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Graduate School

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ADHERENCE OF MEN WITH MYOCARDIAL INFARCTION  
TO PRESCRIBED EXERCISE

by

Marsha Schwartz

---

A Thesis in Partial Fulfillment  
of the Requirements for the Degree  
Master of Science in the Field of Nursing

---

June 1970

166236



Each person whose signature appears below certifies that he has read this thesis and that in his opinion it is adequate, in scope and quality, as a thesis for the degree of Master of Science.

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Marsha Schwartz

TABLE OF CONTENTS

	Page
LIST OF TABLES . . . . .	vii
 Chapter	
1. EXERCISE AND THE HEART . . . . .	1
The Effects of Exercise on the Heart . . . . .	1
The Effects of Exercise on the Normal Heart . . . . .	1
Exercise After Myocardial Infarction . . . . .	4
Adjustment Following Myocardial Infarction . . . . .	8
Following the Physician's Orders . . . . .	10
The Role of the Nurse in Rehabilitation . . . . .	11
The Need for the Study . . . . .	15
2. THE STUDY . . . . .	17
Definition of the Problem . . . . .	17
Purpose of the Study . . . . .	17
The Hypothesis . . . . .	17
Definition of Terms . . . . .	17
Limitations . . . . .	18
The Sample . . . . .	18
Description of the Sample . . . . .	18
Criteria Used to Diagnose Myocardial Infarction . . . . .	19
Indications of Infarction Demonstrated by Patients . . . . .	20
Conducting the Study . . . . .	21

Chapter	Page
Selection of Patients . . . . .	21
The Hospital Visit . . . . .	22
The Interview Guide . . . . .	22
The Interview . . . . .	24
Criteria to Determine Adherence to Prescription .	25
Categories of Adherence to Prescription . . . . .	26
Method of Determining Adherence of the Sample . .	27
3. THE RESULTS OF THE STUDY . . . . .	28
Response to Questions During Interviews . . . . .	28
Activity During Hospitalization . . . . .	28
Patient Knowledge of Prescription . . . . .	29
Change in Activity After Hospitalization . . . . .	30
Effect of Change in Activity on Family Routine . .	33
Enjoyed Activity . . . . .	34
Testing the hypothesis . . . . .	34
Difficult Restrictions . . . . .	35
Limitation of Activity by Shortness of Breath, Fatigue, and Chest Pain . . . . .	36
Patient's Concept of Adherence to Prescription . .	37
Information Given by Wives . . . . .	40
Agreement of the Judges . . . . .	41
Adherence to the Prescription . . . . .	41
Reasons for Following the Prescription . . . . .	43
Reasons for Not Following the Prescription . . . . .	44
Adherence to the Prescription as Related to Age .	44



Chapter	Page
4. DISCUSSION OF THE RESULTS . . . . .	46
Comparison of Data with Literature . . . . .	46
Implications for Nursing . . . . .	48
5. SUMMARY AND CONCLUSIONS . . . . .	50
Summary . . . . .	50
Conclusions . . . . .	53
Recommendations for Further Study . . . . .	54
BIBLIOGRAPHY . . . . .	56
APPENDIX A . . . . .	63
APPENDIX B . . . . .	69
APPENDIX C . . . . .	71
APPENDIX D . . . . .	73

LIST OF TABLES

Table	Page
I. Relationship of Patient's Knowledge of Prescribed Exercise to the Judge's Rating of Adherence . . . .	31
II. Relationship Between the Patient's Concept of Adherence to Prescribed Exercise and the Rating of the Judges . . . . .	39
III. Agreement of Judges as to Patient Adherence to the Exercise Prescription . . . . .	42
IV. Adherence to Prescribed Exercise as Related to Age . .	45



## Chapter 1

### EXERCISE AND THE HEART

#### INTRODUCTION

One of the greatest threats to the preservation of health in recent years has been coronary artery disease. This disease and its complications are the leading causes of death in North America and Western Europe. More than 500,000 deaths per year in the United States can be accounted for by coronary artery disease (2:18).

Numerous studies have been done for the purpose of determining factors that contribute to the causes of coronary artery disease. Several such studies are the Framingham study and a study of physical inactivity by Frank. The individuals in these studies who were physically active were less likely to develop coronary artery disease than those whose lives were more sedentary. Sedentary individuals seemed to be most subject to fatal heart disease (46:811; 32:1025).

#### THE EFFECTS OF EXERCISE ON THE HEART

##### The Effects of Exercise on the Normal Heart

Although exercise benefits the body in many ways, some of the best results of exercise can be observed in the heart (29:173). Scott noted that the heart responded to exercise by making several adjustments. One of the parameters to be considered in this adjustment was the heart rate. During exercise the heart rate increased. Cardiac

output and coronary flow also increased in response to exercise but these increases were largely due to an acceleration in heart rate (60:854).

The normal heart is usually able to meet the demands of moderate activity with an increase in heart rate and little change in stroke volume. Severe activity in the normal heart increases both heart rate and stroke volume (60:859).

Although heart rate has been found to increase initially during exercise, a reduction of exercise heart rate has been observed to occur after physical training. This change in exercise heart rate was noted by Frick and others in a study of sedentary men (34:146). Ekblom reported similar findings. Eight male students between the ages of 17 and 27 participated in a physical training program. After physical training they had an average reduction in heart rate of 26 beats per minute during exercise (30:527).

Changes in the oxygen requirements of the myocardium have also been noted following physical training. According to Scott, oxygen requirements were increased initially during exercise. However physical training over a period of weeks resulted in a decrease in oxygen cost to the heart muscle. Even short term intensive training of a few weeks was observed to cause increased stroke volume and decreased heart rate at a cardiac output that remained the same (60:855, 859; 1:17). These results suggest that physical training increased the efficiency of the heart.

Structural changes of the vasculature of the heart have also been observed to occur in response to exercise. Leon and Bloor demonstrated that enforced swimming of rats modified the vasculature of the

heart to increase the size of the lumina in the extracoronary collateral arteries. There was also an increase in the ratio of capillaries to muscle fibers (50:488).

Eckstein reported another beneficial cardiovascular change in exercised dogs. An artificial narrowing of the circumflex artery was effected by ligature in the dogs. Following the ligature half of the dogs were exercised regularly and exercise was restricted for half of them. The exercised dogs with mild arterial narrowing were found to have more collateral circulation than the dogs who were not exercised. Moderate and severe narrowing of the circumflex artery resulted in increased collateral development proportional to the degree of narrowing in both groups of dogs (28:230). The results of this study imply that exercise alone may stimulate an increase in collateral circulation when there is only mild arterial narrowing and cause an even greater increase in collateral circulation than moderate or severe narrowing.

The findings reported by Eckstein are comparable to those observed in human hearts by Zoll. Human hearts were studied at autopsy to discover the amount and quality of interarterial anastomoses when coronary artery occlusion was present. Relative cardiac anoxia appeared to be the common underlying stimulus for the development of interarterial coronary anastomoses (67:797).

The data seem to indicate that a lack of oxygen to the myocardium or a need for an increased amount of oxygen stimulates increased growth of collateral vasculature in the heart. Exercise training has been suggested as a possible stimulus to increase the growth of interarterial anastomoses.



The result of cardiac changes after physical training is an increased efficiency of the heart as a pump. It has been noted that there is an increase in the overall strength of the heart. More cardiac work can be done with less effort (3:183, 185).

The benefits of increased collateral revascularization and increased efficiency of the heart have been presented in literature as possibly significant in reducing coronary heart disease but the evidence is not conclusive (37:308). Not all physicians accept the view that exercise is as beneficial as suggested by some of the research. According to Skinner the hypothesis that regular exercise can reduce the risk of coronary heart disease has not been proven. The data from experimental investigations is insufficient evidence to show that regular exercise can either increase or adversely affect life expectancy. However endurance training appears to favorably alter some of the factors associated with the increased risk of developing coronary vascular disease. "The clinical consequences of these changes are unclear at the present time," states Skinner (56:2).

Exercise is not a proven preventative of coronary heart disease. However, increased physical activity is the only approach currently being considered that has positive physical and emotional rewards for the patient (37:308).

#### Exercise After Myocardial Infarction

The importance of exercise has not been established in relation to the prevention of coronary heart disease but there is an increasing amount of experimental evidence that cardiovascular benefits result from exercise (37:308).

A gradual reversal in the attitude of physicians regarding

exercise after myocardial infarction has been noted by Alligood. He stated that physicians are tending to move from "proscription to prescription" of exercise for the infarction patient. Many physicians are likely to encourage rather than discourage physical activity for the postinfarction patient (24:525).

These changing concepts in the care of the postinfarction patient may have been influenced by the results of studies done with exercising postinfarction patients. The effects of exercise in patients who have recovered from myocardial infarction have been found to be similar to the responses seen in presumably healthy men. Naughton observed that an increase in cardiovascular efficiency occurred after eight months of physical training in postinfarction patients. The heart rate of these men was decreased 12 to 20 beats per minute at comparable oxygen demands (53:541, 543). This implies that the efficiency of the heart can be increased in the postinfarction patient as well as in the presumably healthy person. Less cardiac work was required to perform the same physical exercise after the postinfarction patients had physical training.

According to Naughton however, the results of this study should not be generalized for all postinfarction patients. He suggested that patients that have extensive scarring and fibrosis of the myocardium or irreversible myocardial restriction could not be expected to have as successful a response to physical training. Only one of the twenty-three patients studied by Naughton did not show improvement in cardiovascular adjustment to exercise. However this patient reported that he felt better after six months of physical training (53:544).



