, pp. 1-2).
4. Dynamic exercise is frequently equated with aerobic or isotonic exercise. This activity involves repetitive activities of large muscle groups performed with little resistance to movement and results in changes in muscle length with minimal change in tension. Examples are brisk walking, jogging, and cycling (McMahon & Palmer, 1985, p. 57).
5. Target heart rates are two types: (a) exercise target pulse rate is 85% of the highest level of heart rate safely achieved at the treadmill exercise testing, and (b) the cool-down target pulse rate is 60% of the highest

level of heart rate safely achieved at treadmill exercise testing.

6. Symptom-limited graded exercise test is a type of treadmill test which consists of a series of timed periods of walking or running on a treadmill in which the workload is gradually increased. The client's electrocardiogram, heart rate, blood pressure, and occurrence of chest pain are monitored throughout the test. This test shows the maximum physical activity the patient can safely perform without the onset of chest pain, ischemic changes in the EKG, exercise-induced dysrhythmia, or hypotension.

Operational Definitions

1. Cardiac Rehabilitation Program (CRP) is a structured program which offers supervised exercise sessions, treadmill exercise tests, electrocardiograms, psychological support, and risk factor education to clients with CVD.

2. Cardiac rehabilitation exercise program is one of the major components of a Cardiac Rehabilitation Program. It includes the exercise prescription which will be discussed in operational definition number three.

3. Prescribed components of the exercise program are:
(a) the intensity of the exercise aims at stressing the cardiovascular system to a previously calculated target heart rate (HR). The target HR is achieved through any continuous activity that raises the HR 60% to 85% of the way

between resting and maximum; (b) the duration of the exercise is the amount of time the individual will exercise at the target HR; (c) frequency of the exercise is the number of days per week the exercise is performed at a specific intensity and duration; and (d) type of exercise is the dynamic exercise that keeps the HR elevated to the target HR throughout the duration of the exercise (Runyan, 1986).

4. Dynamic exercises in the CREP are series of exercises divided into three phases. These phases are: (a) warm-up calisthenics, lasting for 20 minutes; (b) aerobic, including brisk walking, cycling, jogging, and rowing, and lasting for 30 minutes; and (c) cool-down or relaxation calisthenics, lasting for 10 minutes. The exercise class meets 3 days per week every other day; two registered nurses and an exercise therapist supervise. During the exercise class, clients are instructed to check their pulse rates to make sure they reach, but do not exceed, their target heart rates. Target heart rates are predetermined on an individual basis through treadmill testing before clients start.

5. Palo Alto, Young Men Christian Association (YMCA) CRP is a CRP designed for outpatients with CAD referred by a cardiologist. Its population includes clients (a) at least 3 weeks post uncomplicated MI, (b) at least 4 weeks post uncomplicated coronary artery bypass surgery, (c) stable

after uncomplicated coronary angioplasty, and (d) with high risk factors to CAD. The purposes of the program are to: (a) provide high quality medical care, emotional support, and health education to individuals with CAD; (b) improve cardiovascular function; and (c) minimize coronary artery risk factors.

6. Compliance to the exercise program in the Palo Alto YMCA CRP is the continued participation in the CREP for at least 6 months.

Sample and Setting

The sample consisted of a convenience sample of 38 men and 1 woman, ages 50-75 years, with diagnosed cardiovascular disease and enrolled in the CREP for at least 6 months. All persons in the sample were currently residents of an urban area in northern California.

Research Design

The design of the study was descriptive and exploratory in nature. It identified facts, opinions, beliefs, and attitudes from the cardiac rehabilitation clients regarding their compliance with the exercise program.

Descriptive statistics were used to organize and summarize the data. Frequency distributions for qualitative data, with consequent conversion to percentages were used.

The variables described were (a) age, (b) sex, (c) marital status, (d) level of education, (e) ethnicity, (f) socioeconomic status, (g) perception of one's

susceptibility to CVD, (h) perception of the seriousness of CVD, (i) knowledge of one's risk factors to CVD, (j) perception of the efficacy of the exercise program, and (k) motivational factors that initiated participation in the program.

Variables controlled in this study were (a) membership in the CREP, (b) diagnosis with cardiovascular disease, and (c) 6 months participation in the CREP.

Data Collection

The data collection instrument was a questionnaire developed by the investigator based on the concepts of HBM. It was modeled after the interview questions on health care belief devised by Kellogg, Jacobson, Lettieri, and Kellogg (1986, pp. 66-69). It was piloted for clarity and content validity. It was tested for clarity by requesting five CREP clients to fill out the questionnaire. In addition, they were asked to list the number of the questions that were not clear to them. Content validity of the questionnaire was tested by presenting it for evaluation to four cardiac rehabilitation nurses. Analysis of the pilot tests resulted in a few modifications of the original questionnaire.

Scope and Limitation

The study included a small sample of 39 CREP clients between the ages of 45 and 80 years, living in an affluent urban area in northern California. This sample cannot be assumed to be representative of all CREP clients.

Therefore, results of the study cannot be generalized to the total population of CREP participants, but the results may be applied to CREP participants with similar attributes.

The study design used was descriptive and was exploratory in nature. The information obtained from this study is superficial. Additional studies on this topic are needed to obtain in-depth information of the factors influencing compliance to a CREP.

An unavoidable problem in using a questionnaire as a data collection instrument is the assurance of response accuracy. There is often no way of knowing whether the responses to the questions are indeed true. People are known to respond to questions in a way that makes them look good; this response style is known as social desirability. Since there is no way to tell whether the respondents are telling the truth or responding in a socially desirable way, the investigator assumed that the respondents were telling the truth (Wood & Haber, 1986, p. 161).

Chapter 2
CONCEPTUAL FRAMEWORKS AND REVIEW
OF THE LITERATURE

Conceptual Frameworks

All behaviors are motivated (Rosenstock, 1960); hence, compliance to a CREP is a behavior resulting from various motives and incentives. The most relevant social psychological theory related to incentives for compliance is the value-expectancy theory which attempts to describe behavior or decision-making uncertainty. This theory explains that behavior can be predicted from the value of an outcome and the expectancy that a given action will result in that outcome (Feather, 1959).

Health Belief Model

An example of the value-expectancy approach to predicting behavior is the Health Belief Model, one of the conceptual frameworks of this study. The basic components of the HBM are derived primarily from the work of Lewin (1935, p. 52). He conceptualized that behavior may be regarded as a function of a person's motives and of his beliefs about various opportunities for action. This principle, therefore, explains that health behavior is a function of a health motive or threat and the individual's beliefs about various courses of action open to him (Rosenstock, 1960).

The HBM was developed in the early 1950s by Rosenstock, Hochbaum, Kegeles, and Leventhal to provide a framework for exploring preventive behaviors (Becker et al., 1979, p. 78). According to the HBM, a person is likely to take preventive health action when he/she perceives one or more of the following: (a) susceptibility to a specific disease, (b) belief that a specific disease will have serious effects on his/her life if he/she should contract it, (c) certain actions can be implemented to minimize the likelihood of contracting the disease and minimize the severity of the disease, and/or (d) the effort of taking the action is less than the threat of the disease itself (Rosenstock, 1960).

