Cardiac Rehabilitation: Patient Recall of Exercise Guidelines and Implications for Physical Therapists

Mary Jones
University of North Dakota

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CARDIAC REHABILITATION: PATIENT RECALL OF EXERCISE GUIDELINES AND IMPLICATIONS FOR PHYSICAL THERAPISTS

by

Mary Jones
Bachelor of Science in Physical Therapy
University of North Dakota, 1995

An Independent Study
Submitted to the Graduate Faculty of the
Department of Physical Therapy
School of Medicine
University of North Dakota
in partial fulfillment of the requirements
for the degree of
Master of Physical Therapy

Grand Forks, North Dakota
May
1996
This Independent Study, submitted by Mary Jones in partial fulfillment of the requirements for the Degree of Master of Physical Therapy from the University of North Dakota, has been read by the Faculty Preceptor, Advisor, and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.

Renee Matley
(Faculty Preceptor)

Beverly Johnson
(Graduate School Advisor)

(Chairperson, Physical Therapy)
PERMISSION

Title Cardiac Rehabilitation: Patient Recall of Exercise Guidelines and Implications for Physical Therapists

Department Physical Therapy

Degree Master of Physical Therapy

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Signature  

Date 12/11/45
# TABLE OF CONTENTS

LIST OF TABLES ................................................................. v

ACKNOWLEDGMENTS ............................................................ vi

ABSTRACT ........................................................................ vii

CHAPTER

| I  | INTRODUCTION ............................................................... 1 |
| II | LITERATURE REVIEW ........................................................ 5 |
|    | Description of Level II Cardiac Rehabilitation Programs .... 6 |
|    | Benefits of Cardiac Rehabilitation Programs ................. 8 |
|    | Cardiac Rehabilitation Compliance Issues .................... 9 |
|    | Cardiac Rehabilitation Phase II at United Hospital ....... 11 |
| III | METHODOLOGY ............................................................... 13 |
|    | Subjects ................................................................. 13 |
|    | Data Collection and Analysis .................................... 13 |
| IV  | RESULTS ...................................................................... 15 |
| V   | DISCUSSION ................................................................ 21 |
|    | Risk Awareness ......................................................... 21 |
|    | Compliance Factors .................................................... 23 |
|    | Physical Therapy Interventions ................................... 24 |
| VI  | CONCLUSION ................................................................. 27 |

APPENDIX A: Data Sheet ......................................................... 30

APPENDIX B: Approval and Consent Forms ......................... 32

REFERENCES ..................................................................... 36
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Characteristics of Subjects</td>
<td>16</td>
</tr>
<tr>
<td>2. Frequencies and Percentages of Responses from Level II Cardiac Rehabilitation Graduates Relative to Recall of Target Heart Rate and Exercise Parameters by Diagnosis</td>
<td>17</td>
</tr>
<tr>
<td>3. Frequencies and Percentages of Responses Pertaining to Recall of Target Heart Rate and Exercise Parameters by Age</td>
<td>19</td>
</tr>
<tr>
<td>4. Frequencies and Percentages of Responses Pertaining to Recall of Target Heart Rate and Exercise Parameters by Gender</td>
<td>20</td>
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</table>
ACKNOWLEDGMENTS

To my loving Lindsay for your continual encouragement and dogged faith in me. With your belief in my abilities when my own faded, my dream is becoming reality.

My thanks and appreciation to Renee Mabey for your steady guidance and solid support through this project and this program. My thanks also to the United Hospital Cardiac Rehabilitation staff. I hope this independent study is of value to you.

And finally, my gratitude to the entire UND faculty and support staff. It was a privilege to attend this physical therapy program.
ABSTRACT

The efficacy of a cardiac rehabilitation program depends on adequate patient compliance. Patients with coronary heart disease and those recovering from heart surgery may have a successful recovery from acute episodes of myocardial infarction or following operation. It must be recognized that they may require long-term supervision and support. The purpose of this study was to identify if diagnosis of myocardial infarction or heart surgery was a determinant of compliance with exercise guidelines once a patient has graduated from a level II cardiac rehabilitation program. A retrospective chart audit was performed for the years 1991-1994. A data sheet was used to record diagnosis, exercise parameters, and target heart rate as recalled by the patient six months after graduation from a level II cardiac rehabilitation program. Factors were analyzed using traditional descriptive and analytical statistics to reflect a hierarchy for prognostic value.
CHAPTER I
INTRODUCTION