Common findings in exercise studies with postinfarction patients included decreases in heart rate and increases in stroke volume after exercise training (25:3; 33:192). A decrease in the tension-time index (TTI) was noted by Frick and Katila (33:192). Tension-time index refers to the product of the mean systolic pressure and the duration of systole. This product is used as an index of the total tension of the myocardial fiber. Sarnoff and others found the TTI to be the primary determinant of myocardial oxygen consumption in studies of isolated, metabolically supported canine hearts (59:154, 155). A decrease in the TTI would therefore suggest that physical training is able to decrease the need of the myocardium for oxygen during exercise.

Other physical gains have also been noted following physical training. Some of the observable effects were loss of body weight and an increased capacity for physical work. Rechnitzer and others studied cardiac and noncardiac exercisers. Both cardiac and noncardiac exercisers lost subcutaneous fat but experienced an increase in muscular endurance (57:735). Cardiac function was not measured in this study.

Barry also reported an increase in work capacity after exercise training. His six subjects included both postinfarction patients who trained at home and those who trained under supervision. Although the results of this study indicate beneficial physical changes it was noted that the subjects who trained under supervision followed the exercise prescription more closely than those who trained at home (25:7).

Although the presence of a physician and the use of specific



measurements of cardiac function are usually recommended for post-infarction exercise programs, an apparently successful program in Canada had neither of these resources. A cardiologist, E. Maurice Heller, reported that 22 postinfarction patients successfully participated in a graded exercise program for three and one-half years without specific measurements of cardiac function. This program was supervised by a physical educator. "The sole criterion used to determine the amount of activity permitted and to assess the individual's progress is work capacity (field performance)--the degree of activity the patient can tolerate without undue symptoms." The undue symptoms were palpitation, unusual fatigue, or angina (40:655, 658-659).

Heller recommended the graded exercise program for postinfarction patients who had experienced infarction six months previously. Heart failure and recurring pulmonary congestion were contraindications for joining his exercise group. Serious arrhythmias such as atrial fibrillation or paroxysmal ventricular tachycardia were also contraindications for participation in the graded exercise program (8:655).

Some of the benefits noted in this program were the improvement of mild hypertension, easier weight control, and a greater degree of mental and physical relaxation. The subjects also seemed more willing to accept other therapeutic constraints such as giving up smoking and diet restrictions (40:658-659).

More emphasis has been placed on physical benefits than psychological benefits gained from exercise training for the post-infarction patient. However the psychological stress that men with

myocardial infarction encounter suggest that rehabilitation can be successful only if the psychological needs of the patient are met. Studies indicate that psychological benefits have been gained in exercise training by postinfarction patients. Men studied by Hellerstein and others were observed to have less fear of exercise and an increased sense of well being after exercise training. The patients in this study included men who had a coronary artery disease and myocardial infarction (8:453).

Studies of patients who participated in exercise training beginning three to six months after infarction indicate that favorable results were noted in both physical and psychological aspects. Although some advantages of exercise for the postinfarction patient have been observed, this trend is being investigated further.

While physical training for the postinfarction patient has been observed to be beneficial, successful rehabilitation after myocardial infarction may depend upon how well the patient follows the exercise prescription when he returns to his home. The scientific knowledge that improves his care is useful to him only if he can have a meaningful life. Both established reaction patterns and environmental factors influence adjustment to life after myocardial infarction.

#### ADJUSTMENT FOLLOWING MYOCARDIAL INFARCTION

Jenkins and others reported that an overt behavior pattern seemed to be associated with the occurrence of coronary heart disease. The overt behavior pattern of the coronary-prone individual has been described as competitive, aggressive, pressured by self for vocational



productivity and achievement, having an excessive sense of time urgency, impatience, and restlessness (44:377).

The individual who possesses one or more of these characteristics may have difficulty in adjusting to a change in activity even if it is temporary. If reoccurrence of myocardial infarction is feared the reaction would likely be one of excessive caution and fear of activity that has been prescribed. Fear of exercise can interfere with successful rehabilitation (2:102).

The patient who has not been able to accept the fact of myocardial infarction may attempt physical activity beyond the activity prescribed by the physician. Furthermore, this denial may mean that the patient is unable to admit his feelings of fear or other emotions (2:100).

Inability to perform the masculine role of provider and protector for his family may be a source of frustration to the man who has recovered from myocardial infarction. He may have been advised by his physician to abstain temporarily or altogether from some of the activities he usually did in his home and for his family. These restrictions might seem like an ultimatum to "stop living" to the patient (36:C21).

About 50 percent of the individuals who experience myocardial infarction expire before they reach the hospital (2:v; 14:24; 7:288). In the past, about 30 percent of the patients treated in the hospital expired. More recently however, specialized coronary care has reduced this rate to 21 or 15 percent, depending upon the area and the available care (2:v; 13:13; 47:126). Recovery of the myocardial infarction patient often depends upon the immediate availability of a

resuscitation squad, physician and hospital coronary care.

Approximately 82 percent of British patients who survive infarction return to work by the sixth month after infarction reported Sharland (61:720). Wincott and Caird also studied British patients. They found that 80 percent of the survivors returned to work by six months after infarction but psychological as well as physical problems existed. Anxieties about employment and finance were common as well as fear of recurring myocardial infarction, invalidism, and dependence on others (66:1302).

#### Following the Physician's Orders

The postinfarction patient may find problems that once seemed small are difficult to cope with. Myocardial infarction can be a terrifying experience. The memory of this experience and the uncertainties of the future may cause him intense anxiety. He may become temporarily incapable of making constructive plans or following orders prescribed by the physician (2:100).

The results of studies done with patients having various health problems indicate that patients had difficulty in adjusting to changes in living that were prescribed by the physician. The factors that influenced these patients to follow physician's orders could be used to plan more effective rehabilitation for postinfarction patients.

Cardiac patients were studied by Davis to determine factors that correlated with following, or not following the physician's orders. It was noted that the patients who seemed to follow instructions had a business-like relationship with the physician rather than



a friendly relationship. The patients who adhered to instructions also had a higher education, were younger in age, less likely to smoke, less likely to have hypertension and they visited their physician more times in a year than the patients who did not follow the physician's orders (68:105).

Dinsmore observed that errors in self-medication were related to the misunderstanding of the purpose of the medication (69:51). The postinfarction patient may also have difficulty in following the exercise prescription if he does not understand its purpose.

Patients on low-cholesterol diets studied by Peterson seemed to adhere to the diet orders prescribed by physicians. These patients appeared to be aware of the reasons they should follow the diet (70:46). This would suggest that a valuable part of rehabilitation is to assist the postinfarction patient to become aware of the rationale of the exercise program prescribed for him.

Although current concepts encourage the use of prescribed exercise in the rehabilitation of the postinfarction patient, desired results cannot be obtained unless the patient follows the prescription. This requires that the patient understand the exercise prescription and know why he should follow it. It is the responsibility of the health team to offer guidance to the postinfarction patient so that he may experience successful rehabilitation and a meaningful life.

#### The Role of the Nurse in Rehabilitation

One of the significant goals of coronary care is the rehabilitation of the postinfarction patient to a life that is productive and normal for him. This rehabilitation begins when the patient is admitted to the coronary care unit (2:84, 101).

As a member of the health team, the nurse holds a key role in the rehabilitation of the postinfarction patient. A closeness between patient and nurse often develops during the traumatic experience of myocardial infarction. This relationship can be used to good advantage when the nurse aids the patient in planning for a return to a life that is as normal as possible (14:93).

Andreoli and others state:

Essentially rehabilitative goals are directed toward helping the patient and his family accept the fact of myocardial infarction, adjust to the experience, and make constructive plans to deal with it (2:102).

The nurse may help the patient and his family accept the illness if she is aware of the significance of the patient's reaction to it. Appropriate support can then be provided. Both the patient and his family should have an opportunity to verbalize their feelings. Often it is the nurse who is available for listening (2:102).

The knowledge of the patient and his background can help the nurse explain limitations and treatment in a manner that the patient and his family will be more likely to understand. Adjustment to myocardial infarction may be facilitated by the nurse in her use of the nursing history as a basis for planning nursing care.

According to Lewis the nursing history should include information about:

. . . the person's previous experience with illness and hospitalization and their meaning to him, his knowledge about his own health problems and diagnostic and therapeutic regimen, his role in his family and the type of household to which he belongs, the effect of his illness on his family, his language facility, educational achievement and intellectual capacity, his recreational interests, his religious interests and practices, his usual health practices and preferences, his occupational and social roles, his economic status, his relationship to the normal tools and tasks for his sex and stage of development, his methods of



coping with past stressful situations, and importantly, his relationships with "significant others" (51:27).

The information in the nursing history may be utilized to achieve the goals of rehabilitation. A knowledge of the attitude the patient has toward changes he will have to make and how he plans to make them can help the health team plan a home regimen that is realistic for the patient (15:260).

Planning with the patient and spouse for discharge should include discussion about the home environment. Some aspects of environment that are likely to influence the activity of the post-infarction patient are housing, transportation and family composition (15:36, 39, 42). An example of the way in which housing may affect the activity of the patient is the physical arrangement of stairs, bathrooms and floor levels in the home. Transportation arrangements may be difficult if there is not a family member available to do necessary shopping or take the patient to physician's appointments. Family composition and the degree of responsibility the patient must assume may also affect his activity at home. Minor repairs and housekeeping that demand immediate attention may frustrate the patient to the extent that he will perform contraindicated activities.

