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Health Beliefs and Adherence to Cardiac Exercise Following a Cardiac Event

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HEALTH BELIEFS AND ADHERENCE TO CARDIAC EXERCISE FOLLOWING A CARDIAC EVENT

By

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ABSTRACT

THE RELATIONSHIP OF HEALTH BELIEFS TO ADHERENCE

TO CARDIAC EXERCISE FOLLOWING

A CARDIAC EVENT

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The purpose of this study was to examine the relationship of cardiac patients' health beliefs regarding exercise and their adherence to an exercise program following a documented cardiac event. A sample of 90 subjects, recovering from a recent cardiac event, was selected from two acute care medical centers in southwestern Michigan and northwestern Michigan. Each subject responded to a mailed questionnaire six to eight weeks post hospitalization which assessed perceived benefits, perceived barriers and self-efficacy as they related to a regular, aerobic exercise program.

Descriptive statistics, along with t-test and chi-square were used to analyze the data. Findings include (a) perceived benefits, barriers and self-efficacy are significantly related to adherence to exercise post cardiac event and (b) gender, marital status and occupation are also significant indicators of adherence.

This is dedicated to my father, Robert L. Cauzillo, whose life was prematurely taken by cardiac disease. His spirit and joy for life lives on in his children and family.

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CHAPTER I

INTRODUCTION

Cardiovascular disease is the leading cause of death among Americans. It's impact is devastating on the nation and the individuals and families affected. According to the American Heart Association (A.H.A.) (1995), cardiovascular disease claimed the lives of 925,079 Americans in 1992. This figure accounts for 42.5% of all deaths in the United States that year (A.H.A., 1995). This year as many as 1,500,000 Americans will have a heart attack, and more than 500,000 of them will die following the attack.

Cardiovascular disease demands attention. Too many people are dying, with many deaths preventable by making life-style changes, lowering blood pressure, smoking cessation, reducing the amount of cholesterol in the blood and knowing the signs of heart attack. These actions are vital for everyone, especially for those who have survived a cardiac event. In survivors of myocardial infarction (MI), modification of established cardiovascular disease risk factors has been associated with a reduced probability of a recurrent event (Siegel, Grady, Browner, & Hulley, 1985). Meta-analysis of trials of cardiac rehabilitation consisting of some combination of risk factor management and exercise conditioning suggests there may be as much as a 25% reduction in fatal events during the first 3.5 years after an MI (Oldridge, 1991).

The success of the treatment for the individual after a cardiac event, is partly dependent on that person's degree of adherence to the prescribed dietary, exercise, and medication regime. Yet the lifestyle changes or health related behavior the individual accepts following diagnosis of heart disease varies greatly. Research suggests as many as 40-50% drop out within 6-12 months of referral to a program of exercise rehabilitation (Oldridge, 1991). Yet, another study done by Geisse and Schomer (1986) reports that life style is significantly healthier among those who participate in a rehabilitation program than those who did not. For this reason it is valuable for nursing to examine this phenomenon; specifically to examine and explain why people do or do not engage in a cardiac rehabilitation exercise program following a cardiac event.

The Health Belief Model (HBM) was developed in the 1950's to provide a framework to explain the variables that relate to compliant health behavior. According to the model, a number of variables are associated with the likelihood of taking

preventative action (Becker & Maiman, 1975). The likelihood of taking action depends on beliefs about the effectiveness or perceived benefits of the action in reducing the health threat and the difficulties or perceived barriers that must be encountered if such action is taken (Becker et al., 1977). Other variables in the model include perceived seriousness, perceived susceptibility and health motivation. The concept of self-efficacy has recently been included in the framework. The Health Belief Model has been widely used in research examining a variety of health

behaviors. Several studies have utilized the concepts of the HBM to analyze the adherence of individual, post cardiac event, to a cardiac rehabilitation or exercise program. Tirrel and Hart (1980) found that indeed the variables of perceived benefits and perceived barriers, along with the knowledge of exercise, demonstrated the strongest relationship to compliance levels. The purpose of this study is to support, expand and refine those findings, to assist nurses in the post care of cardiac clients. It is the hope that this information can expand the knowledge available regarding health beliefs and adherence to prescibed therapy, as well as, guiding effective nursing interventions, in motivating individuals in the attainment of positive health behaviors.