Cardiovascular disease is the number one cause of death in the United States. Nearly one out of two people will succumb to some form of cardiovascular disease.\(^1\) Little information concerning the rehabilitation possibilities of the survivors was available until the 1960s. Since then, comprehensive studies regarding the physical rehabilitation of cardiac patients has addressed this information gap.\(^2\) The Task Force on Barriers to the Rehabilitation of Persons Disabled by CHD, sponsored by the American Heart Association, as well as the 1969 and 1971 International Cardiac Rehabilitation Conferences in Yugoslavia were among the first to provide much needed guidance in exercise testing and training in coronary heart disease.\(^2\) Reports from these sources form the basis of cardiac rehabilitation programs that exist today. The results from these investigations may be instrumental for the many affected people who survive coronary health problems and go on to lead long productive lives. In October 1995, the National Health Care Policy and Research Board announced results of studies indicating that patients who participate in cardiac rehabilitation programs show a 25\% decrease in
subsequent heart attacks and deaths. However, less than one-third of heart attack survivors participate in such programs.³

As many as 80% to 85% of cardiologists, internal medicine specialists and general practitioners report they prescribe an exercise regimen after myocardial infarction (M.I.).⁴ Physical therapists, as members of the cardiac rehabilitation team, may see these patients. Physical therapists have many references to use when developing exercise rehabilitation programs for such patients. Principles of exercise prescription for cardiac patients are published in medical textbooks. One example is Guidelines for Exercise Testing and Prescription published by the American College of Sports Medicine. Scientifically based criteria for in-patient, out-patient, and home exercise programs are included in these textbooks.²,⁵ Thus, parameters of a physical activity program can be individualized for each cardiac patient.

Patients recovering from heart surgery or M.I. may make fast recovery from acute episodes or following surgery,⁶ but they still have a long road to travel. Physical therapists, nurses, and physicians trained in cardiac rehabilitation can guide them along the way. Most cardiac rehabilitation programs are designed in 12-week units because much of the improvement in exercise tolerance occurs in the first 12 weeks of rehabilitation.⁷ However, the chronic symptoms of the condition merit long-term supervision in a cardiac rehabilitation program. The structure of such a program includes monitored exercise, education, and risk-factor modification.²,⁵,⁸ It is the role of the physical
therapist with cardiac rehabilitation expertise to assist them during participation in such programs. Rehabilitation requires patients to decrease risk factors by making lifestyle changes to improve their health. Some patients may find these changes very difficult and compliance is a concern. Lack of patient compliance is important to physical therapists and patients because it can adversely affect a patient's recovery. Returning to old habits of high-fat diet, lack of exercise, and smoking almost insures a person will have further coronary problems.

Much has been written about compliance issues and patients with cardiac diagnoses. Drop-out rates, benefits of resistive exercise programs, smoking cessation, and psychosocial factors have been studied. A question of interest at the United Hospital cardiac rehabilitation clinic is whether a difference in compliance exists between cardiac surgery patients and patients who experience a myocardial infarction. A difference in ability to recall target heart rate and exercise parameters between groups may construe a difference in compliance.

The purpose of this chart review is to determine if there is a difference in long-term compliance between patients who experienced a M.I. and patients who had cardiac surgery. For purposes of this paper, long-term compliance means patients are able to recall target heart rate and exercise guidelines six months after completing a level II cardiac rehabilitation program. The term surgery includes angioplasty and coronary artery bypass grafts. The collected
data will indicate each group’s compliance with exercise recommendations up to six months after completing a level II cardiac rehabilitation program.

The relationship between post-surgery and post-M.I. patients and their compliance to long-term exercise recommendations can be used by physical therapists in two ways. Physical therapists can learn how to better encourage patients to comply with exercise plans. They can also learn how to better structure home exercise programs to enhance compliance.

This chart review is based on the assumption that participation in a cardiac rehabilitation program enhances a patient’s quality of life. This assumption is apparent when a patient returns to his/her former level of function under the supervision of a physical therapist.
CHAPTER II
LITERATURE REVIEW

Until World War II, cardiac patients were treated almost like invalids. They were often prescribed at least six weeks of complete bed rest in the hospital followed by six more weeks at home in bed. It was not until the early 1950s that post-myocardial infarction care evolved to armchair exercises. In contrast, hospital activity is now encouraged and exercise is monitored by health care professionals including physical therapists. Instead of going home to bed rest after discharge, patients are encouraged to return to as normal a life as possible. The majority of patients receive a prescription for a cardiac rehabilitation program on an outpatient basis.

The prescription for cardiac rehabilitation does not always concur with the patients' ideas about health and recovery. The social and cultural background of a patient influences his/her beliefs about what is beneficial in recuperation from a cardiac problem. Regular exercise done in a specified target heart rate zone, a cornerstone of cardiac rehabilitation, is not familiar to many people. Patients' perceptions of their ability to perform an exercise prescription can influence how much effort they will expend toward exercise compliance. Therefore, an understanding of compliance issues is essential for physical
therapists working in cardiac rehabilitation. It will enable them to help patients integrate risk-reduction behaviors into a daily routine. The benefits of these changes will last a lifetime.