Although it has been suggested in literature that the exercise prescription should emphasize activity the patient should do, contraindicated activity needs to be considered in discharge planning. The patient and his spouse may need guidance from members of the health team in planning delegation of activities the patient should avoid.

Former activity patterns and diversion are also factors that should affect the planning of the prescription. If the patient has a

diversion or former activity that can be allowed these should be incorporated into the exercise prescription (13:40).

The exercise prescription should be planned by the health team, the patient, and spouse to fit the environment of the patient as much as possible. Each patient needs a prescription designed specifically for him.

When the patient begins to think about going home and his life pattern the nurse should encourage him to verbalize anticipated problems and his interpretation of the temporary or longterm limitations in activity. As the nurse understands how the patient interprets the prescribed exercise she can more accurately determine if further explanation is needed. Exploring difficulties that can be foreseen may prevent some of the problems. Planning can then be done to avoid these problems (36:C24).

The planning of the exercise prescription could best be done if all of the information of the various members of the health team were available. It would seem that this could be most ideally done if the team members were able to contribute to a group conference.

Effective communication is necessary between the patient and the members of the health team when the exercise prescription is being planned. This communication may be facilitated by the nurse because she has opportunity to learn what the expectations and understanding of both the patient and the health team members are as they plan the prescription together.

The success of the patient's rehabilitation can only be evaluated by his adjustment in the home situation. The nurse would be better able to contribute to the successful rehabilitation of the



postinfarction patient if she were aware of some of the problems the patient is likely to face when he leaves the hospital. Knowing whether postinfarction patients are likely to follow prescribed exercise could increase her awareness of the problems that men with myocardial infarction have.

#### THE NEED FOR THE STUDY

According to some authorities a regular, specified exercise program is the best insurance available to prevent recurring myocardial infarction for many patients (10:597). The high correlation between physical inactivity and heart disease suggests that postinfarction patients may need rehabilitative assistance to change sedentary life patterns to include exercise.

Necessary rehabilitative assistance can be given the postinfarction patient only if the health team is aware of his needs. To be able to assess the needs of the patient requires that the health team have a knowledge of some of the problems encountered by the postinfarction patient when he returns home. It would be helpful to know if postinfarction patients are likely to adhere to prescribed exercise and the factors that influence the adherence. This information could best be obtained directly from persons who have experienced myocardial infarction and have returned to their homes. The health team could use this information to guide the postinfarction patient in planning constructively for future activity.

Although the exercise of the convalescent postinfarction patient is usually limited it may be assumed that adherence to the

early exercise prescription may give some indication as to how the patient will respond to a more vigorous exercise program later on.

## Chapter 2

### THE STUDY

The health professions have made a concentrated effort in recent years to decrease the threat of coronary heart disease through prevention and rehabilitation. Improvements in coronary care and the resulting decrease in mortality have increased the need for rehabilitation.

#### DEFINITION OF THE PROBLEM

##### Purpose of the Study

The primary purpose of this exploratory study was to discover if patients with myocardial infarction followed prescribed exercise after they returned to their homes. An investigation was made to find the reasons that each patient either adhered to or deviated from the prescribed exercise.

The secondary purpose of the study was to test the hypothesis that patients who enjoyed an activity that could be allowed would be less likely to deviate from the exercise prescription than those who were not allowed to do activities they enjoyed.

##### Definition of Terms

The term exercise prescription refers to the activity ordered by the physician. Both activities to be performed and activities to be omitted were included in the exercise prescription. It was assumed



that the exercise prescription reflected the severity of infarction. In this study deviation was considered to be the performance of an activity that should have been omitted or the omission of an activity that had been prescribed.

#### Limitations

There were several limitations to this study. The lack of a written prescription for exercise in most cases limited the reliability of information about the prescription. The rating of adherence was based on recall of verbal instructions rather than a more reliable source of information. The fact that the interviewer was not present to verify what exercise the physician prescribed for the patient also limited the reliability of the study.

The physician's explanation of the exercise prescription was given verbally to the investigator some time after he had given the prescription to the patient. This increased the possibility of some variation between what the physician told the patient and what he told the investigator.

In view of the criteria used to determine adherence to the exercise prescription, more specific questions regarding the time and effort of various activities could have been included in the interview. More accurate data regarding the activities of the patients could have increased the accuracy of the jury in determining the patient's adherence to the prescription.

### THE SAMPLE

#### Description of the Sample

Men were selected for the sample because myocardial infarction



is more prevalent among men than among women. A convenience sample of fifteen Caucasian men hospitalized with myocardial infarction was selected from four hospitals. Three hospitals in Portland, Oregon, Portland Adventist Hospital, Providence Hospital, and Good Samaritan Hospital are privately owned general hospitals, and Loma Linda University Hospital is a private teaching hospital. The subjects were discharged from 19 to 36 days after infarction. The average length of stay in the hospital was 26.5 days.

Fourteen of the patients lived in Oregon. One patient lived in Southern California. The ages of the subjects ranged from 39 to 75 years. The average age for this sample was 58 years. Fourteen of the subjects were married and one was single.

Seven of the subjects in the sample were employed full-time before myocardial infarction occurred. Included in this group were: a lithographer, steamfitter, salesman, accountant, correspondence school instructor, foreman of sawmill equipment manufacturing, and an investigator of complaints about water bills.

The group of seven retired subjects included a former interior-exterior decorator, ship machinist, minister, truckdriver, electrician, plasterer, and sawmill worker. One patient was a semi-retired merchant.

Five of the patients had experienced a previous myocardial infarction.

#### Criteria Used to Diagnose Myocardial Infarction

The physicians attending the patients in this sample made the diagnosis of myocardial infarction by observation of specific signs and symptoms that are associated with myocardial infarction. According

to Fowler the information used by the physician to recognize myocardial infarction includes a history of chest pain, changes in serial electrocardiograms, and elevation of the serum enzyme levels. Elevation of body temperature, leucocytosis, elevation of the erythrocyte sedimentation rate are also observed to aid in the diagnosis of myocardial infarction. Although all of these signs and symptoms are observed, changes in the electrocardiogram and elevation of the serum enzymes are the most significant (6:461-463).

#### Indications of Myocardial Infarction Demonstrated by the Sample

All of the typical signs associated with myocardial infarction that are listed above were observed in four (27 percent) of the patients in this study (Appendix C). All of the patients had typical electrocardiographic changes. Twelve (80 percent) of the subjects had an elevation of one or more of the serum enzymes. Nine (60 percent) of the patients had an elevated leucocyte count. An elevation in the sedimentation rate was noted in eleven (73.3 percent) of the cases. Twelve (80 percent) of the subjects had an elevation of body temperature of 99 degrees Fahrenheit or above. The entire sample experienced pain that was typical of myocardial infarction. The final discharge diagnosis for each patient was listed by his physician as myocardial infarction.

The fact that the physician treated the patient as having a myocardial infarction and prescribed exercise accordingly was considered sufficient for inclusion in the sample for this study.

## CONDUCTING THE STUDY

Selection of Patients

Permission to examine the patient's records and to visit the hospitalized patients was obtained from the medical records librarian and the director or assistant director of nursing service in each hospital. Nursing service assisted in the location of patients with myocardial infarction.

Physicians on the medical staff of Portland Adventist Hospital received a letter that described the study (Appendix A). Permission to interview patients who were hospitalized with myocardial infarction was granted by these physicians (Appendix A).

When it became evident that there was not an adequate number of patients with myocardial infarction available in Portland Adventist Hospital, patients in Providence Hospital, and Good Samaritan Hospital were included in the study. Loma Linda University Hospital was contacted later. The physicians in the hospitals in Portland were contacted after the patient's record had been checked for indication of a confirmed diagnosis of myocardial infarction. In several instances when the patient was to be discharged shortly the physician was contacted by telephone. The study was briefly described at this time and permission to interview the patient was obtained. Further description of the study was given in a letter that included an interview guide and a form for the physician to sign indicating that his patients could be included in the study. Verbal confirmation of a diagnosis of myocardial infarction was given by the physician of each patient in this study before the patient was visited.



### The Hospital Visit

A brief visit was made to the hospitalized patient before he was discharged. The purpose of this visit was to obtain information about the pattern of activity in occupation and recreation the patient was accustomed to before myocardial infarction occurred. This was also an opportunity for the patient to see the interviewer and to ask questions he might have about what was expected of him when he was interviewed in his home. Two of the patients were not visited in the hospital because they were discharged earlier than the investigator expected. These men gave permission for the home visit to be made when they were contacted by telephone.

Each patient in the sample was informed that the investigator was a nurse interested in helping patients plan for the return to normal activity after myocardial infarction. It was stated by the investigator that patients who had experienced myocardial infarction were considered to have valuable information to contribute to the study.

Arrangements for the home visit were discussed after the patient gave permission for the visit. Each patient visited in the hospital was told that he would be contacted by telephone so the home visit could be arranged at a convenient time for him and his wife. The home visits were made from seven to eighteen days after the patients were discharged from the hospital.

### The Interview Guide

An interview guide (Appendix B) with open-ended questions was constructed to compare the exercise pattern of the subject before

myocardial infarction with his exercise after discharge from the hospital.

Literature was reviewed as the interview guide was prepared to discover possible influencing factors in the rehabilitation of the postinfarction patient. Interview guides used in other studies which explored patient adherence to specific physician's orders were also reviewed.

The interview guide was designed to gather information about the exercise of the postinfarction patient, before infarction, during hospitalization, and at home. The first questions on the interview guide were the least threatening of the questions asked the subjects.