The model further postulates that a relevant motivational stimulus must occur to trigger the appropriate health behavior. This stimulus could be internal, such as a life crisis or increase in the symptoms of the disease or it could be external, such as advice from a friend or a health professional (Becker, Maiman, Kirscht, Haefner, & Drachman, 1977).

Becker and Maiman (1975) developed a modification of the HBM. They added the following variables as modifiers to the preventive behavior: (a) demographic variables, (b) sociopsychological variables, (c) structural variables, and (c) cues to action. They also added the element of health motivation. This referred to a generalized state of intent that resulted in behaviors to maintain or improve

health, such as exercising regularly, maintaining a well balanced diet, and abstaining from smoking. A diagram of the modified model is shown in Figure 1.

The model as modified by Becker and Maiman is divided into three components: (a) individual perceptions, (b) modifying factors, and (c) variables affecting the likelihood of initiating action. Individual perceptions consist of perceived susceptibility and perceived seriousness. Perceived susceptibility refers to the individual's belief that he or she may contract a specific disease and/or the recurrence of a specific disease. To a person with CAD, this category may refer to a second MI, a recurrence of anginal symptoms, or a flaring up of other symptoms related to CAD. Perceived seriousness refers to the individual's belief that contracting or recurrence of a specific disease would have grave consequences for him/her. These consequences not only include clinical severity, but also effect on family relationships, finances, occupation, and role functions (Rosenstock, 1960). Perceived threat is the combination of perceived susceptibility and seriousness.

The modifying factors include demographic, sociopsychological, structural factors, and cue to action. Examples of these factors are given in Figure 1.

The variables affecting the likelihood of initiating action consist of perceived benefits and perceived barriers. Perceived benefits refer to the individual's belief of the

Figure 1. The Health Belief Model as predictor of preventive health behavior.

Note. From Sociobehavioral determinants of compliance with health and medical care recommendations, by Becker, M. H., and Maiman, L. A., 1975, *Medical Care*, 13(1), 10-24.

effectiveness of a specific behavior in reducing the threat of the condition (Champion, 1984). On the other hand, perceived barriers pertain to the negative aspect of the anticipated behavior. These barriers may be in the form of cost, inconvenience, or unpleasantness (Champion, 1984).

Orem's Self-Care Model

A very appropriate nursing model to use as a guide for a study involving clients' participation in a CREP is Dorothea Orem's Self-Care Model. The self-care model correlates with the HBM motivational concepts. An individual functioning in a self-care concept is manifesting highly motivated behavior toward health maintenance and health promotion. Such behavior is observed among CREP clients who continuously participate in the CREP. These clients are aware of their health deviation and are voluntarily taking steps in controlling it through a structured exercise and health education program.

Orem's (1985) Self-Care Model emphasizes the ability to perform self-care which is defined as "the practice of activities that individuals initiate and perform on their own behalf in maintaining life, health, and well-being" (p. 84). She terms the ability to care for oneself as self-care agency and the ability to care for others as dependent-care agency. The purposes of self-care or dependent-care are to meet three types of self-care requisites: universal, developmental, and health

deviation. Universal self-care requisites are necessary to life processes and the maintenance of human structure and function. These include (a) sufficient intake of air, food, and water; (b) adequate elimination processes; (c) prevention of hazards; (d) balanced periods of rest and activity; (e) balanced amounts of solitude and social interaction; and (f) promotion of normalcy (Orem, 1985, p. 92).

Developmental self-care requisites are associated with human developmental processes and with conditions and events occurring during various stages of the life cycle including events that can adversely affect development (Orem, 1985, p. 90). Health deviation self-care requisites arise from disabilities, deviations, or defects in human structure and function and from medical diagnosis and treatment of pathologic conditions (Orem, 1985, p. 90).

The CREP client's continued adherence to a prescribed activity, such as cardiac rehabilitation exercise, is one way of maintaining health and well-being and manifesting abilities to perform self-care. The CREP exercise activity assists the client to fulfill the three self-care requisites. Under the universal self-care requisites, exercise activity offers the CREP client balanced periods of rest and activity, provides social interaction, and promotes return to normal living after a cardiac event. Developmental self-care requisites are fulfilled in the CREP

through the provision of a very rich ground for socialization and peer support, thereby facilitating an easier transition through the developmental changes the client experiences after a cardiac event. Finally, exercise activity is known to have a positive effect in assisting with the restoration of physical and psychological function after a cardiac event (Staniloff, 1984), hence fulfilling the health deviation health care requisite.

Orem (1980) perceives the special concern of nursing as "the individual's need for self-care action and the provision and management of it on a continuous basis in order to sustain life and health, recover from disease or injury, and cope with their effects" (p. 6). The CREP nursing personnel function under this principle. They are available to clients to provide physical, social, and psychological support. Although the exercise program is done in groups, the progress of every client is evaluated individually by the CREP nursing personnel.

Literature Review

Health Belief Model

At the time the HBM was formulated, it was viewed as potentially useful in predicting primary and secondary preventive behaviors. By the 1970s, several studies had investigated the applicability of one or more concepts of the HBM in circumstances involving sick role and tertiary prevention (Becker & Maiman, 1975).

Kegeles (1963) studied the relationship between belief and attitudinal variables with preventive dental visits. Belief variables of susceptibility, severity, benefits, and barriers were measured via interviews and questionnaires among a sample of 430 factory workers. The study revealed that the largest number of preventive visits were made by persons exhibiting all of the four beliefs, and that as the number of the beliefs decreased, so did the number of preventive visits. Becker et al. (1977), in a quasi-experimental study, showed the general usefulness of the HBM in predicting and explaining mothers' adherence to a diet regimen prescribed for obese children. The HBM concepts that were evaluated were health motivation, illness threat, potential diet benefits and success, barriers to compliance, and control over health matters. The results of the study supported the concepts of the HBM in predicting and explaining mothers' adherence to a diet regimen prescribed for their obese children. Leavitt (1979) demonstrated a correlation between the HBM concepts of susceptibility, seriousness, and benefits with the utilization of ambulatory health services.

Hochbaum (1956) used the HBM in predicting secondary preventive behavior when he studied 1200 adults to identify the key factors underlying their decision to obtain a chest x-ray for detection of tuberculosis. He concluded that beliefs in susceptibility to tuberculosis and in the

benefits of the chest x-ray were the major factors in submitting to the chest x-ray. Fink, Shapiro, and Roester (1972) found that perception of personal susceptibility to breast cancer and belief in the seriousness of the disease were the major factors influencing participation in a breast abnormality cancer screening program.