The following literature review is divided into four sections. The first section briefly describes level II cardiac rehabilitation programs. The second section is an overview of the benefits of cardiac rehabilitation programs. The third section summarizes compliance and rehabilitation issues. The fourth section outlines the level II cardiac rehabilitation program at United Hospital, Grand Forks, ND.

Description of Level II Cardiac Rehabilitation Programs

A standard phase II program consists of three visits per week to the rehabilitation center for supervised exercise and education. Additional home exercises are usually prescribed. The exercise sessions are supervised by physical therapists and nurses who are trained in cardiac rehabilitation.$^5,8$

Aerobic activities such as treadmill walking and cycle ergometry are the core of the supervised activity. These are forms of exercise that are easily quantifiable and reproducible.$^8$ Intensity is prescribed conservatively and individually for each patient. A safe heart-rate level is determined by the health care professionals.$^6,8$ Warm-up activities such as stretching safely increase work done by the cardiovascular system. Cool-down activities are performed to slowly decrease the demands on the heart. Blood pressure and heart rate are
monitored throughout each session. This insures patients work within their
target heart rate zones and blood pressure requirements.

A cardiac rehabilitation program is more than a training regimen. Most
patients have the potential to benefit from educational aspects of
rehabilitation.\textsuperscript{8,16} Therefore, information about the acute M.I. event or surgery,
medications, diet, smoking cessation, and stress management are an integral
part of rehabilitation. This information can be given in two ways. Patients may
attend special classes on these topics or they may receive on-the-spot
education during the exercise session.\textsuperscript{2,6,8,16} Family members can also attend the
educational classes. Doing so gives family members tools to reinforce risk-
modification behaviors in the patient.

Patient satisfaction and progress are monitored through noninvasive
methods including talks with the health care professional overseeing the
exercise session and record keeping of heart rate, blood pressure, and
workload. Patients can see their gains documented on a regular basis. Their
questions and concerns can be promptly addressed.

Traditional exercise therapy is made more palatable by programs which
reward consistent participation. Special T-shirts, educational booklets, and
graduation diplomas add fun to the difficult task of improving functional capacity
and changing lifestyle habits. Long-term support may be provided by meetings
and newsletters\textsuperscript{6,12} which provide information on current issues. These methods
also provide avenues for patients to stay in contact with each other and remain motivated.\textsuperscript{17}

The object of rehabilitation therapy in patients with cardiac diagnoses is not to cure but rather to improve the overall quality of life. Rehabilitation, therefore, needs to be comprehensive and must take into account the physical, social, and personal aspects of a patient's life.\textsuperscript{6,13}

Benefits of Cardiac Rehabilitation Programs

The goal of cardiac rehabilitation is the patient's return to a normal, active, and productive life.\textsuperscript{4} The first report on cardiac exercise therapy in 1957 included 21 case studies. Twenty of these case studies showed improvement in functional capacity via participation in a walking program. The patient who did not improve was noncompliant with therapy.\textsuperscript{12}

Since then several physiologic and psychologic benefits of exercise training for cardiac patients have been documented. Improvements noted include reduction in angina pectoris, exercise-related dyspnea, and fatigue. Peak oxygen uptake increased as well as submaximal exercise endurance and muscular strength.\textsuperscript{8}

Oldridge\textsuperscript{4} concluded exercising subjects have a 15\% to 28\% increase in exercise tolerance in the 12 weeks following a myocardial infarction. In the majority of cases, this improvement is most beneficial to those who had significantly limited exercise tolerance. These physical improvements enable patients to accomplish tasks at a lower heart rate and blood pressure thus
reducing demands on the cardiovascular system. Psychological aspects have also been documented. Patients who participate in cardiac rehabilitation programs have less anxiety and depression, more confidence, and higher self-esteem than nonexercising patients.8,18

Cardiac Rehabilitation Compliance Issues

Klinger9 reports two definitions of compliance. The first is “the extent to which a person’s behavior (in terms of taking medications, following diets, or executing lifestyle changes) coincides with medical or health advice”[p32] The second definition states compliance “is a function of beliefs about the difficulties which must be encountered or endured during compliance.”[p35]

Though the public is aware that recovery from coronary heart disease could be augmented by a healthy lifestyle,15 there are several reasons patients remain non-compliant with exercise recommendations. Studies have reported environmental and personal reasons for noncompliant behavior to cardiac rehabilitation programs.8,9,14,18-20 Although potential dropouts cannot be accurately predicted, there are factors that increase the likelihood of noncompliance. These factors include continued cigarette smoking and/or obesity,8,9 depressed mood, blue-collar occupations, and previous aversion to physical exercise.8,18 Personal priorities were cited in studies by Klinger9 and Shephard14 as the primary reason for non-compliance. Patients have an array of demands competing for their time and opportunity costs may be too high for some. Klinger9 reported logistic difficulties such as travel time and weather
conditions for patients living outside metropolitan areas. Patients diagnosed with a chronic illness are less likely to exercise because they rationalize that they are not going to get better.\textsuperscript{20}