Each patient was asked what his activity in the hospital had been. This information was obtained to compare the exercise behavior in the hospital with that performed at home. A request for the description of the activity prescribed by the physician was made to determine whether the patient had a knowledge of the prescribed exercise.

Two questions were included about change in activity. The purpose of these questions was to discover how much change in activity occurred after infarction and how this affected the family routine.

The question "Is there an activity that you can do now that you like to do?" was designed to test the hypothesis that patients who can be allowed to do activities they enjoy would be more likely to follow the exercise prescription.

To aid in the identification of problems encountered by the postinfarction patient, a question was asked about restrictions that

were the most difficult to follow.

Three questions about the physical symptoms of chest pain, shortness of breath, and fatigue were included in the interview guide to find out if the performance of activity was affected by any of these symptoms.

A report of the activities performed during the day of or the day before the interview was requested for the purpose of comparing the activities with the prescription.

The final question directed to the patient was, "Do you feel that you follow what your doctor told you to do?" This question was asked to learn what concept the patient had of his adherence to the prescription for exercise. Since this question was considered to be the most threatening of those asked the subjects it was saved until the last.

The last question on the interview guide was designed to obtain information from the spouse of the patient. The spouse was asked if there was other information that could be added, to determine if there were any corrections or additions to the information the patient had stated about his activity.

### The Interview

The guided interview was used to gather the data for this study. Selltiz pointed out that the interview can be a unique opportunity to gather information in a short period of time if the interviewee is able and willing to communicate the information desired. The interview allowed flexibility since the questions could be repeated or rephrased for clarification (21:237, 242).



The subjects interviewed for this study seemed pleased to have a home visit. An effort was made to restrict the interview to forty-five minutes to avoid tiring the patient. All of the patients seemed to enjoy having someone to talk to however, and termination of the interview was difficult in several instances. Several of the interviews lasted longer than an hour.

The interview guide was not referred to until near the end of the home visit as an effort to make the interview informal. Before the close of the interview the questions were reviewed by the investigator to determine if the patient had given enough information to answer the questions on the interview guide.

#### Criteria Used to Determine Adherence to Prescribed Exercise

The criteria for the evaluation of the data in this study were based on the metabolic cost and levels of activity as presented by Kottke and others. According to Kottke light activities have a metabolic cost of 1.6 to 2.5 calories per minute. Moderate activities have a metabolic cost of 2.6 to 3.5 calories per minute. The metabolic cost of a heavy activity was considered to be over 3.5 calories per minute (48:543). Kottke stated that the postinfarction patient should perform only light activities during the convalescent stage (47:132). However other physicians may differ on this point and prescribe selected moderate activities for the postinfarction patient.

The activities reported by the patient in the interview were compared with the exercise prescription to determine if the patient followed the exercise prescription. The energy costs of the reported activities were determined by consulting references that listed the

metabolic cost or calories per minute of various activities (35:438-441; 20:218-219; 5:82-83).

Considering the activities which were deviations from the prescription, the total exercise behavior of the patient was placed in one of four categories: no deviation, minor deviation, moderate deviation, or major deviation. Within the category of moderate or major deviation the exercise behavior was further classified as either plus or minus in deviation. If the activities of the patient were less than the prescribed exercise the deviation was considered to be a minus deviation. Activities that exceeded the prescription were rated as plus deviations.

Categories of adherence to prescribed exercise. The patient was placed in the category of no deviation if he adhered to the exercise prescription by performing the activities prescribed and by omitting activities that were contraindicated or not ordered. If the patient performed activities that were not prescribed but were of equal metabolic cost and could be substituted for the prescribed activities his deviation was considered to be a minor deviation. Moderate deviation was a deviation in one to two activities that had a metabolic cost between 2.6 and 3.5 calories per minute. Major deviation was a deviation of three or more activities that had a metabolic cost between 2.6 and 3.5 calories or any deviation that had a metabolic cost over 3.5 calories per minute.

In this study the patient was considered to be following the exercise prescription if his exercise behavior did not include any deviations or if the deviation from the prescription was minor.

The Method Used to Determine Adherence to Prescribed Exercise

The investigator and three other graduate students in medical-surgical nursing separately evaluated the energy costs and exercise behavior of each patient. The category that the majority (75 percent) of these judges placed the patient in was used to determine the adherence of the subject to the exercise prescription. The materials used by the judges are in Appendix D. This method of classifying data was used as an effort to reduce bias.



## Chapter 3

### THE RESULTS OF THE STUDY

Fifteen postinfarction patients were interviewed to determine if they followed exercise prescribed by a physician. The data about exercise behavior obtained in the interviews were compared to the exercise prescription and rated by four judges. The judges determined whether the subjects followed the prescription or not by selecting a category of adherence for each subject. The adherence of each subject to the prescription was determined by the category of adherence that the majority (three) of the judges selected.

Responses to questions during the interviews are discussed in the first section of this chapter. The second section contains a review of patient adherence to the prescription as rated by the judges. Adherence to the prescription and the reasons the patients did or did not follow the prescription are discussed in the third section.

#### RESPONSE TO QUESTIONS DURING INTERVIEWS

##### Activity During Hospitalization

All of the patients were questioned about physical activity during hospitalization. While there was a variety in the number of days at which it was ordered, each patient reported having been allowed to be up to the bathroom. Two (13.3 percent) of the patients stated that the only walking done during hospitalization was to the bathroom

which was located near the patient's room. One of these patients observed that he felt a certain amount of weakness when he began to increase ambulation at home. It was noted that the distance for ambulation other than to the bathroom varied from an approximate 50 feet per day for some, to approximately 100 feet per day for others. One (6.6 percent) patient reported having walked about 200 feet per day shortly before discharge from the hospital.

Two (13.3 percent) of the patients reported that they exceeded the physicians' orders for activity in the hospital. Comparison of data shows that these patients also deviated from the exercise prescription at home. This would suggest that observance of the patient's reaction to prescribed activity in the hospital may give significant clues to indicate what his attitude is toward exercise after myocardial infarction.

#### Patient Knowledge of the Exercise Prescription

The question, "What activity did your doctor tell you to do at home?" was asked to determine if the patient understood the exercise prescription. The exercise prescriptions usually included the amount of walking or sitting the patient should do and several contraindicated activities such as walking up stairs or lifting. Although most of the patients could repeat the prescription accurately, a desire for more information about exercise was often expressed.

A total of 13 (83 percent) of the patients in the sample received verbal prescriptions for exercise. Two (13.3 percent) of the patients had been given a written prescription. Eleven (73 percent) of the subjects were able to repeat the physicians' instructions for

exercise in a way that corresponded accurately with that reported by the physician. However 3 (20 percent) of the patients who accurately repeated the verbal prescription asked the investigator about the activity they should do. Two of these patients who had questions deviated from the prescription.

The patients who had a written prescription were able to state the prescribed exercise without referring to the prescription. These patients did not ask questions about their activity although one had deviated from the instructions.

Table I shows that an inaccurate report of the prescription was given by four of the patients who deviated from the verbal instructions. Five of the subjects did not follow the physician's orders although they had given a correct account of the prescription. A total of nine did not follow the prescription. The four subjects who followed the prescription reported it accurately.

Three of the subjects commented that the physician "didn't tell me much" or "he just told me to take it easy". However it was interesting to note that these subjects had been given more detailed information than it first seemed and they were able to repeat the exercise prescription accurately.

A total of five (33.3 percent) of the subjects in the sample questioned whether their activity was what it should be. This implies that some postinfarction patients may be leaving the hospital with unexpressed questions or misunderstandings about exercise at home.

#### Change in Activity After Hospitalization

The subjects were asked how their activity had changed since



TABLE I  
 RELATIONSHIP OF PATIENT'S KNOWLEDGE OF PRESCRIBED  
 EXERCISE TO THE JUDGE'S RATING OF ADHERENCE

Number of Patients	Followed	Opinion of Judges		Totals
		Didn't Follow	Adherence not Determined	
Reported Exercise Prescription Accurately	4	5	2	11
Reported Prescription Inaccurately	0	4	0	4
Totals	4	9	2	15

myocardial infarction occurred. Many of the subjects seemed dissatisfied with their present activity. Negative responses to the question were given by ten (66.6 percent) of the patients. The phrase "I can't" was used often in reference to specific activities they had been instructed to omit. The contraindicated activities mentioned most often were driving, riding in a car, repairs around the house, and gardening.

Six (40 percent) of the subjects reported not being able to do their own household repairs and gardening as they had before infarction. Employment was mentioned by only one (6.6 percent) subject. He was a semiretired merchant who enjoyed selling to customers. Three (20 percent) of patients who had deviated from the prescription made the statement "I can't do anything".

Three (20 percent) of the subjects who had been ill before infarction did not note much change in activity. Their illnesses included a cerebral vascular accident six weeks before infarction, a urinary tract infection, and episodes of mild burning chest pain for several weeks before hospitalization with infarction.

A decrease in the amount of walking and an increase in time spent "lying around" was reported by two (13.3 percent) retired subjects. Both of these subjects seemed content with the change in activity.

The subjects who reported the least change in activity seemed to have the least difficulty in adjusting to and following the exercise prescribed. The large number of negative responses suggests that the emphasis on activity for the postinfarction patient may still be on restriction of activity rather than on the activities that the

patient can be allowed to do.