Becker, Drachman, and Kirscht (1972) used the HBM in a sick-role setting. They investigated the relationship between HBM variables and mothers' adherence to giving medication to their children with otitis media. The study demonstrated a significant correlation between the presence of an antibiotic in the urine and the re-susceptibility, severity, benefits, barriers, and general health motivation. Similarly, Becker, Radius, and Rosenstock (1978) found that medication adherence for asthmatic children was significantly correlated with beliefs of susceptibility to asthma attacks, recognition of the severity of the attacks, and benefits of medication adherence. Parallel with the above studies, Haynes et al. (1976) concluded that health beliefs expressed 6 months after the initiation of taking hypertensive medication among 128 hypertensive men were consistent with compliance.

The literature has offered very few nursing studies on the application of the HBM concepts. Nurses like Holm, Fink, Christman, Reitz, and Ashly (1985), Hijeck (1984), and Champion (1984) used the HBM in their studies. Holm et al.

(1985) analyzed the health beliefs, health locus of control (HLOC), client satisfaction, social support, and self-motivation of a group of cardiac clients who initiated and completed a phase II outpatient cardiac exercise program. The analysis of the data showed perceptions of illness severity, re-susceptibility, and effectiveness of the cardiac exercise program contributed significantly to compliant behavior. Interestingly, general health motivation and cues to taking health-related actions did not reflect a tendency toward compliant behavior. Analysis of the other variables revealed a tendency of the clients to be externally controlled, satisfied with the program and staff, and recipients of social support. The two other nurses developed study tools using the HBM as a framework. Hijeck (1984) developed a questionnaire designed to assist cardiac rehabilitation nurses to predict clients' entry into a CREP. Champion (1984) developed a questionnaire testing the applicability of the HBM in breast examination screening for cancer. She tested her tool successfully for validity and reliability.

In summary, several studies supporting the applicability of the HBM have been documented. However, nursing research using the HBM as a framework lags behind.

Compliance in Cardiac Rehabilitation

Cardiac rehabilitation programs have been developed in an effort to improve clients' physical and psychological

adaptation subsequent to the diagnosis of CAD and CVD. These programs stressed life style modification beginning with identification of risk factors and including regular exercise training to improve cardiovascular function. Regular exercise has been generally accepted as a safe and appropriate component of the cardiac rehabilitation process in clinically suitable clients (AHA Committee Report, 1981). It is considered as a positive rather than a negative modality for both therapeutic and preventive purposes in the management of CVD. It has been linked to improvement of cardiovascular efficiency (Blackburn, 1983) and associated with a number of clinical, physiological, vocational, and psychological benefits (Oldridge & Stoedefalke, 1984).

It is therefore clear that a regular exercise program offered in a CREP is beneficial to clients. Continued compliance with such a program is the key factor in the achievement of the benefits from exercise (Oldridge & Jones, 1982).

Some studies and theories on the three general strategies for improving compliance (i.e., organizational, educational, and behavioral) have exhibited both positive and negative results and opinions. It was concluded (Young, 1986) that the most effective strategy is to use the strategies in combination, and whatever works is the best. Under the educational strategy, a study done by Sackett (1975) demonstrated conclusively that the compliance rate

had no relationship to knowledge of the disease. However, according to Kasl (1975), increased knowledge, not of the disease but of the treatment and the resulting effects, does increase compliance.

The following are four nursing studies involving compliance in a CREP. Eyherabide and Yates (1986) compared the level of exercise compliance among four groups of post coronary artery bypass surgery clients. Their study demonstrated a higher percentage of exercise compliance at a level congruent with the exercise prescription among those who exercised in groups at a CREP.

Klinger (1984), in a descriptive study, identified factors facilitating and inhibiting compliance with a cardiac rehabilitation regimen among post-MI clients. The major facilitating factors identified were (a) social support, particularly from the spouse; (b) faith in the judgement of the health professional making the recommendation; (c) personal traits such as determination, self-discipline, adaptability, patience, independence, and endurance; and (d) being retired from work. On the other hand, the major inhibiting factors were (a) personal priorities such as enjoying smoking and eating unhealthy food and job-imposed inactivity, (b) adverse weather conditions, (c) forgetting to take medication or to follow medical advice, (d) concurrent illness, (e) cardiac related symptoms, and (f) social pressure towards smoking and

eating.

Kinnaird, Yoham, and Kieval (1982) presented four case studies describing the compliance attitudes of four clients toward a cardiac rehabilitation regimen. The first case involved a 41 year old, post-MI, computer executive who was convinced to comply with the cardiac rehabilitation regimen by the employment of health education and social support strategies. The second case was a typical client functioning under the concepts of the HBM. His beliefs concerning the seriousness of his heart illness, his re-susceptibility to another MI, and the benefits derived from a cardiac rehabilitation regimen influenced almost every aspect of his rehabilitation. The third case was a 40 year old, post-MI, advertising executive who rejected every strategy employed to assist him to comply with the cardiac rehabilitation regimen. The investigators considered his noncompliance the freedom of an adult to choose which direction he wanted to go. The fourth case was a 69 year old woman who developed angina and was referred to the CREP to increase her exercise tolerance. Her fear of incurring more angina with exercise was so great that the employment of several compliance strategies such as education, social support, and psychological support were not successful in keeping her in the program. These four cases showed varied personality traits as they affected compliance with a CREP.

McMahon, Miller, Wikoff, Garrett, and Ringel (1986)

studied 112 post MI subjects, ages 30 to 70 years. All the subjects were participants in a CREP. They investigated the relationship between health intention to a medical regimen and the actual compliance to the regimen. The result demonstrated actual compliance to a medical regimen is less than the health intention to comply with a medical regimen.

Clinical trials investigating the effects of regular cardiac rehabilitation exercise following an MI or diagnosis of CAD on morbidity and mortality suggest favorable effects, but they have not shown statistically significant results (Naughton, 1983). However, an analysis of pooled data from all published clinical trials on the effects of regular cardiac rehabilitation exercise following an MI or diagnosis of CAD on morbidity and mortality not showing statistically significant results is unjustified (Staniloff, 1984).

Hertanu, Davis, Focseneanu, and Lahman (1986) demonstrated some beneficial effects of cardiac rehabilitation exercise among clients. These benefits were (a) improved function by increasing total oxygen consumption, (b) active client participation during recovery, and (c) early return to work (in selected clients). Oldridge and Jones (1986) and Wilhelmsen et al. (1975) pointed out that poor client compliance may be the reason why a significant positive effect of regular physical exercise on mortality and morbidity would not be seen.

Noncompliance to CREPs has been estimated to be about

50% (Oldridge, 1982). Several studies had investigated compliance and dropout in CREP. Foremost among these studies was the Goteberg re-infarction trial which was conducted by Wilhelmsen et al. (1975). The study provided the first extensive descriptive report on compliance and dropout rate in exercise rehabilitation. It analyzed whether supervised physical training could reduce death and non-fatal re-infarction in a random series of post infarct clients born in 1913 or later who were hospitalized for MI during 1968-1970 in Goteberg, Sweden. At follow up, 1 year after MI, only 39.9% of those who had started training in the hospital were still in the program. Among those who started training at home or in the work place, the percentage was even less; 21% were still in the program. Reasons given for the high dropout rate were motivational factors and practical difficulties such as lack of accessible parking area.