Locus of control has been shown to influence adherence to cardiovascular rehabilitation programs.\textsuperscript{21} Patients with an internal locus of control believe they can positively affect their health. They are also more likely to stick with modifications in lifestyle.\textsuperscript{21} In contrast, patients with an external locus of control believe that health outcomes are determined by chance or powerful others.\textsuperscript{20}

Patients have reported many factors that helped them comply. Klinger\textsuperscript{9} reported that social support from the spouse as well as other people as the most important factor in facilitating compliance. The patient's perceived belief of others' regard for the importance of a particular health behavior has been identified as influential.\textsuperscript{22} Doughty\textsuperscript{23} found that cardiac rehabilitation programs and self-help groups assist patients in overcoming feelings of isolation. They also provide opportunities for patients to talk about solutions for practical difficulties. Age and patients with more than one risk factor are associated with higher compliance.\textsuperscript{19} Finally, higher compliance is associated with faith in the judgment of the health professionals.\textsuperscript{9}

The key challenge in cardiac rehabilitation is continued patient adherence to rehabilitation programs. Typical dropout rates are approximately 2\% to 25\% after three months, increasing to 40\% to 50\% by 6 to 12 months.\textsuperscript{4,19,21} One third
to two thirds of those enrolled in cardiac rehabilitation programs are noncompliant with exercise. Patients who dropped out in terms of attendance also seemed to comply poorly with exercise prescription during the course of the rehabilitation program. As yet, patients who will be non-compliant cannot be accurately predicted. Therefore, physical therapists must become aware of how motivation influences health behaviors. This awareness will help physical therapists develop strategies which facilitate patients' continued attendance and participation in cardiac rehabilitation programs.

Cardiac Rehabilitation Phase II at United Hospital

The cardiac rehabilitation program at United Hospital in Grand Forks, ND, is a model of the program described above. Among the cardiac rehabilitation team members patients may see during a level II exercise session are a physical therapist, cardiac nurse, and an occupational therapist.

Patients are referred to the program by their physicians. Before entering the program, each patient participates in a clinical evaluation that includes a medical history and/or physical examination. Heart rate and blood pressure measurements are recorded. The patient performs a resting and a graded exercise electrocardiogram to determine tolerance for exercise. The multidisciplinary program includes monitored exercise by a nurse or therapist trained in cardiac rehabilitation. During the exercise session, physical activities are designed to place a gradually increased work load on the coronary system to improve its function. Patients are instructed in the warning signals of exercise
intolerance. They are informed to tell the staff about any sign or symptom of distress. An exercise log is used to record the patient’s progress and participation in home exercise recommendations. The program also includes education and risk-factor modification. Patients are encouraged to ask questions and include family members in the rehabilitation process.

Patients at United Hospital participate in the supervised exercise program for eight weeks and agree to a follow-up visit six months from date of discharge from the program. They are encouraged to continue exercising within target heart rate guidelines for 30 minutes a day four to five times per week between discharge and return for the recheck appointment.

The United Hospital program illustrates the difference between preceding cardiac rehabilitation programs that focused on inactivity with the physical exercise component of today’s programs. Benefits derived from participation in cardiac rehabilitation programs were explained and issues involving compliance were addressed.

There is a need for a better understanding of what motivates patients to comply with cardiac rehabilitation programs. It is the intention of this chart review to help identify patients who have accurate recall of target heart rate and exercise parameters six months after participation in a level II cardiac rehabilitation.
CHAPTER III

METHODOLOGY

A chart review was conducted to determine relationships between patient age, gender, diagnoses, and ability to state target heart rate and exercise parameters.

Subjects

A chart review of 161 cardiac patients was done at the United Hospital Cardiac Rehabilitation out-patient clinic in Grand Forks, ND. The charts of subjects who returned for their six-month check up were reviewed. Participation in the program post-M.I. or post-cardiac surgery was noted. The review included charts from 1991 to 1994.

Data Collection and Analysis

A data sheet (Appendix A) was used to record facts about each subject. These facts were self-reported exercise frequency and duration, and target heart rate. Data were collected in a codified form to insure confidentiality.

Chart review procedures were conducted upon the approval and consent of the United Hospital and the University of North Dakota Institutional Review Board's policies and procedures committee (Appendix B). The United Cardiac Rehabilitation staff allowed access to the files and analysis was done in
accordance with their needs. Results of this study may be used by the United Cardiac Rehabilitation team as they deem necessary.