#### The Effect of Change in Activity on Family Routine

The question was usually phrased "How does your change of activity fit into the family routine of activity?". Five (33.3 percent) of the subjects did not note a significant change in family routine, or report any problems caused by the change.

The temporary restriction of social activities was the primary change reported by four (27 percent) of the subjects. They missed being able to go out to eat and visit friends. Three (20 percent) of the patients seemed annoyed because they had to allow teenage sons or other men to make repairs in their homes.

Two (13 percent) of the patients were not in their own homes after hospitalization. One of them stayed in his son's home and was a part-time babysitter for his year-old grandson. A single patient who did a lot of driving in his work as a salesman indicated that he felt lost and restless just staying in his sister's home.

Household duties increased for one (6.6 percent) subject. He began preparing breakfast for both him and his wife and helped more with the canning and freezing of food than he had done previously.

Although the roles of their family members were changed by the hospitalization and decrease in activity experienced by the patient, none of the patients mentioned that other members of the family had to alter their activities. The change may have been insignificant but it seems possible that the topic of change in the family routine may have been an unpleasant reminder to some of the subjects that the role they were accustomed to had been altered. These changes may have been



difficult for the patients to discuss.

#### Activities Enjoyed Within the Exercise Prescription

The question asked was usually "Is there an activity that you can do now that you like to do?" Seven (46.4 percent) of the subjects could not think of any activity they enjoyed. Watching television and reading was enjoyed by four (26.6 percent) of the subjects. Reading was a favorite pastime of two (13.3 percent) of the patients. One (6.6 percent) patient watched television a great deal before myocardial infarction and continued to enjoy it after he was discharged from the hospital. Listening to the radio and stereophonic music was particularly enjoyed by one (6.6 percent) subject who had assembled the electronic components of the stereo before infarction occurred.

Testing the hypothesis. The hypothesis that the patients who enjoyed an activity that could be allowed would be less likely to deviate from the exercise prescription was not supported by the data in this study.

Fisher's exact test was used to test the hypothesis. This test is an exact method for testing the hypothesis of independence in 2X2 contingency tables when the sample is less than 40 (12:23). Results of the test did not show a significant association between following the prescription and having a diversion that could be enjoyed. However there was a significant association of .042 between the subjects who did not adhere to the prescription and reported an enjoyed activity.

It appeared that the patients who seemed to adhere to the prescribed exercise did not feel well enough to be interested in

enjoyable diversion or hobbies. The subjects who did not note fatigue or weakness seemed more likely to attempt former activities that were contraindicated although they reported that they had diversions that could be enjoyed within the exercise prescription.

Eight of the subjects reported an activity that they could enjoy without deviating from the exercise but most of these diversions soon became tiresome. This may have been due to the lack of hobbies and diversion before infarction. There was not much variety in diversion noted. Watching television and reading were mentioned the most often. Most of the subjects did not have more than one interest so that activities could be alternated to vary the routine. The hobbies and diversions to which the subjects were accustomed and which they seemed to enjoy most were contraindicated. Some of the activities the patients enjoyed before myocardial infarction were horseback riding, carpentry, hiking, and gardening.

Planning for diversion did not seem to be part of the exercise prescription. Patients may need guidance in planning diversion since they may be hesitant to begin any new activity not specifically recommended to them by the health team.

#### Restrictions That Were the Most Difficult to Follow

To discover which restrictions were the most difficult to follow the patients were asked, "Which restrictions are the hardest to follow?" The contraindicated activities that were the most difficult to avoid seemed to be those that a man usually performs to maintain a home and provide for his family. Seven (46.6 percent) of the subjects found it difficult to keep from doing maintenance and repairs in the



home and yard. A grandfather and a 41-year-old father (13.3 percent) had difficulty in remembering not to lift small children. One (6.6 percent) subject often forgot to walk slowly up stairs instead of running. The salesman who enjoyed driving and the merchant who enjoyed his business (13.3 percent) were anxious to get back to work. One (6.6 percent) of the subjects liked to cook and had to be reminded by his wife to stay out of the kitchen.

Two (13.3 percent) of the subjects reported that they did not feel well enough to do anything other than rest in bed or sit up for short periods of time. They did not seem to be tempted to perform activities that were contraindicated.

The tasks of minor repairs in the home seemed to be a problem that most of the patients encountered. It may be that these tasks were not only obvious temptations but may have also caused the subjects to feel that they were not as much the head of their house as they were before infarction.

#### Limitation of Activity by Chest Pain, Shortness of Breath, and Fatigue

The subjects were asked whether chest pain, shortness of breath, or tiredness limited activity at any time. Four (26.6 percent) of the patients reported chest discomfort. Two of these subjects noticed the discomfort when lying down or sitting as well as at other times. The subject who helped his wife around the house noted a tightness in his chest at times and stopped his activity to rest when it occurred. A patient who watered in the yard noted that bending over caused chest pain.

Fatigue was noted by three (20 percent) of the patients. One



patient reported feeling tired in ten minutes when he sat up after bedrest. Two of the patients who noted fatigue had been ill before infarction. One of them was tired after twenty minutes and the other after thirty minutes of sitting in a chair.

None of the patients noted shortness of breath. Eight (53.3 percent) of the subjects did not report chest pain, fatigue, or shortness of breath. Thirteen (86.6 percent) of the subjects stated that these physical symptoms did not limit their activity. The performance of a contraindicated activity to the point of chest pain or fatigue suggests the possibility that the subject might be denying the existence of injury to his heart.

#### Patient's Concept of Adherence to Prescribed Exercise

The subjects were asked if they felt they were following the instructions the physician had given them. Twelve (80 percent) of the patients stated that they were following the instructions. Four of the patients who said they were following orders expressed fear of recurrence of chest pain and myocardial infarction. It is interesting to note that these subjects stated earlier that chest pain did not limit their activities. These patients deviated from the prescription although they expressed fear of chest pain and a recurrence of infarction.

A patient who was ill before infarction stated that he followed the instructions "because what the doctor says is law". Another patient who deviated from the prescription but believed he followed it reported that his physician had told him he could find his own limits in activity. This patient had performed activities that had been

specifically contraindicated by the exercise prescription.

Four of the patients who stated they were following the prescription have had a previous myocardial infarction. Although these patients seemed particularly concerned about avoiding contraindicated activity three of them deviated from the prescription.

Three (20 percent) of the subjects reported that they had not followed all of the instructions for activity. Fear of the future seemed uppermost in the mind of one subject. Although he mentioned that he "could go any time", he deviated by performing activity in excess of the prescription many times. All of the subjects who reported not following the prescription had deviated by performing excessive activity.

The concept the patients in this sample had of their adherence to prescribed exercise was valid in seven (46.6 percent) of the cases. Four (26.6 percent) of the subjects stated that they were following the exercise prescription and three (20 percent) stated they were not.

The relationship of the patients concept of adherence to the exercise prescription to the judges rating of exercise behavior is summarized in Table II. Of the eight patients that deviated from the prescription in excess, three seemed to be aware that they had deviated by performing less activity than prescribed but believed that he was following the instructions.

There was a discrepancy between the concept the subjects in this sample had of their adherence to the exercise prescription and what their exercise behavior actually was. This suggests that some of the subjects may have misunderstood the prescription or were not aware that the activities they performed were a deviation from instructions.

TABLE II  
 RELATIONSHIP BETWEEN THE PATIENT'S CONCEPT OF ADHERENCE TO  
 PRESCRIBED EXERCISE AND THE RATING OF THE JUDGES

Number of Patients	Followed	Opinion of Judges		Totals
		Didn't Follow	Adherence not Determined	
Think they are Following Prescribed Exercise	4	6	2	12
Think they are not Following	0	3	0	3
Totals	4	9	2	15



### Information Given by Wives

During the interview with the patients the women present were asked if there was anything that could be added to what the patient had said. Thirteen of the women were wives, one was a sister, and one was a daughter-in-law.

Six (40 percent) of the women reported that they had to prevent the patients from performing activities that were contraindicated. One of the wives told her husband to stop talking during the interview so he wouldn't get "too tired". Another wife told the interviewer that her husband "wasn't going to get away with doing nothing" as long as he was around the house. This woman made repeated attempts to answer for her husband during the interview.

Activities performed by the subjects that were a deviation from the exercise prescription were reported by four wives. Incidents which upset the subjects after infarction were mentioned in the interview by two wives.

Two of the women did not report any information about the subject that was different from that which the subject had disclosed about himself. Most of the women who were present for the interview did very little talking.

Most of the wives reported telling their husbands what to do about activity and other orders that the physician had given the subjects. This suggests that these women take the role of trying to protect their husbands from further illness. Some of the wives may have been overprotective because they were not aware of what the prescribed exercise should have been or had not been involved in the plans for exercise to be performed at home.

## AGREEMENT OF THE JUDGES

Four judges separately rated the exercise behavior of the patients. The adherence of each patient to the prescription was determined by the category of adherence that the majority (three) of the judges selected.

Table III shows that all of the judges agreed on the category of adherence of seven (46.6 percent) of the patients. Four (26.6 percent) of the subjects were categorized the same by a majority of the judges.

The categories of adherence were those of no deviation and minor deviation while the categories of deviation were moderate and major. The thirteenth subject was placed in categories of adherence by a majority of the judges. Categories of deviation were selected by three of the judges for the ninth subject.

The adherence to the exercise prescription of two of the patients was not determined by a majority of the judges. This lack of agreement may have been partly due to difficulty in rating the exercise behavior of the patients since the time spent in exercise was not included in the data. Disagreement of the judges may also have been caused by the general terms that were used in several of the exercise prescriptions.