Purpose

The purpose of this study was to determine if the strengths of the health belief of an individual who is adherent to an exercise program differ from an individual non-adherent to an exercise program.

CHAPTER II

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

Conceptual Framework

The Health Belief Model (HBM) provided the conceptual framework for this study. The HBM was developed in the early 1950's by Rosenstock, Hochebam, and Kegeles, to explore why some people take action to avoid illness, while others do not. In the 1950's the investigators in the Public Health Service were concerned with prevention of disease, wanting to explain preventative health behaviors. The major concern was the reluctance of individuals to accept screening of tuberculosis, immunizations, and other preventative measures offered free or at a nominal fee (Becker et al., 1977). The HBM offered an explanatory framework for analysis of factors associated with acceptance or rejection of a health measure.

The model concepts are derived from a well established body of psychological and behavioral theory, particularly Kurt Lewin. Lewin (1944) theorized that it is the world of the perceiver that determines what he will or will not do. Lewin believed the individual's perception of the positive or negative value of a behavior to influence the probability of the occurrence of the behavior. The HBM grew from this and was later modified by Becker in 1974. The HBM assumes that a person's attitudes and beliefs are important determinants of his/her health action. The model assumes that health is valued. The HBM hypothesizes an individual will not seek

preventative care unless they 1) possess a minimal level of knowledge, 2) view theirself as potentially vulnerable, 3) perceive the condition as threatening, 4) is convinced of the efficacy of intervention, 5) see few barriers in understanding or attaining the recommended action, and 6) is generally concerned about health and seeking health related information.

The HBM concepts related to adherence to preventive care following a cardiac event include:

Perceived susceptibility to disease. The individual's perceived probability of developing further cardiac disease.

Perceived seriousness of disease. The individual's perception of the consequences of contracting further cardiac disease; either by the degree of emotional arousal created by the thought of the disease, or the difficulties the individual believes the disease would create.

Perceived threat. Perceived susceptibility and seriousness combined would equal the perceived threat.

Perceived benefits. Beliefs regarding the effectiveness of the recommended action following a cardiac event. The individual's evaluation of the advocated behaviors in terms of feasibility and efficacy.

Perceived barriers. Perceived or real factors that prevent involvement in recommended action following a cardiac event: cost, inconvenience, fear of pain, or change.

General health motivation. A person's general concern for health and the tendency to seek health related information and participate in health related behaviors.

Modifying factors. Factors that affect the predisposition to secondary preventive action, including demographic, sociopsychologic, and structural factors.

Cues to action. Stimulus that occurs to trigger appropriate action. These cues may be internal, such as symptoms, fatigue, or recall of the condition, or external, as mass media, advice from others, poster or newspapers.

Self-efficacy. Rosenstock, Stretcher, and Becker (1988) recommended including self-efficacy as a method of further explaining health behavior. The thoery of self-efficacy postulates that health behavior is determines by outcome expectations and efficacy expectations. Self-efficacy expectation is the conviction or belief that a person has regarding their ability to carry out the health recommendation. Based on Bandura's (1977) formulation, self-efficacy influences behavior in three ways: the ability to initiate the behavior, the ability to maintain the behavior and the degree of persistence in continuing the behavior in the face of obstacles.

In summary, the theoretical constructs of the HBM are offered as a basis to predict and explain health behaviors, adherence to prescribed therapies and response to symptoms. According to Becker (1974), the acceptance of ones' susceptibility to cardiac disease is theorized to provide the force leading to action. The direction that action takes is thought to be influenced by beliefs that the available alternatives to reducing the disease threat are beneficial and at the same time present minimal barriers. More recently, self-efficacy has been demonstrated to significantly add to

the predictability of the HBM in explaining health behaviors (Rosenstock et al., 1988). In this study the concepts of perceived benefits, perceived barriers and self-efficacy were investigated in relation to adherence to the cardiac rehabilitation/exercise program.