The data were analyzed according to traditional descriptive and analytical statistics. A chi square test for independence was used (p = .05) to determine if there was:

- A difference in ability to state target heart rate between myocardial patients and surgery patients six months after graduation from a level II cardiac rehabilitation program.
- A difference in ability to state exercise parameters of recommended frequency and duration between myocardial patients and surgery patients six months after graduation from a level II cardiac rehabilitation program.
- A relationship between gender and the ability to state target heart rate and exercise parameters of recommended frequency and duration.
- A relationship between age (younger than 65 years, 65-74 years old, and 75 years and older) and ability to state target heart rate and exercise parameters of recommended frequency and duration.
CHAPTER IV

RESULTS

Charts of 161 patients were reviewed. These data represent 125 males (77.6%) and 36 females (22.4%) with an age range of 34 to 80 years ($X = 65.1$ years). See Table 1 for characteristics of subjects.

Data from the 161 charts revealed 96 patients (62.7%) were able to recall target heart rate (THR) six months after graduation from the level II cardiac rehabilitation program. Of the charts reviewed, 131 patients (86.2%) could recall exercise parameters (EP).

This chart review was conducted with the following premise as guidance: Is there a difference in the ability to state THR or EP based on diagnostic category, gender, or age?

Of the patients who had cardiac surgery, 52 (61.2%) could recall THR. Of the patients diagnosed with M.I., 36 (65.5%) could recall THR. There was no significant correlation between diagnosis and ability to recall THR (see Table 2).

Of the surgery patients, 81% could recall EP. Of the patients with the diagnosis of M.I., 95.5% could recall EP. An attempt to test this correlation was made but the results were not valid. The test did not meet the assumptions of
Table 1.—Characteristics of Subjects

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
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<tbody>
<tr>
<td><strong>Diagnosis</strong></td>
<td></td>
<td></td>
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<tr>
<td>Post surgery</td>
<td>89</td>
<td>60</td>
</tr>
<tr>
<td>Post M.I.</td>
<td>59</td>
<td>40</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
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<td></td>
</tr>
<tr>
<td>Men</td>
<td>125</td>
<td>78</td>
</tr>
<tr>
<td>Women</td>
<td>36</td>
<td>22</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 65 years old</td>
<td>60</td>
<td>38</td>
</tr>
<tr>
<td>65-74 years old</td>
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<td>45</td>
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Table 2.—Frequencies and Percentages of Responses to Recall of Target Heart Rate and Exercise Parameters by Diagnosis

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<th>Surgery</th>
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<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
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<td>36</td>
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<td>33</td>
<td>38.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*State Exercise Parameters</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>52</td>
<td>94.5</td>
<td>68</td>
<td>81.0</td>
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<td>3</td>
<td>5.5</td>
<td>16</td>
<td>19.0</td>
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</table>

*Fewer than five MI patients could not recall EP. Cells less than five violate the assumptions of Chi square test. Results could not be interpreted.
the chi square for independence test because fewer than five post-M.I. patients could not recall their EP (see Table 2).

The following could recall THR in the age groups: younger than 65, 41 patients (70.7%); ages 65-74, 36 patients (52.9%); 75 and older, 18 patients (72.0%). The following could recall EP in the age groups: younger than 65, 51 patients (89.5%); ages 65-74, 59 patients (88.15%); age 75 and older, 19 patients (73.1%). There was no significant correlation between age and ability to recall THR and EP (see Table 3).

Nineteen females (55.9%) and 77 males (64.7%) could recall THR. Twenty-nine females (84.3%) and 102 males (86.4%) were able to recall EP. There was no correlation between gender and ability to recall THR or EP (see Table 4).
Table 3.—Frequencies and Percentages of Responses Pertaining to Recall of Target Heart Rate and Exercise Parameters by Age

<table>
<thead>
<tr>
<th></th>
<th>Age 1 (&lt; 65 years old)</th>
<th>Age 2 (65-74 years old)</th>
<th>Age 3 (75 years and older)</th>
<th>Chi²</th>
<th>p</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>State Heart Rate</td>
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<td>71.0</td>
<td>36</td>
<td>53.0</td>
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<td>32</td>
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<td>89.0</td>
<td>59</td>
<td>88.1</td>
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<td>6</td>
<td>10.5</td>
<td>8</td>
<td>11.9</td>
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Table 4.—Frequencies and Percentages of Responses Pertaining to Recall of Target Heart Rate and Exercise Parameters by Gender

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<th>Female</th>
<th>Chi²</th>
<th>p</th>
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<tbody>
<tr>
<td>Heart Rate</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>yes</td>
<td>77</td>
<td>64.7</td>
<td>yes</td>
<td>19</td>
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<td>42</td>
<td>35.3</td>
<td>no</td>
<td>15</td>
</tr>
<tr>
<td>State</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise Parameters</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>yes</td>
<td>102</td>
<td>86.4</td>
<td>yes</td>
<td>29</td>
</tr>
<tr>
<td>no</td>
<td>16</td>
<td>13.6</td>
<td>no</td>
<td>5</td>
</tr>
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</table>
CHAPTER V

DISCUSSION

The results of this chart review showed a general trend indicating the majority of graduates from a level II cardiac rehabilitation program are able to recall target heart rate (THR) and exercise parameters (EP). The ability to recall was not impacted by diagnosis, gender, or age. It is the author's opinion that the recall correlates with increased public awareness of cardiac risk factors. In addition, there is an attitudinal change evolving in health care. The medical model where health professionals are in control and the patient has little power is being replaced by an educational model of rehabilitation. Health professionals and people undergoing rehabilitation work as partners in goal achievement. The relationship is one of teacher-student rather than healer-patient. The United Hospital program closely follows this philosophy which may account for the majority of accurate recall responses.