## ADHERENCE TO THE PRESCRIPTION

Nine (60 percent) of the subjects deviated from the exercise prescription. Eight of the patients deviated from the prescription by performing exercise in excess of the instructions. Deviation by

TABLE III  
 AGREEMENT OF JUDGES AS TO PATIENT ADHERENCE  
 TO THE EXERCISE PRESCRIPTION

Patient	No Deviation	Minor Deviation	Moderate Deviation		Major Deviation	
			+	-	+	-
1					100%	
2					100%	
3	100%					
4					100%	
5					100%	
6					100%	
7		50%	50%			
8		75%	25%			
9		25%		50%		25%
10	75%	25%				
11		50%	50%			
12			25%		75%	
13	25%	50%	25%			
14	25%				75%	
15					100%	



performing less exercise than prescribed occurred in one case.

Adherence to the prescription was observed in the exercise behavior of four (26.6 percent) of the subjects. It was not determined by the judges if two (13.3 percent) of the patients followed the exercise prescribed.

#### Reasons for Following the Exercise Prescription

The four subjects who seemed to be following the exercise prescription did not seem to feel well enough to do any activity beyond that prescribed by the physician. The third subject had been having mild episodes of pain in the mid chest for several weeks before infarction occurred. This subject had a previous infarction and reported that he did not feel strong enough to be up and around for very long at a time. A second infarction had also been experienced by the eighth subject. He reported having chest pain at times when he was just lying down and that he did not feel well enough to sit in a chair very long. Subject #10 had been ill with a urinary tract infection before infarction and became tired after thirty minutes of sitting in a chair. The thirteenth subject had a cerebral vascular accident six weeks before myocardial infarction. This patient was able to ambulate slowly by himself. The adherence of this subject to the exercise prescription may have been influenced by his decreased ability to ambulate as well as by his brother's recent death due to myocardial infarction.

Although fear of death was not mentioned by any of the subjects who followed the prescription it may have been a factor. Both the third and the eighth subject reported that the infarction had been rather serious and they were aware that their prognosis had been quite guarded several times during hospitalization.

### Reasons for Not Following the Exercise Prescription

Adherence to the exercise prescription seemed to be difficult for many of the patients. Boredom and restlessness from "just being around the house" was reported by six (40 percent) of the subjects. The subjects who enjoyed reading and watching television often became tired of it. Hobbies or other diversions did not seem to be part of the exercise prescription.

Questions about the exercise prescription and a desire for more details about activity were reported by five of the patients. Several of the subjects wondered if they were doing the right amount of activity. These uncertainties were not mentioned by the patients who received a written prescription.

Avoiding contraindicated activity that had once been routine was a problem to many of the patients. Seven (46.6 percent) of the subjects found it difficult to keep from making minor repairs around their homes.

### Adherence to the Exercise Prescription as Related to Age

Table IV indicated the relationship of age to the exercise behavior of the subjects. There was not a majority of patients in any one age group. A significant number of patients did not either adhere to or deviate from the prescription in any of the age groups. This may have been due to the small sample.

TABLE IV  
ADHERENCE TO PRESCRIBED EXERCISE  
AS RELATED TO AGE

Number of Patients	Ages				Totals
	39-48	49-58	59-68	69-78	
Adhered to Prescribed Exercise	0	1	2	1	4
Deviated from Prescribed Exercise	3	1	2	3	9
Adherence not Determined	1	0	1	0	2
Totals	4	2	5	4	15



## Chapter 4

### DISCUSSION OF THE RESULTS

Identification of several problems that seem common to postinfarction patients was possible in this study although the sample was small. Some of these problems appear to be similar to those found in the literature.

#### COMPARISON OF DATA WITH LITERATURE

A comparison of the data of this study of postinfarction patients with that found in literature shows that inadequate communication between the health team and the patient can cause deviation from the physician's orders. Dinsmore observed that 52 percent of patients who were over sixty years of age were making errors in self-medication. Twenty-eight percent of the errors were errors of omission (69). In comparison, 60 percent of the postinfarction patients deviated from the exercise prescription. One (6.6 percent) of the patients deviated from the prescription by omitting prescribed activity. A desire for more information was expressed by 46.6 percent of the postinfarction patients. There were 26.6 percent of the patients in this sample who did not repeat the prescription accurately. These patient responses imply that communication between the health team and the postinfarction patient may not be adequate.

A majority of the patients on low-cholesterol diets studied by Peterson followed the diet prescription. However monotony was a

problem to 29 percent of the patients who did not adhere to the diet (70). Monotony was also a problem to the postinfarction patients studied to determine adherence to prescribed exercise. Forty percent of the subjects reported that they were bored with the decrease in activity.

Previous habits seemed to influence adjustment to the physician's orders. Long-standing food habits that could not be allowed on a low-cholesterol diet were difficult to change for 14 percent of the subjects in the study done by Peterson (70). Difficulty in avoiding contraindicated activity that had been routine was reported by 46.6 percent of the postinfarction patients who were studied to determine adherence to prescribed exercise.

Rosen and Bibring observed several characteristics in men of certain age groups that could influence adherence to physician's orders. External achievement and autonomy are the goals that the majority of men under fifty strive for. Men between the ages of fifty and sixty usually still feel they must push on but they begin to doubt their ability to reach personal goals. Increased passiveness, dependence, and compliance is often seen in men over age sixty. The men in this age group may accept limitations imposed by illness more readily than younger men (58:815).

There were four subjects in the study of postinfarction patients who were younger than fifty. Three of these subjects deviated from the exercise prescription by performing activity in excess of the prescription. Of the three patients in their fifties, only one deviated by performing activity in excess of the prescription. Four of the eight subjects over sixty years of age deviated by performing

excess activity. One of these patients deviated by omitting prescribed activity. The postinfarction patients who were older than sixty did not seem to accept limitations in activity any more readily than the younger men.

Adsett and Bruhn noted that the wives of postinfarction patients often see themselves as "feeders and protectors" of their husbands (23:584). In comparison, forty percent of the wives of postinfarction patients whose activities were studied made attempts to prevent their husbands from overexerting. These women tried to keep their husbands from performing proscribed activities.

#### IMPLICATIONS FOR NURSING

The following recommendations are for nurses who are involved in rehabilitation of postinfarction patients. Because over one half of the postinfarction patients in this study did not follow prescribed exercise, and because they were found to have questions about exercise even though they knew the prescription, it is suggested that nurses could contribute to helping these patients follow an exercise pattern.

1. If nurses are aware of the patient's background, exercise habits, knowledge of his illness and reaction to it, nurses could help fit the prescription to the patient and help him to understand it. This information may be gathered by obtaining a nursing history from the patient and/or close family members.

2. If nurses communicate pertinent information about the patient's usual activities (recreational, home and business) to other members of the health team the exercise prescription could be fitted to the needs and home environment of the patient. This communication



and planning could be facilitated by involving physicians, nurses, patient and spouse in a discharge planning conference.

3. Once the physician has given the exercise prescription to the patient the nurse can discuss the prescribed activities with the patient and family to clarify their understanding of the prescription.

4. Having discussed the exercise prescription with the patient, the nurse could encourage the patient to question the physician regarding details unclear to the patient.

## Chapter 5

### SUMMARY AND CONCLUSIONS

#### SUMMARY

The purpose of this study was to discover if postinfarction patients adhere to their exercise prescription after they are discharged from the hospital. The reasons they did or did not follow the prescription were investigated.

A review of the literature revealed that there is a relationship between physical activity and coronary heart disease. Physically active individuals seem less likely to develop coronary heart disease. Studies have shown that exercise increases collateral growth and the size of the lumina of the coronary blood vessels.

The benefits of exercise training included an increase in the efficiency of the heart. More cardiac work is done with less cardiac effort. These improvements were observed in presumably healthy persons as well as subjects who had myocardial infarction.

Studies of patients with various health problems have shown that many patients have difficulty in adjusting to prescribed changes in living. The patient who has had myocardial infarction may be fearful that beneficial exercise will be harmful to his heart. Recurrence of infarction may also be feared. Conversely he may deny that the injury to his heart was serious and attempt activity that is too strenuous. How well he adheres to his early exercise prescription

may give clues as to how well he will follow a graduated exercise program in the later rehabilitation period.

The data for this exploratory study were obtained by partially-structured interviews. Fifteen men who had experienced myocardial infarction were interviewed in the hospital and at home.

The exercise behavior of the subjects was compared with the prescribed exercise and rated according to criteria based on the metabolic cost of various activities. Adherence was determined by the category that the majority of four judges selected for each subject.

Nine of the subjects deviated from the exercise prescription. One of the patients who deviated from the instructions performed less activity than had been prescribed. Four of the subjects seemed to follow the prescription. The judges did not agree on how well two of the subjects followed their exercise prescription.

Five of the patients in the sample had questions about prescribed exercise. The two patients who had a written prescription did not seem to have this kind of question. The activity most difficult for seven of the subjects to avoid was that of making minor repairs around the home. It was noted that the four patients who followed the prescription reported either having been ill before infarction, or had experienced fatigue or chest pain after infarction.

The exercise prescription was repeated accurately by eleven of the subjects but only four of the subjects followed the prescribed exercise. Five of the subjects in the sample who repeated the prescription accurately, deviated from the instructions. The adherence of two who repeated the prescription accurately was not determined by the judges. An incorrect report of the activity prescribed was given by four patients who deviated from the prescription.