Literature Review

There has been a significant amount of research done on the HBM itself as well as its use as the theoretical framework of numerous studies. Self-efficacy has been examined in relationship to diverse health behaviors. However, the studies examining the relationship of health beliefs to the adherence to cardiac rehabilitation exercise programs are few. The literature review will focus on the HBM, specifically the concepts of benefits and barriers, with the addition of the concept of self-efficacy, and the concepts of adherence and cardiac rehabilitation exercise program.

Health Belief Model

The HBM provides a paradigm for exploring the relationship between health beliefs and adherence to a cardiac rehabilitation program by an individual with heart disease. The framework suggests if one has strong beliefs of the benefits of cardiac rehabilitation, perceives self-efficacy to perform an exercise program, while perceiving few barriers, one would be more adherent to a cardiac rehabilitation program.

Hiatt, Hoeshell-Nelson, and Zimmerman (1990) investigated factors influencing patient entrance into a cardiac rehabilitation program. They administered a

questionnaire based on the HBM variables of perceived susceptibility, seriousness, benefits and barriers to 39 discharged cardiac patients. Results of this descriptive, correlational research identified significant differences in perceived barriers and benefits between subjects who chose to attend outpatient cardiac rehabilitation and those who did not attend. Demographic variables revealed that patients who were married or had incomes greater than $20,000/year, perceived more benefits and fewer barriers. They found no significant difference between the groups for perceived severity or susceptibility. Limitations of the study includes a small, convenience sample, and a single institution study. While Hiatt et al. (1990) looked at entrance into a cardiac rehabilitation program, an investigation into adherence to a program will expand on their research.

The individual perception of barriers has been most consistently associated with cardiovascular health behaviors (Kirscht, Janz, & Becker, 1987; Kirscht & Rosenstock, 1977; Tirrell & Hart, 1980). The study by Tirrell and Hart (1980) looked at the relationship of health beliefs and knowledge to exercise compliance post coronary artery bypass surgery. Twenty-six men and four women were interviewed ten-twelve months post cardiac event. Correlation between exercise compliance and the HBM variables of severity, susceptibility, barriers, health motivation and self-efficacy, were examined. The strongest relationship was seen between the perception of barriers and the recommended exercise compliance. They identified that the greater the number of barriers, the lower the level of adherence. This study looked at compliance one year from the cardiac event. In the current

research, compliance was investigated six to eight weeks post event, where the motivation to comply with recommended therapy may be higher, and fewer barriers applicable.

In a review of the research done using the HBM, Janz and Becker (1984) identified perceived barriers as the most powerful HBM dimension. Kim, Horan, Gendler, and Patel (1991) developed the Osteoporosis Health Belief Scale (OHBS) to measure health beliefs relates to osteoporosis. The questionnaire was distributed to a large convenience sample of 150 elderly. Results of discriminant function analysis of the OHBS shows barriers and health motivation to be very important variables in explaining both calcium intake and exercise behaviors of the elderly.

Champion (1987) examined the relationship of five HBM concepts: benefits, barriers, susceptibility, severity, health motivation, and knowledge, to the frequency of breast self-examination (SBE). A convenience sample of 585 women, with the mean age of 33 years, were approached in a waiting room of an outpatient clinic to complete a questionnaire based on the HBM concepts, and knowledge of SBE. Results from multiple regression and discriminant function analysis demonstrated the variables important in explaining SBE behavior were barriers, knowledge and susceptibility. The research demonstrated an increased frequency of SBE among individuals receiving education by a health professional. The study supports and validates the importance of health teaching by a health professional, as is done in cardiac rehabilitation settings. The results are consistent with previous work of Champion (1985).