Bruce, Frederick, Bruce, and Fisher (1976) compared active participants and dropouts in the Cardiopulmonary Research Institute (CARPI), Seattle, Washington Cardiac Rehabilitation Program. The population studied consisted of 547 men and 56 women, ages 50-60 years, enrolled in the CAPRI up to April, 1974. Eighty-four percent had clinical manifestations of coronary heart disease. A few had chronic pulmonary disease, hypertension, and diabetes. The supervised exercise program involved 30 to 60 minutes of

graded levels of walking, calisthenics, and, if indicated, jogging for three mornings per week. Altogether, 352 (58.4%) dropped out after an average of 8.6 months for men and 5.7 months for women. The remaining 230 men and 21 women remained active for 22 and 20 months, respectively. Causes of dropout were (a) conflicts with client work schedules, financial inability to pay costs, and moving away; (b) lack of interest and motivation and personal problems involving families; and (c) unknown.

Another study frequently cited by authorities in the field of cardiac rehabilitation exercise compliance was the Ontario Exercise Heart Collaborative Study (OEHCS), which was conducted by several investigators specializing in the field of cardiac exercise rehabilitation (Oldridge, 1984). The OEHCS was a multi-center randomized clinical trial of high intensity exercise for prevention of recurrent MI in 733 men. The dropout rate in this study was 46.5% after a period of 4 years (Oldridge, 1984). This study identified smoking and blue collar occupations as consistently and statistically significant predictors of dropout (Oldridge et al., 1983). Other identifying characteristics of those who dropped out from the exercise program were (a) type-A behavior pattern, (b) non-participation in physical activities during leisure hours, and (c) more than one previous infarction (Oldridge, 1979).

Andrew and Parker (1979) studied the factors related to

dropout among clients enrolled in the OEHCS. The study tool was a questionnaire. The results showed more dissatisfaction among those who dropped out compared to compliers in areas of perception of the program, personal convenience factors, and family/life style components.

Blumenthal, Williams, Wallace, Williams, and Needles (1982) studied the physiological and psychological variables that might predict compliance to prescribed exercise therapy in clients recovering from MI. The study showed physiological and psychological distinguishing characteristics between dropouts and compliers. The clients who dropped out had reduced left ejection fraction assessed by radionuclide angiography at rest and during peak exercise. The dropouts' psychological profile showed more depression, hypochondriacal attitudes, anxiety, introversion, and lower ego strength.

From the review of the literature it can be concluded that the therapeutic and preventive benefits of cardiac exercise can only be realized when clients maintain an exercise commitment, thus supporting the significance of this study. Most studies from the literature concerning compliance to cardiac rehabilitation exercise programs had their emphasis on studying the characteristics of the exercise dropout. Nursing research emphasizing the characteristics of those who continuously participate in a CREP were in limited supply; this study was conducted to

help fill this gap in the research arena.

This nursing study explored the factors that influenced compliance with the CREP based on the HBM as predictor of preventive behavior. It also attempted to show support on the applicability of the HBM.

Chapter 3

METHODOLOGY

This descriptive study was designed to identify facts, opinions, beliefs, and attitudes of cardiac rehabilitation clients regarding their compliance with an exercise program. A structured questionnaire (Appendix C) developed by the nurse investigator was the study instrument. The study instrument was piloted for clarity and content validity prior to distribution to the sample population. The study was conducted in January and March, 1988, in an urban area in northern California.

Sample

The sample consisted of clients with diagnosed cardiovascular disease and enrolled in the CREP for at least 6 months. They consisted of 38 men and 1 woman between the ages of 45 and 80 years. The majority were Caucasian, married, with a college degree or some college education, and retired. All persons in the sample were residents of an affluent urban area in northern California.

Approval was obtained from the Protection of Human Subjects Review Committee of San Jose State University for the study proposal and the data collection instrument after it was piloted for clarity and content validity. The director and associate director of the CREP permitted the investigator to use their population for the study (see

Appendix B for the institutional consent). Each sample client signed a consent form before participating in the study (see Appendix D).

Data Collection Instrument

The data collection instrument was a questionnaire (Appendix C) developed by the investigator using the HBM as a framework. The questionnaire consisted of 32 questions encompassing eight HBM variables that may influence the likelihood of continued participation in the CREP. These eight variables were (a) demographics, (b) sociopsychological, (c) structural, (d) health motivation, (e) cues to action, (f) perceived seriousness of CVD, (g) perceived susceptibility to CVD, and (h) perceived benefits from the CREP. In addition, two questions not included under the concepts of the HBM were added to obtain information regarding attendance compliance.

Research Procedure

Initial contact with the CREP was made through a telephone call to the associate director of the program. A letter (Appendix A) requesting permission to use the CREP population for the research and outlining the goals and nature of the research was sent to the director and associate director of the program. As soon as permission was granted, an appointment was scheduled for the nurse investigator to meet with the CREP clients to explain the nature of the study and the questionnaire. At a later

scheduled date, clients who wished to participate in the study were requested to fill out the questionnaire subsequent to signing the consent form. Twenty-three of the 39 participants filled out the questionnaire after the exercise class on that same date. The remaining 16 participants filled out the questionnaire at home and returned it at a later date. The 16 questionnaires that were brought home by the clients were submitted to the associate director of the program and received by the nurse investigator within a period of 2 weeks.

Descriptive statistics were used to summarize and organize the data. The data were categorized under the eight HBM variables. Tables were used to display the data.

Chapter 4

ANALYSIS AND INTERPRETATION OF DATA

Analysis of Data

The purpose of this study was to explore factors that enhance compliance in the CREP. Thirty-eight men and 1 woman with diagnosed CVD, who had been enrolled in the CREP for at least 6 months, were surveyed to identify facts, beliefs, opinions, and attitudes utilizing concepts from the Health Belief Model (HBM) regarding participation in the CREP. The sample's mean length of participation in the CREP was 7.4 years with a standard deviation of 4.2. Each member of the group had attended at least 59 (75%) out of the 78 exercise classes in the last 6 months, and those who missed the classes were either ill or out of town. One hundred percent reported that they continued to participate in the CREP long after coverage from their health insurance had stopped. A comparison of their past and present risk factors showed change toward healthy habits and lifestyle. These data represent a strongly compliant group. Hence this group was a rich source of data regarding factors influencing compliance. The data were analyzed using the eight HBM variables mentioned earlier.

Demographics and Sociopsychological Data

Demographic characteristics of the sample showed an age range of 45-80 years with a mean of 64.6 and a standard

deviation of 7.8. The majority of the sample were married (79.5%). The ethnicity of the population was comprised of 95% Caucasian, 2.5% Hispanic, and 2.5% Asian. They were highly educated and were either retired or held white collar jobs. These data are displayed in Table 1.

Social status of the population revealed a very affluent group with the majority (61.5%) earning over \$50,000 annually. Data showed spouse or significant other support (82%) and peer support (95%) were major sociopsychological factors influencing compliance to the CREP in this population. These data are outlined in Table 2.