A change in activity was noted by twelve subjects. Three of the patients had been ill before infarction and did not note much change in activity. A majority of the patients were conscious of activities they were advised not to perform. Responses to the questions about change in activity usually contained a negative answer and an example of forbidden activity was mentioned.

Changes in family routine after infarction were mentioned by six patients. Four of the subjects noted change in social activities and five subjects did not note any change in family routine.

Seven of the subjects did not have an enjoyed diversion that could be allowed. Reading and watching television was enjoyed by eight subjects but some of them became bored with these diversions after a short time. Fisher's exact test was used to determine if the data supported the hypothesis that patients who could be allowed to perform an enjoyed activity would be more likely to follow exercise instructions. The results of the test did not support the hypothesis. Seven of the subjects enjoyed some of the activities included in their exercise prescription, yet they did not follow the prescription.

Eight patients reported their activity was not limited due to shortness of breath, chest pain, or fatigue. Shortness of breath was not noted by any of the patients in the sample. Four patients reported chest pain. Fatigue was reported by three of the patients.

Although twelve of the subjects in the sample stated that they followed the physician's instructions for exercise, only four of them adhered to the prescription. The three subjects who reported that they did not follow all of the instructions for activity had deviated by performing excessive exercise.

Six of the wives reported trying to prevent their husbands from performing forbidden activities. Activity in which their husbands had deviated from the prescription was reported by four of the women.

The adherence of postinfarction patients to prescribed exercise appears to be related to the amount of change in activity. The subjects who adhered to the exercise prescription seemed to have the least change from their usual activity.

### CONCLUSIONS

The reactions of other men who have had myocardial infarction could not be predicted statistically since the sample in this study was small. However conclusions of clinical significance were drawn from the data of the sample:

The majority of the postinfarction patients did not follow the exercise prescription. One of the subjects performed less activity than prescribed but the other subjects deviated from the prescription by performing excessive exercise.

Some of the possible reasons why patients followed prescribed exercise were fatigue and chest pain. The patients who followed the prescription did not seem to feel well enough to do any activity beyond that prescribed by the physician.

Possible reasons for not following the prescription included boredom and misunderstanding of the prescribed exercise. The avoidance of proscribed activity that had been routine was a problem to many patients.

The hypothesis that patients who enjoyed an activity that could

be allowed would be less likely to deviate from the exercise prescription was not supported.

#### RECOMMENDATIONS FOR FURTHER STUDY

The problem of this study apparently needs wider investigation. If, as some research seems to indicate, exercise after myocardial infarction, is beneficial then it is important that the patient exercise as prescribed. The following suggestions might be considered by those conducting studies on this problem.

1. Written exercise prescriptions in terms of specific exercise behavior on a graduated scale would provide a more objective criterion for the patient to follow and a more reliable research tool.
2. An exercise diary kept by the patient might provide more objective evidence of adherence to prescribed exercise than a recall type of interview.
3. Separate interviews with both the patient and spouse may reveal facts about the patient's adherence to prescribed exercise that could not be obtained from an interview with the patient alone.
4. A week by week study of the patient's adherence to a prescription of graduated activity might reveal relationships between time and deviations from the prescription.
5. A comparative study of the adherence to prescribed exercise could be performed on two matched groups of patients, one receiving instruction from the physician alone, the other receiving instruction from a health team discharge planning conference.
6. A comparative study of the adherence to prescribed exercise could be performed on two matched groups of patients, one receiving



instruction from the physician with no clarification and reinforcement of instruction by nurses, the other receiving instruction from the physician with clarification and reinforcement by nurses.

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APPENDIX A



June 3, 1969

Miss Marsha Schwartz  
Farmington, Washington 99128

Dear Miss Schwartz:

The Research Advisory Committee on Human Experimentation has voted to approve your study on patients with myocardial infarction. This approval is given with the understanding that you will acquaint the Committee promptly with any change in your plans or procedure that might affect the rights or welfare of your subjects.

With every wish for your success in these investigations,  
I am

Sincerely yours,

John E. Peterson, M.D.  
for the Research Advisory Committee  
on Human Experimentation  
Loma Linda University

JEP:rm

Dear Dr.:

I am a nurse in graduate school conducting a study of men who have had myocardial infarction. The purpose of this study is to determine whether patients with myocardial infarction follow the prescribed activity when they are discharged from the hospital. The reasons they do or do not follow the prescription will be investigated.

I would like to include your male patients who have had myocardial infarction in this study. Enclosed is a copy of the interview guide that will be used to interview the patients. A short visit will be made before the patient is discharged from the hospital. The home visit will be made about one week after the patient has returned home. I will be contacting you to learn what instructions each patient received about physical activity.

A consent form has been enclosed for your signed permission to indicate that your patients may be included in the study. The consent form may be mailed in the self-addressed stamped envelope provided.

Thank you for your interest and consideration.

Sincerely yours,

Marsha Schwartz, R. N.

Enclosures

## PHYSICIAN'S CONSENT FORM

Date \_\_\_\_\_

I hereby grant permission for Marsha Schwartz to interview  
my patients who have had myocardial infarction.

Signed \_\_\_\_\_



June 6, 1969

Miss Marsha Schwartz  
14406 N. E. Glisan  
Portland, Oregon 97230

Dear Miss Schwartz:

Your letter of May 30, 1969, has been received in which you have asked to do your research in male cases with myocardial infarction in our hospital.

In behalf of the hospital, we give you permission to carry out the above study, providing that you also obtain permission from the individual doctors involved, as you mentioned.

Success as you continue your study, and anything further that we can do to assist you, please let us know.

Sincerely,

Beverly Bunnell, R.N.  
Director of Nursing Service  
Portland Adventist Hospital

BB/ny

## CONSENT TO REVIEW MEDICAL RECORD CHARTS

Marsha Schwartz is hereby granted permission to use information from the records of male patients in this hospital who have myocardial infarction.

Signed \_\_\_\_\_  
\_\_\_\_\_

APPENDIX B



## INTERVIEW GUIDE

The Hospital Visit

What did you do in a usual day before this (heart attack) happened to you?

Work  
Recreation  
Hobbies  
Weekends

The Home Visit

1. What activity did you do in the hospital?
2. What activity did your doctor tell you to do at home?
3. What do you do differently now than before you went to the hospital (or before heart attack)?
4. How does your change of activity fit into the family routine of activity?
5. What are you allowed to do now that you like to do?
6. Which restrictions are the hardest for you to follow?
7. How much does chest pain limit your activity?
8. How much does shortness of breath limit your activity?
9. How much does tiredness limit your activity?
10. What do you do in a usual day now?  
What did you do today (or yesterday), for instance, from the time you got up in the morning?  
What activity do you usually do on weekends?
11. Do you feel that you follow what your doctor told you to do?
12. (to wife) What would you like to add, Mrs. X?

APPENDIX C

CRITERIA FOR DIAGNOSIS OF MYOCARDIAL INFARCTION

Patient	EKG Changes Typical of MI	Serum Enzyme Elevation		Leucocytosis	Elevation of Erythrocyte Sedimentation Rate	Elevation of Body Temperature	Pain Typical of Myocardial Infarction
		LDH	SGOT CPK				
1	x	x		x	x	x	x
2	x			x		x	x
3	x	x	x	x	x	x	x
4	x	x	x	x	x	x	x
5	x	x	x	x	x	x	x
6	x				x		x
7	x		x		x		x
8	x	x	x			x	x
9	x	x	x	x	x	x	x
10	x	x			x	x	x
11	x	x		x	x	x	x
12	x						x
13	x	x	x	x	x	x	x
14	x	x	x				x
15	x	x	x	x	x	x	x
Totals	15	5	11	9	11	11	15



APPENDIX D

## INSTRUCTIONS

Step 1 Determine whether activity performed by the patient is a deviation from the prescription.

- A. Compare the exercise in the "exercise reported" column with the exercise prescription.
- B. Place a + or - to the left of the activity that is a deviation to indicate whether the activity performed was in excess of, or less than the prescription.

Note:

- + deviations exceed the prescription
- deviations omit or perform less than the prescription

Step 2 Assign an energy cost to the deviation in activity.

- A. Consult the material that contains the energy costs of various activities. If the exact activity the patient performed is not on the list use the energy cost of the activity that is the most like the activity performed by the patient.
- B. Write the energy cost of the deviation in activity to the right of the "exercise reported" column.

Step 3 Determine the adherence of the patient to the exercise prescription.

- A. Select one of the "categories of adherence" for the patient by noting:
  - 1. if there was any deviation in exercise
  - 2. the number of times of deviation
  - 3. the metabolic cost of deviation
- B. If the deviation in activity was moderate or major decide whether the total exercise behavior of the patient was + or -.
- C. Place a check mark in the appropriate space on the last page to indicate the category selected.