Studies have revealed that people are more likely to comply with health recommendations of various sorts when they believe the action is effective in preventing, detecting, or treating the disease. Perceived benefits to cardiovascular risk factor modification have been related to adherence to antihypertensive medication regimen and participation in a regular physical activity program (Hiatt et al., 1990; Kirscht & Rosenstock, 1977; Mirotznik, Speeding, Stein, & Bronz, 1985). Similarly, Muench (1987) studied seventy-two subjects enrolled in a cardiac rehabilitation program with respect to their health behaviors and the HBM variables of susceptibility, seriousness, benefits and barriers. Muench reported that cardiac rehabilitation patients who perceived more benefits from program participation also reported fewer barriers to adherence. Muench also reported a strong relationship between support of a close relative and adherence to program.

Dai and Cantanzaro (1987) also found perceived benefits to be a strong variable related to compliance, in a study that examined health beliefs and skin care regime among twenty paraplegic male outpatients. While this study supports the importance of the HBM variable of benefits, it also found the four variables of the HBM (benefits, barriers, susceptibility, severity) to have a synergistic influence on compliance. They found the level of compliance to be more predictable if taken as a composite of the variables (1987). The findings also support the importance of education in techniques of skin care and prevention to increasing compliance.

Self-Efficacy

Self-efficacy theory has been used as a framework for predicting health behaviors including smoking cessation, weight control, physical activity, and cardiac rehabilitation (Coehlo, 1985; Jeffrey et al., 1984; Stanley & Maddux, 1986; Taylor, Bandura, Ewart, & DeBusk, 1985). These studies indicated self-efficacy as a consistent predictor of health behavior and that interventions can enhance self-efficacy.

Studies have provided support for the role of efficacy expectations on the performance of regular physical exercise. Kaplan, Atkins, and Reinsch (1984) tested the relationship of self-efficacy to a medically prescribed walking program among subjects with chronic obstructive pulmonary disease. Self-efficacy Theory was supported by the following findings: (a) adherence to the walking program resulted in increased subject's expectation of their ability to accomplish the behavior in the future; (b) these expectations were associated with increased performance (achieving a higher work load) on a treadmill exercise test, three months later; and (c) significant correlations between perceived self-efficacy and behavior were found when self-efficacy represented the specific behavior of walking versus dissimilar behaviors such as general exertion.

Desharnais, Boullin, and Godin (1986) found that an expectation of self-efficacy was a more central determinant of adherence to regular physical exercise than was the expectation of outcome, although both variables were significant related to exercise adherence. Stanley and Maddux (1986) supported that individual intention

to participate in an exercise program was influenced by both perceived personal ability to initiate the behavior and the expected outcomes of participation. In subjects with diagnosed cardiovascular disease, efficacy expectations following treadmill testing and circuit weight training were predictive of the duration and intensity of subsequent home activity (Ewart, Taylor, Reese, & DeBusk, 1983). In all studies, results support the importance of self-efficacy in increasing adherence to prescibed exercise regimens.

Adherence

Adherence can be defined as the extent to which an individual's behavior coincides with medical or health advice. In much of the literature the term compliance is used in the same manner as adherence. Therefore literature on compliance and adherence will be cited.

While progressive exercise training for the cardiac patient had been demonstrated to be beneficial in many ways, due to low levels of adherence, many patients do not benefit from a prescribed exercise program. Studies on exercise compliance have demonstrated compliance rates ranging from 40-60% (Oldridge, 1983).

Comparisons between groups of patients who complete cardiac rehabilitation programs and those who drop out provide evidence of the benefits of such programs. A study by Shepard, Corey, and Kavanagh (1981) reported a fivefold difference in fatal and nonfatal recurrences of MI between patients who quit and those who complied. Giesse and Schomer (1986) reported life style was significantly healthier

with regard to diet, exercise and general care of the body, among those who participated in a rehabilitation program and those who did not.

In examining the four risk factors most frequently prescribed to patients to change, Miller, McMahon, and Johnson (1983) reported the best adherence to nonsmoking (74%), followed by diet (58%), exercise (43%), and stress management (35%). These figures suggest that a high degree of noncompliance is a general problem encountered whenever and wherever health related behavior change is attempted (Comoss, 1988).