Risk Awareness

The ability to recall THR and EP in the 1990s may be an outcome of the investigations into exercise testing and training in coronary heart disease in the late 1960s. Results from that scientific research formed the basis of outpatient cardiac rehabilitation programs which encourage activity and return to as normal
a life as possible for the cardiac patient.\textsuperscript{2,8} Much of this information is common knowledge to the public after 30 years of media attention.

Recognition of exercising within a specified target heart rate zone and the importance of lifestyle changes has filtered into the mass media. Methods of improving cardiac health and advances in cardiac care are common in mass media publications as well as television and radio shows and on-line computer services. An example of this mass exposure are the publications by the American Heart Association (AHA). The AHA publishes several brochures regarding the importance of risk-modification behaviors for the general public. These educational materials are available from the AHA, doctor's offices, hospitals, and outpatient clinics. Another example is the consumer version of the clinical practice guidelines from the Agency for Health Care Policy and Research. These booklets are available in English and Spanish and are meant for use by the general public to increase knowledge and involvement in health-care decision making.\textsuperscript{3} These publications create awareness of controllable risk factors, such as diet, exercise, and hypertension, as well as those factors not under voluntary control, such as heredity, race, and gender. Publication of the benefits of engaging in regular exercise, maintaining a reasonable body weight, and controlling cholesterol levels and dietary fat may increase some people's awareness of strategies to improve cardiac health.

Cardiovascular disease is the leading cause of mortality in the United States, accounting for almost 50 percent of all deaths.\textsuperscript{1,3,8} At a personal level
nearly every adult knows someone who either has cardiac problems or knows someone who died because of them.

Compliance Factors

The United Hospital level II cardiac rehabilitation program closely follows guidelines for enhancing patient compliance. Compliance is enhanced if specific components are included in cardiac rehabilitation programs. Health-care professionals can shape expectations and attitudes of cardiac-rehabilitation patients through individual counseling.\textsuperscript{15,16} Specific instructors for exercises and changes in diet are important to patients. Educational classes taught by professionals and well-written handouts are enabling factors in building new habits.\textsuperscript{9,26} Early patient education emphasizing the importance of life-long adherence to health behaviors and referral of patients to group-support programs fosters compliance.\textsuperscript{22}

Adherence to healthy cardiac behaviors among patients is enhanced when the patient has a supportive spouse or social network.\textsuperscript{9,21,22} The patient's confidence in the judgment of the health professional making the recommendations correlates with increased compliance.\textsuperscript{9} Patients' beliefs about the quality of the cardiac rehabilitation program in which they are involved enhances compliance. Patients reported quality programs incorporate several factors. These factors include working with the health professional to reach mutually agreed upon activity goals, self-monitoring of heart rate before and after activities, and weekly visits with staff to review data.\textsuperscript{23,27} Compliance also
correlates with patient's health locus of control and self-perceived ability to make changes.\textsuperscript{21,23,26} In studies examining compliance and post-MI patients, a specific factor that facilitated compliance was the personal trait of determination.\textsuperscript{9,22}

In summary, compliance may be enhanced by many factors. Among these factors are clear communication; emotional support; understanding the patient's values, viewpoints, and preferences; and integration of the program into the patient's lifestyle.

In studies by Klinger\textsuperscript{9} and Bailey,\textsuperscript{22} patients identified factors inhibiting compliance. These inhibiting factors include personal priorities, adverse weather, forgetting, concurrent illness, cardiac-related symptoms, and social pressures. In other studies, lack of insurance coverage, young age of a patient, female gender, blue collar and/or low socio-economic status were also associated with lack of compliance.\textsuperscript{2,4,7}

**Physical Therapy Interventions**

Adherence to a cardiac level II rehabilitation program can be facilitated by physical therapists. Physical therapists who know their patients' histories of making lifestyle changes, such as smoking cessation, and the patients' compliance with recommendations may help them understand the patients' level of self-discipline.\textsuperscript{21} Physical therapists can use this information to facilitate long-term participation by negotiating goals and developing individualized treatment plans.\textsuperscript{23}
Evidence suggests that age is not a limiting factor in participating in a cardiac rehabilitation program.\textsuperscript{2,3} The author's chart review supports this earlier study. Elderly patients were as competent of accurate recall of THR and EP as younger populations. However, referral to and participation in cardiac rehabilitation programs is less frequent at an elderly age, especially for elderly females.\textsuperscript{3} Special effort should be extended to elderly coronary patients enabling them to participate in cardiac rehabilitation.