Structural

The sample had knowledge of the different risk factors to CVD that applied to them. A comparison of their past and present risk factors showed change towards healthy habits and lifestyle. Significant lifestyle improvements occurred in the following: (a) decrease cholesterol in diet (100%), (b) increase regular exercise (95%), (c) abstinence from smoking (86%), (d) lower blood pressure (73%), and (e) decrease level of emotional stress (53%). Other risk factors were moderately affected: (a) decrease type-A behavior (36%), (b) decrease in blood cholesterol (36%), and (c) decrease weight (33%). Table 3 compares the past and present risk factors.

Table 1

Demographic Characteristics (N = 39)

Characteristics	Number of Responses	Percentage
Ethnicity		
Caucasian	37	95.0%
Hispanic	1	2.5%
Asian	1	2.5%
Marital status		
Single	3	7.7%
Married	31	79.5%
Divorced	3	7.7%
Separated	2	5.1%
Educational level		
High School	6	15.4%
Vocational	2	5.1%
College	15	38.5%
Advanced	11	28.2%
Abstained	5	12.8%
Occupation		
Retired	20	51.3%
White collar job	14	35.9%
Blue collar job	0	0%
Abstained	5	12.8%

Table 2

Sociopsychological Factors (N = 39)

Factors	Number of Responses	Percentage
Annual income in thousands		
\$15 - \$25	3	7.7%
\$25 - \$35	5	12.8%
\$35 - \$50	6	15.4%
over \$50	24	61.5%
Abstained	1	2.6%
Spouse support or significant other support		
Yes	32	82.0%
No	3	7.7%
Abstained	4	10.3%
Peer support		
Yes	37	95.0%
No	1	2.5%
Abstained	1	2.5%

Table 3

Comparison of Past and Present Risk Factors (N = 39)

Risk Factors	Past	Present	Difference	Percentage
Family history	16	16	0	0%
Type-A personality	25	16	9	36%
Emotional stress	15	7	8	53%
Lack of regular exercise	20	1	19	95%
High cholesterol diet	18	0	18	100%
Hypertension	11	3	8	73%
Smoking	15	2	13	86%
Overweight	12	8	4	33%
High blood cholesterol	22	14	8	36%

Health Motivation

Data on health motivation practices revealed high percentages of the sample who maintained a low cholesterol diet (92.3%) had regular check-ups (89.7%), abstained from smoking (87.2%), and used car seat belts (82%). A lower percentage of the sample practiced meditation and relaxation exercises to relieve stress (25.6%). Also a significant percentage of the population (30.8%) now abstain from alcohol. These data are displayed in Table 4.

Cues to Action

The physician is seen as the primary motivating figure for initiating cardiac rehabilitation. Physician's advice (71.8%) was the foremost cue to action. However, the data show that the cardiac rehabilitation nurse is also significant since 30.8% of the sample were introduced to the CREP while still hospitalized through advice of a cardiac rehabilitation nurse. Other cues to action that initiated enrollment to the CREP were (a) fear of CVD recurrence (17.9%), (b) persuasion from family members and friends (12.8%), (c) personal knowledge of the benefits of the CREP (7.7%), and (d) newspaper and magazine advertisements (5.1%). Table 5 displays these data.

Perceived Seriousness and Susceptibility

The majority of the clients showed a good understanding of the risk factors which made them susceptible to heart disease. Fifty-three percent of the sample perceived their

Table 4

Health Motivation Factors* (N = 39)

Factors	Number of Responses	Percentage
Maintained low cholesterol diet	36	92.3%
Regular medical check-up	35	89.7%
Abstinence from smoking	34	87.2%
Use car seat belt at all times	32	82.0%
Abstinence from alcohol	12	30.8%
Practiced meditation relaxation	10	25.6%

*Note. Some individuals had multiple responses.

Table 5

Cues to Action Variables* (N = 39)

Variables	Number of Responses	Percentage
Advice from Physician	28	71.8%
Advice from Cardiac Rehabilitation Nurse	12	30.8%
Fear of CVD recurrence	7	17.9%
Persuasion from family and friends	5	12.8%
Knowledge of benefits	3	7.7%
Newspaper and magazine advertisement	2	5.1%

*Note. Some individuals had multiple responses.

heart diseases were life threatening and 41.2% did not. Five percent abstained from answering the question. Responses to perceived susceptibility to heart diseases showed 7.7% believed they were not susceptible, 61.1% moderately susceptible, 28.2% very susceptible, 2.6% abstained. Data are shown in Table 6.

Perceived Benefits

The responses showed that the clients received the following perceived benefits from the CREP: (a) safe physical exercises (97.4%), (b) relevant information regarding health (97.4%), (c) increased confidence to return to desired physical activity (95%), (d) source of peer support (95%), (e) increased feeling of strength to do pleasurable activities (95%), (f) reduced the possibility of CVD symptoms recurrence (92.3%), (g) reduced emotional stress (76.9%), (h) modification towards a healthy lifestyle (71.8%), and (i) weight loss (51.3%). Table 7 displays these data. Other factors that influence compliance reported by the sample were: (a) improved feelings of well being and quality of life (95%), (b) suitable class schedule (95%), (c) supportive staff (85%), and (d) benefit of a structured exercise program (50%).

Data Interpretation

The data collected in this study have shown several factors that influenced compliance in the exercise program at a CREP among clients with CVD diagnosis who have been

Table 6

Perceived Seriousness and Susceptibility (N = 39)

Perception	Number of Responses	Percentage
Perceived seriousness to CVD		
Yes	21	53.8%
No	16	41.2%
Abstained	2	5.0%
Perceived susceptibility to CVD		
Not susceptible	3	7.7%
Moderately susceptible	24	61.5%
Very susceptible	11	28.2%
Abstained	1	2.6%

Table 7

Perceived Benefits from the CREP (N = 39)

Benefits	Number of Responses	Percentage
Safe physical exercise		
Yes	38	97.4%
No	1	2.6%
Abstained	0	0%
Relevant information regarding health		
Yes	38	97.4%
No	1	2.6%
Abstained	0	0%
Increased confidence to return to desired physical activity		
Yes	37	95.0%
No	1	2.5%
Abstained	1	2.5%
Source of peer support		
Yes	37	95.0%
No	1	2.5%
Abstained	1	2.5%
Increased feeling of strength to do pleasurable activities		
Yes	37	95.0%
No	2	5.0%
Abstained	0	0%
Reduced possibility of CVD symptoms recurrence		
Yes	36	92.3%
No	3	7.7%
Abstained	0	0%
Reduced emotional stress		
Yes	30	76.9%
No	7	17.9%
Abstained	2	5.2%

Table 7 (Cont.)

Benefits	Number of Responses	Percentage
Modification towards healthy lifestyle		
Yes	28	71.8%
No	11	28.2%
Abstained	0	0%
Weight loss		
Yes	20	51.3%
No	16	41.0%
Abstained	3	7.7%

with the program for at least 6 months. The HBM provided useful concepts in organizing and categorizing the identified factors. The health beliefs of the sample showed increased tendencies toward compliance in the CREP.