<u>Patient</u>	<u>Exercise Prescription</u>	<u>Exercise Reported by Patient</u>
1	walk one block each day may ride in car one half hour no stairs no work	wash up and bathe 8 or 9 in AM fix tea watch AM movie after breakfast nap after lunch walk one block usually  skipped walk the day of the home visit--gone 3 hrs downtown, ride in car about 45 minutes, walked at least 2 blocks to visit shop where he worked and attorney--no stairs  watched PM movie before supper watched TV in evening until bedtime at 11 PM  fixed venetian blind on window a day before the visit
2	walk 2-3 blocks daily no stairs no hills nap AM and PM no lifting	walk to get AM paper (20 feet) rest one hour in the AM read walk 1-1/2 blocks both AM and PM pick up 23 lb grandson several times nap after lunch TV about 1 1/2 hrs in PM
3	walk progressively in house sit in yard in nice weather no work or lifting no stairs	up to wash and for breakfast watch TV in bed up 30 min in AM walking and sitting 2-3 hr nap after lunch up 30 min in PM sitting and walking watch TV in bed



<u>Patient</u>	<u>Exercise Prescription</u>	<u>Exercise Reported by Patient</u>
4	<p>may dress</p> <p>stay upstairs in room</p> <p>do nothing</p> <p>if walk downstairs must be carried back up</p>	<p>wash and dress before breakfast</p> <p>watch TV while lying on bed or sitting in chair</p> <p>rest on bed after lunch</p> <p>read and watch TV PM and evening</p> <p>lifted children several times</p> <p>moved large chairs about in room</p>
5	<p>down and up front steps daily (5-7 steps, count 10 on each step)</p> <p>don't go into basement</p> <p>no driving</p> <p>no lifting or light housework</p> <p>no restrictions on walking in house</p> <p>nap when tired</p> <p>sit up and be around house</p> <p>curb activity if chest pain or tired</p>	<p>walked fast up stairs more than once several days</p> <p>up 6:30 AM to read paper on couch</p> <p>made breakfast every morning</p> <p>nap after breakfast</p> <p>helped wife with freezing foods and tightening jar lids for canning several days</p> <p>rearranged contents of chest type freezer</p> <p>nap after lunch</p> <p>fixed door on dishwasher (squatting)</p> <p>watch TV and read PM and eve</p>
6	<p>increase steps by 10 each day (180 steps the day of the visit)</p> <p>bedrest or rest on couch</p> <p>up 45 min to 1 hr four times daily</p>	<p>up at 9 AM--wash for breakfast</p> <p>lie down after breakfast</p> <p>walk 100 steps to mailbox and back</p> <p>rest on couch till lunch</p> <p>nap after lunch</p> <p>sit up to watch TV in PM</p> <p>walk around in house several times AM and PM</p>

<u>Patient</u>	<u>Exercise Prescription</u>	<u>Exercise Reported by Patient</u>
6		walked at least 20 steps daily over the prescription  climbed ladder to fix climbing roses  drove himself to lab appointment (20 min driving in light and moderate traffic)
7	don't walk outside  walk in house as tolerated  no stairs	up at 7 AM to wash for breakfast  read after breakfast  watch AM movie lying on couch  walk around few min in yard (at least two days)  read in PM and eve  watch TV lying on couch
8	up for two meals daily  BRP	up to bathroom and for breakfast  up to lunch  not up for two meals every day  some days up for two meals and say up for 20 and 40 min when guests came
9	no driving  walk in house--no stairs  no lifting  up 6 hrs daily	walk around in house few min after breakfast  watch TV in reclining chair or from couch--fall asleep soon after  sleep most of AM and PM
10	up and about in house  no driving  no lifting  no stairs	up for breakfast  back to bed for a nap an hour or so  sit up for 1/2 hr to read or watch TV

<u>Patient</u>	<u>Exercise Prescription</u>	<u>Exercise Reported by Patient</u>
10		<p>up for lunch</p> <p>sleep for hour or so in PM</p> <p>up to watch TV for 1/2 hour or less</p>
11	<p>up 20 min four times daily</p> <p>no stairs</p> <p>don't go outside</p>	<p>up to shave--breakfast</p> <p>nap 1/2 hour or more</p> <p>up 10-15 min before lunch</p> <p>2 hr nap</p> <p>rest on couch and watch TV</p> <p>sit outside in sun about 1/2 hr and read</p> <p>play organ 10-15 min some days (used hands and feet)</p> <p>some days not up more than 20 min in the whole day</p>
12	<p>up and around</p> <p>nap AM and PM</p> <p>no driving</p> <p>no stairs</p> <p>no lifting or work</p>	<p>up and read paper before breakfast</p> <p>walk around 50 foot trailer once</p> <p>nap about an hour</p> <p>watch TV till lunch (sitting)</p> <p>nap about an hour after lunch</p> <p>walk around trailer</p> <p>watch TV until supper and in the eve</p> <p>swept about 5 min outside</p> <p>rode in car with sister for an hour</p> <p>backed car around for sister (2 or 3 min of driving)</p>



<u>Patient</u>	<u>Exercise Prescription</u>	<u>Exercise Reported by Patient</u>
13	up 2 hrs four times daily don't go outside no driving no stairs	up and wash for breakfast (up 2 hrs) watch TV lying on couch up 2 hrs before lunch rest on couch and watch TV sit up 2 hrs and watch TV rest on couch up 2 hrs just before bedtime walked outside once to see yard
14	walk 2 blocks daily outside nap or relax 2 hrs daily may be up and around in house and sit outside	up at 9 AM to watch TV and read walk 1-1/2 block in yard read and watch TV sitting up sit in back yard and read after lunch walk about 1 block in yard read and watch TV until bedtime looks after tomato plants in yard and ties them up
15	bedrest chair rest do nothing	up at 6:30 for coffee left at 8:30 and drove to SBDO and Loma Linda--parked close to place of business and hos- pital so not over a block or two of walking--back home at 1:30 3 hour nap sat up and watched TV after supper removed 6 ft gas heater cover to fix and rehang it yesterday watered in yard and pulled dead stalks off for about 15 min several days ago

## ENERGY COSTS OF VARIOUS ACTIVITIES

According to Edward Gordon	Cost in Calories/Minute
lying down	1.0
getting out of bed to commode	3.6
sitting in chair	1.2
washing face, shaving standing in bathroom	2.5
dressing	2.3
walking 2.5 mph	3.6
standing	1.4
eating, sitting at table	1.4
stirring food	3.3
sweeping	1.7
cleaning windows	3.7
wringing clothes by hand	4.4
sitting at table assembling light parts	1.6
gardening	5.0
gardening, squatting	5.6
driving a car	2.8
hanging washing	4.5
walking downstairs	5.2
playing the piano	2.5
According to Guy Reiff and others	
stocking shelves	3.0
lifting 20 to 40 lbs.	4.5
moving, pushing heavy objects of 75 lbs.	8.0
According to Helen Fennell	
climbing stairs	7.8

## CATEGORIES OF ADHERENCE

No deviation	The patient adhered to the exercise prescription by performing the activities prescribed and omitting activities that were contraindicated or not ordered.
Minor deviation	The patient performed activities that were not prescribed but were of equal metabolic cost and could be substituted for the prescribed activities.
Moderate deviation	The patient deviated in 1-2 activities that had a metabolic cost between 2.6 and 3.5 calories per minute.
Major deviation	The patient deviated of 3 or more activities that had a metabolic cost between 2.6 and 3.5 calories per minute or deviated by performing any activity that had a metabolic cost over 3.5 calories per minute.



## EVALUATION OF PATIENT'S ADHERENCE TO PRESCRIBED EXERCISE

<u>Patient</u>	<u>No Deviation</u>	<u>Minor Deviation</u>	<u>Moderate Deviation</u>		<u>Major Deviation</u>	
			+	-	+	-
1	—	—	—	—	—	—
2	—	—	—	—	—	—
3	—	—	—	—	—	—
4	—	—	—	—	—	—
5	—	—	—	—	—	—
6	—	—	—	—	—	—
7	—	—	—	—	—	—
8	—	—	—	—	—	—
9	—	—	—	—	—	—
10	—	—	—	—	—	—
11	—	—	—	—	—	—
12	—	—	—	—	—	—
13	—	—	—	—	—	—
14	—	—	—	—	—	—
15	—	—	—	—	—	—

LOMA LINDA UNIVERSITY

Graduate School

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ADHERENCE OF MEN WITH MYOCARDIAL INFARCTION  
TO PRESCRIBED EXERCISE

by

Marsha Schwartz

---

An Abstract of a Thesis  
in Partial Fulfillment of the Requirements  
for the Degree Master of Science  
in the Field of Nursing

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June 1970

## ABSTRACT

The purpose of this study was to find out if men with myocardial infarction followed exercise prescribed by the physician. The reasons the patients did or did not follow the exercise prescription were investigated.

An interview guide was used to gather the data for this exploratory study. The questions on the interview guide were designed to obtain information to compare the former exercise pattern of the patient to exercise after infarction. Adherence to the exercise prescription was also determined by the exercise reported in the interview. Fifteen male subjects who had myocardial infarction were interviewed in the hospital and after they had been at home for more than a week.

Adherence to the prescription was decided by a panel of four judges. Exercise behavior was compared to the exercise prescription and categorized according to criteria based on the metabolic cost of various activities.

It was found that nine of the fifteen patients did not follow the exercise prescription. One patient performed less exercise than prescribed but the other eight performed exercise in excess of the instructions. Five of the subjects had questions about exercise or were not sure if they should perform certain activities. Four of the subjects appeared to follow the prescription.

The majority of the patients in the sample reported difficulty



in avoiding contraindicated activities that had once been routine. Seven of the subjects noted that household repairs were the most difficult tasks to avoid. The four patients who seemed to adhere to the prescription had a decrease in activity due to illness before infarction and noted chest pain or fatigue after infarction.

The patients in this study who did not adhere to prescribed exercise seemed to have the most change in activity. This may be an indication that postinfarction patients need help to adjust to a temporary change in activity.

Five of the patients had questions about prescribed exercise. This implies that postinfarction patients may need assistance in understanding prescribed exercise. As a member of the health team the nurse may contribute information about the patient in the discharge planning conference so that a more easily understood prescription may be presented to the patient.