Radtke (1989) looked at exercise compliance in cardiac rehabilitation to determine if patients were compliant and whether the compliance was related to self motivation. Results revealed a compliance rate of 89% post discharge and 82% six months later, indicating that patients were moderately and consistently self motivated. The results also demonstrate that the time lapsed influenced compliance.

Oldridge (1992) examined factors associated with attendance to cardiac rehabilitation programs. He found poor compliance among younger participants (less than 54 years), and a higher drop out rate among female participants.

Cardiac Rehabilitation

Cardiac rehabilitation is a program of risk factor modification that includes exercise training. For overall cardiovascular strengthening and conditioning, patients are instructed to exercise aerobically. Aerobic exercise includes the following three conditions: exercise performed three to five times a week, done in an intensity that raises the heart rate to 65-75% of maximum, and lasts 30-45 minutes of rhythmic

movement using the large muscle groups. The benefits of exercise training post cardiac event had been demonstrated widely in research (Wenger, 1984; Pollock, 1990; Franklin, 1990). Physical exercise had been linked with both reduced death rate from coronary artery disease and regression of atherosclerotic lesions (Nash, 1988).

Implication for Study

To summarize, there are certain variables believed to influence taking preventive health action. According to the HBM, adherence behaviors are more likely to occur if a cardiac patient perceives benefits to a cardiac rehabilitation exercise program while perceiving few barriers. In addition, it is important for the individual to believe he or she is able to carry out the health recommendation. Most studies have supported a relationship between health behaviors and variables included in the HBM.

Cardiac disease represents a significant health problem to our society. There is a great need for further understanding of the process that facilitates or inhibit individual life style changes. This information can provide a basis for appropriate and meaningful interventions in supporting life style changes for the cardiac patient.

Research Hypothesis

The hypothesis tested in this study is perceived benefits, barriers, and self-efficacy of individuals who are adherent to an exercise program will differ from those who are non-adherent.

Definition of Terms

Perceived benefits are beliefs regarding the effectiveness of the cardiac rehabilitation exercise program following a cardiac event. The individual's evaluation of the feasibility and efficacy of this behavior is included.

Perceived barriers are real or perceived factors that prevent involvement in a cardiac rehabilitation exercise program.

Self-efficacy is defined as the belief that one is capable of sucessfully accomplishing a particular behavior.

Adherence is the extent to which an individual's behavior coincides with prescribed cardiac exercise program.

Cardiac rehabilitation exercise program is an aerobic exercise program for cardiovascular training and muscular conditioning post cardiac event.

CHAPTER III

METHODOLOGY

Study Design

A cross-sectional, descriptive correlational design was used to examine the relationship between the HBM variables of perceived benefits, perceived barriers and self-efficacy among individual's adherent to an exercise program and those who were non-adherent. Data were obtained from individual's 6-8 weeks following a hospitalized cardiac event, through the completion of instruments measuring at health beliefs, self-efficacy, and exercise compliance.

Sample and Setting

Subjects were selected from a 350 bed, acute care medical center in northwestern Michigan, and a 200 bed medical center in southwestern Michigan. Both hospitals provided services, including education and rehabilitation, to cardiac clients.

The data were collected from a convenience sample of patients who met the eligibility criteria, who had received in-hospital cardiac rehabilitation instruction between August 15, 1994 to April 1, 1995, and who consented to participate in the study. One hundred and sixteen questionnaires were sent out to prospective subjects with a return rate of 78%. The sample size included 90 participants. The large sample was used to attempt more representative sampling, realizing that

non-random methods may mean the findings can not be generalized to populations other than the sample.

Eligibility criteria included:

1. Age 21 or older
2. Had documented Coronary Artery Disease and a diagnosis of myocardial infarction or angina or undergone coronary artery bypass graft surgery, or angioplasty.
3. Lack significant cerebral, renal, pulmonary or cardiac complications that would prohibit participation in an exercise program.
4. Literate in the English language
5. Received in-hospital Cardiac Rehabilitation instruction
6. Gave consent to participate in study.