The most common demographic characteristics of this sample are (a) Caucasian belonging to a higher income bracket, (b) higher educational attainment, (c) retired from work, and (d) engaged in white collar job; these had been shown to correlate with compliant behavior in some studies. Pender and Pender (1987, p. 48) pointed out that demographic factors such as sex, education, and ethnicity associated with higher socioeconomic level had been shown to be correlated with use of health services. Klinger (1984) identified being retired from work as a factor facilitating compliance to the CREP while Oldridge et al. (1983) identified blue collar occupation as a constantly and statistically significant predictor of dropout from the CREP. However, this study cannot conclude that these demographic characteristics of its sample are correlated with compliant behavior because of the absence of a comparison group.

Sociopsychological factors identified that may influence compliance to the CREP were spouse and significant other consisting of female or male friend support and peer support. These sociopsychological data supported the findings of Holm et al. (1985), Klinger (1984), and

Kinnaird et al. (1982).

Structural variable such as knowledge of individual risk factors was another factor identified that may influence compliance to the CREP. In addition motivation toward health practices was also identified as a factor.

Cues to action that initiated the most enrollment to this CREP were advice from the physician and cardiac rehabilitation nurse. These data indicated the significance of both the physician and the cardiac rehabilitation nurse in encouraging clients' initiation to the CREP and, hopefully, compliance.

Data on clients' perception of the seriousness of heart disease did not come out as a strong factor for compliance. However, the majority of the clients did perceive they were susceptible to heart disease.

Data analysis indicated the strongest factors that influenced compliant behavior among the sample were the perceived benefits of the CREP. The majority of the sample reported improvement of quality of life and a sense of well being as benefits from the exercise program. This result supported the findings of other studies regarding benefits from exercise (Staniloff, 1984).

Chapter 5

CONCLUSIONS AND RECOMMENDATIONS

The factors influencing compliance identified in this descriptive exploratory study should not be viewed in an absolute sense, but as a stimulus for further studies. The subjects used in this study were highly motivated, had good knowledge of their risk factors, were satisfied with the program and staff, believed in the efficacy of the exercise program, and were supported by someone close to them. One advantage in using this population was that they posed a rich source of factors influencing compliance. However, this sample is not representative of all cardiac rehabilitation client groups. It is important that this study be replicated using a variety of client populations with different socioeconomic demographics.

The results of this study should be viewed with caution. The small convenient sample group, coming from a well educated, affluent urban area in northern California is not representative of all cardiac rehabilitation clients; therefore, results cannot be generalized to all cardiac rehabilitation clients, but the results may be applied to cardiac rehabilitation clients with similar attributes.

Before any truly significant conclusions can be drawn, this researcher has several recommendations. First, the sample size should be increased and include individuals with

varied demographic and sociocultural characteristics to reduce the possibility of sample bias affecting the result. Second, the descriptive-exploratory design used in this study offered preliminary data regarding factors influencing compliance. To obtain more in-depth information about this topic, a quasi-experimental or a correlational study design should be tried. Finally, in order to allow for a richer and fuller data collection, the use of a combined questionnaire and interview method is recommended.

Some strategies have been identified that may improve compliance with a cardiac rehabilitation program. These strategies have been categorized under three main components which are: (a) client motivation, (b) cardiac rehabilitation staff leadership abilities, and (c) the characteristics of the exercise program.

Client motivation is an important element in compliance. This could be enhanced through a very carefully planned program orientation and initial exercise sessions. During the orientation, the value or potential outcomes of an exercise program should be discussed. The orientation should be a meaningful educational experience; explanation of the potential outcomes should be presented in simple terms and professional jargon avoided. Questions regarding exercise should be honestly answered and realistic goal-setting should be established. If possible, the client should be presented with options regarding exercise

modalities that would meet his/her special preferences as well as target heart rate requirements. Client's involvement in the decision-making process creates an atmosphere of cooperative effort.

When goals are set and the means of establishing these goals are acceptable to the client, a contract may be presented to the client. Most cardiac rehabilitation programs require a signed written commitment to participate in the program upon entry (Oldridge & Stoedefalke, 1984).

Reinforcement of exercise behavior is an important factor in sustaining motivation. A combination of continuous reinforcement initially and partial reinforcement later in the program is an effective means of helping the client maintain his/her motivation (Oldridge & Stoedefalke, 1984).

A scheduled treadmill testing every 3 or 6 months to provide information regarding the client's exercise performance is a good evaluation tool that helps maintain participation motivation. Such activity enhances client's satisfaction through knowledge of improved exercise performance.

Other incentives to improve client's motivation are (a) honoring special days such as birthday, attendance, and personal achievements; (b) spouse or significant other involvement in the program activities; (c) telephone calls to client when he/she is ill or misses a class; and

(d) using music selected by clients throughout the exercise class.

The cardiac rehabilitation staff must be able to motivate the client's participation. Skills such as the ability to establish rapport, tactfulness, creativeness, and innovativeness are recommended. The cardiac rehabilitation staff should possess traits such as empathy, decisiveness, dependability, enthusiasm, and self-confidence (Oldridge & Stoedefalke, 1984). They should provide individualized attention to the needs of each client. They should encourage group socialization through incorporation of a fun and play element in the exercise class. Alternative activities that change the pace of the exercise sessions prevent boredom.

Strategies under the third component, which are the characteristics of the cardiac rehabilitation program, include the following:

1. The program should have well defined purposes and objectives.
2. It should provide a comprehensive health education program encompassing lifestyle modification and emphasizing identification of risk factors, potential value of regular exercise, diet modification, and healthy habits.
3. Exercise and classroom facilities should be accessible to the client population.
4. It should provide or arrange for an easy means of

transportation for clients when needed.

5. It should provide ample parking spaces near the exercise or classroom facilities for clients' easy access.

6. It should offer exercise and health education classes on schedules suitable to its client population.

REFERENCES

References

- American Heart Association Committee Report: Subcommittee on exercise cardiac rehabilitation. (1981).
Circulation, 64, 1327A-1329A.
- American Heart Association fact sheet. (1985). Dallas:
American Heart Association Communications Division.
- Andrew, G. M., & Parker, J. D. (1979). Factors related to dropout post-myocardial infarction from exercise programs. Medical Science Sports Exercise, 11, 373-375.
- Baer, C. L. (1986). Compliance: The challenge for the future. Topics in Clinical Nursing, 7(4), 77-85.
- Becker, M. H., Drachman, R. H., & Kirscht, J. P. (1972). Predicting mothers' compliance with pediatric medical regimens. Journal of Pediatrics, 81, 843-854.
- Becker, M. H., Drachman, R. H., & Kirscht, J. P. (1974). A new approach to explaining sick-role in low-income populations. American Journal of Public Health, 64, 205-216.
- Becker, M. H., & Maiman, L. A. (1975). Socio-behavioral determinants of compliance with health and medical care recommendations. Medical Care, 13(1), 10-24.
- Becker, M. H., Maiman, L. A., Kirscht, J. P., Haefner, D. P., & Drachman, R. H. (1977). The Health Belief Model and prediction of dietary compliance: A field experiment. Journal of Health and Social Behavior, 18, 348-366.