With a knowledge base of what positively and adversely affects compliance, methods to enhance compliance can be incorporated into a cardiac rehabilitation program. Increase in compliance within a program starts with personalizing treatment plans. Health professionals must explore patients’ attitudes toward specifics of a medical regimen and their previous history regarding adherence to exercise programs. Additionally, a patient’s definition of health as well as developmental, spiritual, and cultural influences must be taken into consideration.\textsuperscript{22}

A tendency to be able to recall THR and EP six months after graduation from a level II cardiac rehabilitation program was found in the author's chart review. This chart review failed to demonstrate a statistically significant advantage of diagnosis, age, or gender to recall THR or EP. It is not known whether all patients participated in level I inpatient cardiac rehabilitation program following MI or surgery. In retrospect, inpatient program participation may have influenced recall ability.
In future research other factors to consider for United Hospital are patient satisfaction after completing the level II cardiac rehabilitation program. Studies could also focus on specific patient education components such as designing a study to determine if a significant correlation exists between positive spousal support and recall of THR and EP. Additionally, studying factors that increase chance of noncompliance including continued cigarette smoking, obesity, depression, blue-collar occupations and aversion to physical exercise, logistic difficulties, weather conditions, concurrent chronic illness, and locus of control may help shed light on ways to improve acceptability of cardiac rehabilitation programs to potential patients.

This chart review covered the years 1991 to 1994. During that time, 356 patients attended all or part of the sessions offered at the cardiac rehabilitation level II program at United Hospital as indicated by billing records. Of that total, only 161 charts fit the parameters for this chart review. The other 195 charts were other diagnoses or procedures not used in this study. Also, some records were incomplete and other patients did not finish the program.
CHAPTER VI

CONCLUSION

This chart review quantifies the ability of participants in the level II cardiac rehabilitation program at United Hospital to accurately recall target heart rate and exercise parameters six months after graduation. The results of the review are available to the United Hospital Cardiac Rehabilitation team and other professionals interested in the study of cardiac rehabilitation program development.

The ability to recall target heart rate and exercise parameters was high, though there were no statistically significant correlations between variables (see Table 5). The reason recall is high is unclear. The cardiac team at United Hospital does many positive things that contribute to compliance and this may contribute to a positive recall response rate. The team looks at the patient’s general health and particular heart condition. They know the physician’s recommendations and each team member is well educated in cardiac rehabilitation. However, compliance may be linked to individual factors which have not been studied at United Hospital. For example, compliance may be partially explained by good family support, dietary changes, or the number of
risk-modification behaviors a person is asked to simultaneously make. In addition, goals are different for each patient.

Future studies could address personal reasons patients have for complying or dropping out of cardiac rehabilitation. Studying factors such as the time of the cardiac rehabilitation classes, location, setting, and cost may disclose how the United Hospital could better accommodate the needs of patients.

Adequate compliance is critical for optimal outcomes of cardiac rehabilitation. Thus, the development and incorporation of effective compliance-enhancement strategies are critical.
APPENDIX A
DATA SHEET

Case #:

Gender:

Age:

Primary diagnosis entering cardiac rehabilitation level II program:

Surgery ______ Myocardial infarction ______

A. EXERCISE

1. Patient can verbalize accurate target heart rate and exercise precautions

   Yes _________ No ______________

2. Patient can verbalize accurate duration and frequency of exercise to maintain cardiac fitness

   Yes _________  No ______________

3. Comments regarding compliance/noncompliance with exercise (if applicable)

   __________________________________________
   __________________________________________
The efficacy of an exercise cardiac rehabilitation program depends on adequate compliance of its participants. There has been insufficient study of long term compliance particularly in relation to desirable lifestyle changes in patients with heart disease. Most rehabilitation programs are designed to influence patients over the short term. Patients with coronary heart disease and those recovering from heart surgery may make an excellent recovery from acute episodes or following surgery. It must be recognized that they may require long term supervision and support.

When patients return for a six-month checkup at United Hospital the cardiac rehabilitation staff ask the patients about their frequency of exercise, if they recall their target heart rate and nutrition questions. They record the responses on an in-house form. The researcher will look at these forms on site in the cardiac rehabilitation office to collect data in a codified form.

The purpose of this study is to identify if primary diagnosis of myocardial infarction or heart surgery is a determinant of compliance with exercise programs once a patient has completed a level II cardiac rehabilitation program.