- Becker, M. H., Maiman, L. A., Kirscht, J. P., Haefner, D. P., Drachman, R. H., & Taylor, D. W. (1979). Patient perception 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: The John Hopkins University Press.
- Becker, M. H., Radius, S. M., & Rosenstock, I. M. (1978). Compliance with medical regimen for asthma: A test of the Health Belief Model. Public Health Reports, 93, 268-277.
- Blackburn, H. (1983). Physical activity and coronary disease: A brief update and population review. Journal of Cardiac Rehabilitation, 3, 101.
- Blumenthal, J. A., Williams, R. S., Wallace, A. G., Williams, 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(6), 519-527.
- Bruce, E. H., Frederick, R., Bruce, R. A., & Fisher, L. D. (1976). Comparison of active participants and dropouts in CAPRI cardiopulmonary rehabilitation programs. The American Journal of Cardiology, 37, 53-60.
- Champion, V. L. (1984). Instrument development for Health Belief Model contract. Advances in Nursing Science, 6(3), 73-85.

- Department of Health, Education, and Welfare. (1971). What is arteriosclerosis? Publication No. (NIH) 72-137, 3-16.
- Eyherabide, A., & Yates, B. C. (1986). The effects of cardiac rehabilitation on compliance in the coronary artery bypass surgery patients. Cardiovascular Nursing, 21, 31-35.
- Feather, N. T. (1959). Subjective probability and decision under uncertainty. Psychological Review, 66, 150-164.
- Fink, R., Shapiro, S., & Roester, R. (1972). Impact of effort to increase participation in repetitive screenings for early breast cancer detection. American Journal of Public Health, 62, 328.
- Haynes, R. B., Sackett, D. L., Gibson, E. S., Taylor, D. W., Hackett, B. C., Robert, R. S., & Johnson, A. L. (1976). Improvement of medication compliance in uncontrolled hypertension. Lancet, 1, 1265-1268.
- Haynes, R. B., Taylor, D. W., & Sackett, D. L. (Eds.). (1979). Compliance in health care. Baltimore, MD: The John Hopkins University Press.
- Hertanu, J. S., Davis, L., Focseneanu, M., & Lahman, L. (1986). Cardiac rehabilitation program: Outcome assessment. Arch Physical Medicine Rehabilitation, 67, 431-435.
- Hijeck, T. (1984). The Health Belief Model and cardiac rehabilitation. Nursing Clinics of North America, 19(3), 449-457.

- Hochbaum, G. M. (1956). Why people seek diagnostic x-rays. Public Health Report, 71, 377-380.
- Holm, K., Fink, N., Christman, N. J., Reitz, N., & Ashly, W. (1985). The cardiac patient and exercise: A sociobehavioral analysis. Heart & Lung, 14(6), 586-593.
- Kasl, S. V. (1975). Issues in patient adherence to health care regimen. Journal of Human Stress, 1(3), 5-17.
- Kegeles, S. S. (1963). Why people seek dental care: A test of conceptual formulation. Journal of Health and Human Behavior, 4, 166.
- Kellogg, B., Jacobson, J., Lettieri, C., & Kellogg, J. (1986). Health management I: Perspectives on community health nursing. California: Statewide Nursing Program of the Consortium of the California State University.
- Kinnaird, L. S., Yoham, M. A., & Kieval, Y. M. (1982). Patients' compliance in rehabilitation programs. Nursing Clinics of North America, 17(3), 523-533.
- Klinger, M. (1984, August). Compliance and the post MI patient. The Canadian Nurse, pp. 32-38.
- Leavitt, F. (1979). The Health Belief Model and utilization of ambulatory care services. Social Science Medicine, 18, 105-112.
- Lewin, K. (1935). A dynamic theory of personality. New York: McGraw Hill.

- McMahon, M., Miller, 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(1), 82-86.
- McMahon, M., & Palmer, K. M. (1985). Exercise and hypertension. Medical Clinics of North America, 69, 57-70.
- Naughton, J. (1983, March). Death rates of cardiac patients: Effects of physical activity. Physician Assistant & Health Practitioner, pp. 57-65.
- Oldridge, N. B. (1979). Compliance of post myocardial infarction patients to exercise programs. Medicine and Science in Sports, 11(4), 373-375.
- Oldridge, N. B. (1982). Compliance and exercise in primary and secondary prevention of coronary heart disease: A review. Preventive Medicine, 11, 56-70.
- Oldridge, N. B. (1984). Compliance and dropout in cardiac exercise rehabilitation. Journal of Cardiac Rehabilitation, 4, 166-177.
- Oldridge, N. B., Donner, A. P., Buck, C. W., Jones, N. L., Andrew, G. M., Parcker, J. D., Cunningham, D. A., Kavanager, T., Rechnitzer, P. A., & Sutton, J. R. (1983). Predictors of dropout from cardiac exercise rehabilitation: Ontario exercise-heart collaborative program. Clinics in Sports Medicine, 3(2), 443-454.

- Oldridge, N. B., & Jones, N. L. (1986). Preventive use of exercise rehabilitation after myocardial infarction. Acta Medica Scandinavia, Supplement, 711, 123-129.
- Oldridge, N. B., & Stoedefalke, K. G. (1984). Compliance and motivation in cardiac rehabilitation study. The American Journal of Cardiology, 51, 71-74.
- Orem, D. E. (1980). Nursing: Concepts of practice. New York: McGraw-Hill.
- Orem, D. E. (1985). Nursing: Concepts of practice. New York: McGraw-Hill.
- Pender, N. J., & Pender, A. R. (1987). Health promotion in nursing practice. Los Altos, CA: Appleton & Lange.
- Rosenstock, I. M. (1960). What research in motivation suggests for public health. American Journal of Public Health, 50, 295-302.
- Runyan, J. D. (1986). Inactivity, aging, and exercise. Physician Assistant, 10(4), 51-52, 54, 56-57.
- Sackett, D. C. (1975). Randomized clinical trial of strategies for improving medication compliance in primary hypertension. The Lancet, 1, 1205-1207.
- Staniloff, H. M. (1984). Current concepts in cardiac rehabilitation. The American Journal of Surgery, 147, 719-724.

Wenger, N. K. (1981). Rehabilitation of the patient with symptomatic coronary atherosclerotic heart disease.

Dallas: American Heart Association Communication Division.

Wilhelmsen, L., Sanne, H., Elmfeldt, D., Grimby, G., Tibblin, G., & Widel, H. (1975). A controlled trial of physical training after myocardial infarction.

Preventive Medicine, 4, 491-508.

Wood, G. L., & Haber, J. (1986). Nursing Research.

St. Louis: Mosby.

Young, M. S. (1986). Strategies for improving compliance.

Topics in Clinical Nursing, 7, 31-38.

APPENDIX A
Letter Requesting Permission

1983-34 San Luis Avenue
Mountain View, CA 94043
October 5, 1987

Palo Alto YMCA
Cardiac Rehabilitation Program
3412 Ross Road
Palo Alto, CA

To whom it may concern,

My name is Marian H. Robinson, I am a graduate student at San Jose State University.

I would like to request permission to use your Cardiac Rehabilitation Program population and client's records for a research project investigating compliance to the program. In conjunction with this, I will secure consent from each client participating in the project. This research project will constitute my thesis in partial fulfillment of the degree of Master of Science in Nursing.

I am looking forward to hearing from you.

Sincerely yours,

Marian H. Robinson

APPENDIX B
Institutional Consent

Therapeutic exercise and education, medically prescribed and supervised, for patients with coronary disease

YMCARDiacTherapy

October 14, 1987

Ms. Marian H. Robinson
1983-34 San Luis Ave.
Mountain View, Calif. 94043

Dear Marian:

In response to your letter of October 5th, 1987, we would be willing to allow you to use our cardiac rehabilitation program population and client's records for a research project investigating compliance to the program. You may contact us at 494-1300.

Sincerely,

Kathy Berra
Kathy Berra, RN
Program Director

Cindy Lamendola Rudd
Cindy Lamendola Rudd, RN
Associate Program Director

APPENDIX C
Questionnaire

Questionnaire

1. Current age: _____
2. Sex: M____ F____
3. Marital status: S____, M____, D____, Sep.____
4. Occupation: _____
5. Ethnicity:
 - ☐ White
 - ☐ Black
 - ☐ Hispanic
 - ☐ Asian
 - ☐ Other
6. Education:
 - ☐ Primary grade
 - ☐ High school
 - ☐ Vocational degree
 - ☐ College degree
 - ☐ Advanced degree
7. Number of children living at home: _____
8. Current annual family income:
 - ☐ Less than \$15,000
 - ☐ \$15,000 to \$25,000
 - ☐ \$25,000 to \$35,000
 - ☐ \$35,000 to \$50,000
 - ☐ Over \$50,000
9. How long have you been a participant in the Palo Alto YMCA Cardiac Rehabilitation Program: _____ months
10. Check any of the following which apply to you:
 - ☐ Heart attack, how many? _____
 - ☐ Congenital or inborn heart defects
 - ☐ Atherosclerosis
 - ☐ Coronary artery bypass surgery
 - ☐ Angioplasty
 - ☐ High blood pressure
 - ☐ Rheumatic heart disease
 - ☐ Angina (chest pain)
 - ☐ Other cardiac diseases _____
 - ☐ Other non-cardiac diseases _____
11. Check the risk factor(s) that applied to you in the past:
 - ☐ Positive family history of heart disease
 - ☐ Competitive or type-A personality
 - ☐ Frequent emotional stress
 - ☐ Lack of regular exercise
 - ☐ High cholesterol diet
 - ☐ Diabetes
 - ☐ High blood pressure
 - ☐ Smoking
 - ☐ Overweight

- ☐ Elevated blood cholesterol
☐ Other _____
-
12. Check the risk factor(s) that apply to you at present:
☐ Positive family history of heart disease
☐ Competitive or type-A personality
☐ Frequent emotional stress
☐ Lack of regular exercise
☐ High cholesterol diet
☐ Diabetes
☐ High blood pressure
☐ Smoking
☐ Overweight
☐ Elevated blood cholesterol
☐ Other _____
-
13. How susceptible do you think you are to heart disease?
☐ Not susceptible
☐ Moderately susceptible
☐ Very susceptible
14. What do you believe caused your heart disease?

-
15. Do you consider your heart disease potentially life-threatening? ☐ yes ☐ no
16. Do you believe that regular participation in the exercise program will significantly reduce recurrence of your heart disease? ☐ yes ☐ no
17. What self-care activities do you regularly participate in:
☐ Maintaining a low cholesterol diet
☐ Meditation, or relaxing hobbies
☐ Abstinence from alcohol
☐ Abstinence from smoking
☐ Always use car seat belts
☐ Regular check ups
18. Check the factor(s) which initiated your enrollment in this program:
☐ Advice from physician
☐ Advice from cardiac rehabilitation nurse
☐ Persuasion from family member or friends
☐ Personal knowledge of the benefits
☐ Television advertisement about benefits
☐ Newspaper/magazine article about benefits

- ☐ Fear of recurrence of illness
☐ Other _____

19. (a) Do you feel you need to lose weight?
☐ yes ☐ no
- (b) Do you believe that the participation in the exercise program will help you lose weight?
☐ yes ☐ no
20. Do you believe that participation in the exercise program will help you reduce emotional stress?
☐ yes ☐ no
21. Do you consider the program's exercises safe for you?
☐ yes ☐ no
22. Does the program significantly increase your confidence to return to desired physical activities?
☐ yes ☐ no
23. Does the program supply a good source of peer support?
☐ yes ☐ no
24. Does the class schedule suit your personal schedule?
☐ yes ☐ no
25. If your health insurance did not cover the program's fees would you still participate?
☐ yes ☐ no
26. Does the program offer relevant information regarding your health?
☐ yes ☐ no
27. Does the exercise program help you feel physically stronger to do the activities you enjoy or need to do?
☐ yes ☐ no
28. Do you consider your pre-illness lifestyle much different from your present lifestyle?
☐ yes ☐ no If yes in what ways?
-
29. How many classes have you been unable to attend over the last 6 months?
☐ 0-4
☐ 5-10
☐ 11-20
☐ more than 20

30. Is your spouse or significant other supportive of your participation in the exercise program?
[] yes [] no
31. Please list any factors that influence your continued participation in the program.
-
-
32. Did you participate in leisure time physical exercise before you had your heart attack and/or diagnosis of cardiac disease?
[] yes [] no

APPENDIX D
Consent Form

Consent Form

You are invited to participate in the study of compliance among cardiac rehabilitation clients. I hope to discover the factors which influence your compliance in participating in the exercise program. You were selected as a possible participant in the study because of your participation in the exercise program offered by the Palo Alto Cardiac Rehabilitation Program.

If you decide to participate in the study you will be given a questionnaire to fill out. It is a simple questionnaire and should not take over 15 minutes to complete.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law.

Your decision whether or not to participate will not prejudice your future relations with Palo Alto Cardiac Rehabilitation Program or San Jose State University. If you decide to participate, you are free to withdraw your consent and to discontinue participation without prejudice.

If you have any questions, please call me, Marian Robinson, RN, BS at (415) 968-2470. If you have any complaints or concerns, please call Ms. Sharon Wahl, MS (Faculty Advisor) at (415) 321-4199. For questions or complaints about research subject's rights, contact Serena Stanford, PhD (Associate Academic Vice President for Graduate Studies) at (408) 924-2480.

YOU ARE MAKING A DECISION WHETHER OR NOT TO PARTICIPATE. YOUR SIGNATURE INDICATES THAT YOU HAVE DECIDED TO PARTICIPATE HAVING READ THE INFORMATION PROVIDED ABOVE.

DATE

SIGNATURE

SIGNATURE OF WITNESS

SIGNATURE OF INVESTIGATOR