Because of the exclusive participation of humans in cardiac rehabilitation programs, use of human subjects in this study is necessary.
Methodology will entail reviewing up to 200 charts of subjects who returned for their six-month check-up status post completion of phase II cardiac rehabilitation program at United Hospital in Grand Forks, N.D.

To collect data in an efficient manner a data sheet* will be used to record various factors (self-reported exercise frequency, duration, target heart rate, primary diagnosis). The data will be used to identify if a correlation between primary diagnosis and compliance with exercise recommendations exists for the participants in the cardiac level II rehabilitation program at United Hospital, Grand Forks, N.D.

Data will be collected in a codified form to insure confidentiality. Factors will be analyzed using analytical and descriptive statistics to reflect a relationship between exercise compliance and primary diagnosis of surgery or myocardial infarction.

*Please see attached data sheet sample
3. BENEFITS: (Describe the benefits to the individual or society.)

It is hoped that by identifying a correlation of primary diagnosis with compliance to exercise post cardiac rehabilitation level II that physical therapy professionals can learn how to better encourage patients to comply with exercise recommendations and/or learn how to better structure exercise programs for home use to improve health status of patients.

4. RISKS: (Describe the risks to the subject and precautions that will be taken to minimize them. The concept of risk goes beyond physical risk and includes risks to the subject's dignity and self-respect, as well as psychological, emotional or behavioral risk. If data are collected which could prove harmful or embarrassing to the subject if associated with him or her, then describe the methods to be used to insure the confidentiality of data obtained, including plans for final disposition or destruction, debriefing procedures, etc.)

With a chart review process, there is a risk of an accidental breach of confidentiality. In this study, all data will be collected in a codified form to insure confidentiality of each subject by using the subject's medical record number for identification. Results will be reported in aggregate. Data will be collected on site in the United Hospital cardiac rehabilitation office. The completed data-collection forms will be stored in Renee Mabey's office at the UND-PT office.
5. CONSENT FORM: A copy of the CONSENT FORM to be signed by the subject (if applicable) and/or any statement to be read to the subject should be attached to this form. If no CONSENT FORM is to be used, document the procedures to be used to assure that infringement upon the subject's rights will not occur. Describe where signed consent forms will be kept and for what period of time.

No consent form will be used. Each subject will be identified by his/her medical record number. Names of participating subjects will not be disclosed.

Consent will be sought from the University of North Dakota and United Hospital.

For FULL IRB REVIEW forward a signed original and thirteen (13) copies of this completed form, and where applicable, thirteen (13) copies of the proposed consent form, questionnaires, etc. and any supporting documentation to:

Office of Research & Program Development
University of North Dakota
Box 8138, University Station
Grand Forks, North Dakota 58202

On campus, mail to: Office of Research & Program Development, Box 134, or drop it off at Room 101 Twamley Hall.

For EXEMPT or EXPEDITED REVIEW forward a signed original and a copy of the consent form, questionnaires, etc. and any supporting documentation to one of the addresses above.

Policies and procedures on Use of Human Subjects of the University of North Dakota apply to all activities involving use of human Subjects performed by personnel conducting such activities under the auspices of the University. No activities are to be initiated without prior review and approval as prescribed by the University's policies and procedures governing the use of human subjects.

Principal Investigator

DATE:

DATE:

DATE: 5-2-95

DATE: 5-2-95

(Revised 8/1992)
Research Project Action Report

Date: May 10, 1995

IRB#: MI-008

Principal Investigator: Mary Jones
Department: Physical Therapy
Phone #: 777-2831

Research Coordinator: ____________________________
Phone #: ______

Project Title: Correlation of Primary Diagnosis and Compliance with Post Phase II Cardiac Rehabilitation Program Exercise Recommendations at United Hospital, Grand Forks, ND

The above referenced project protocol and informed consent was reviewed by the Medical Park Institutional Review Board on ____________ and the following action was taken:

☐ Project approved. Next Scheduled review is on ________________________
   If no date is given, then review will be required in 12 months. (See REMARKS SECTION for any special condition.)

☑ Project approved. EXPEDITED REVIEW NO. 8
   Next scheduled review is on ________________________

☐ Project approved. EXEMPT CATEGORY NO. ____________________________
   No periodic review scheduled unless so stated in REMARKS SECTION.

☐ Project approval deferred. (See REMARKS SECTION for further information.)

☐ Project denied. (See REMARKS SECTION for further information.)

☐ Amendment approved

REMARKS:

Any changes in protocol, adverse occurrences or deaths in the course of the research project must be reported immediately to the IRB chairperson or the IRB office (780-6161).

Signature of Chairperson or Designated IRB Member

Medical Park Institutional Review Board

Date

the proposed project is to be part of a research activity funded by a federal agency, a special assurance statement or a completed 596 Form may be required. Contact IRB office to obtain the required documents.
REFERENCES


24. Patient education materials, United Hospital Phase II Cardiac Rehabilitation program, Grand Forks, ND.