Instruments

The following instruments were used to collect data on the major variables of the study: (A) The Cardiac Exercise Health Belief Scale, (B) The Exercise Compliance Questionnaire, (C) The Cardiac Self-Efficacy Scale, and (D) the Demographic questionnaire.

Cardiac Exercise Health Belief Scale

The Cardiac Exercise Health Belief Scale (CEHBS) was developed to measure health beliefs to adherence to regular cardiac rehabilitation/exercise program (See Appendix A). Items are reflective of the HBM variables of perceived benefits and perceived barriers. It was adopted from the Self Breast Examination instrument

(Champion, 1984) and the Osteoporosis Health Belief Scale (Kim, Horan, Gendler, & Patel, 1991; Kim, Horan, & Gendler, 1992). There are twenty items on the CEHBS, ten reflective of perceived benefits and ten perceived barriers. A five point rating scale was used to rate items from strongly disagree (1) to strongly agree (5). The minimum score on the benefits and barriers scale is ten with maximum score being fifty.

In development of the Cardiac Exercise Health Belief Scale, the instrument had been tested for face validity by cardiac rehabilitation experts. It was also reviewed by two elementary school teachers for readability and level of language used. The scale was then pre-tested on 15 cardiac rehabilitation clients. Reliability of the instrument was evaluated by using the data from the sample. Internal consistency of the benefits and barriers subscales were evaluated to establish reliability. Cronbach alpha coefficients ranged from .84 for barrier and .90 for benefit. Construct validity of the CEHBS was determined by factor analysis. The two factors, reflective of benefits and barriers subscales, were extracted with a factor loading range of .45 to .80 (McGinn, 1995).

Exercise Compliance Questionnaire

To measure exercise adherence following cardiac event, the Exercise Compliance Questionnaire (ECQ) was used to divide the sample into two groups: adherent and non-adherent to exercise (See Appendix B). This questionnaire was developed by Radtke (1989) to determine how well patients complied with their prescribed home exercise program. The six questions were designed to examine the

frequency, method, intensity, and duration of exercise. The answers were listed in numerical order. The score is accumulated according to the numbers selected.

For this study, to be considered adherent to the exercise program the individual needed to select two or higher on question one and two, and a total of five or more on questions one through four. A score of five or more on items one through four would be adherent. A score of less than five would be considered non-adherent to the exercise program. Questions five through eight were for information only, not for determining adherence to the exercise program.

The content of the ECQ was reviewed for face validity by physical therapists who prescribed home exercise (Radtke, 1989). Radtke did not report the reliability of the instrument.

Cardiac Exercise Self-Efficacy Scale

The Cardiac Exercise Self-Efficacy Scale (CESES) was adapted from the Osteoporosis Self-Efficacy Scale (OSES) by Horan, Kim, and Gendler (1993). The OSES, exercise component, is a six item visual analog scale in which the lower anchor is "not confident at all" (0) and the upper anchor "very confident" (100). The total score ranges from zero to six hundred. The reliability coefficient (Cronbach alpha) was .90. A review of the literature provided the basis for item construction and nursing experts analyzed the items for content validity. Construct validity of the scale was determined by factor analysis. Criterion related validity of the instrument was evaluated by discriminant function analysis (Horan, Kim, & Gendler, 1993).

The CESES was set up like the OSES, only using exercise behaviors (See Appendix C). The anchors and scoring were the same except, the mean score on six items was used. Thus, the total score of the CESE ranged from 0 to 100. Cronbach alpha of .94 was obtained using data from this study.

The Demographic Data Sheet

Demographic data were obtained on a separate questionnaire. Items included age, sex, race, marital status, education, employment, income level, risk factor identification, medical insurance status, and date of discharge. A question regarding the presence of any physical limitations that may exclude one from exercise, was included. (See Appendix D)

Procedure for Data Collection

This study included participants, who had received inpatient cardiac rehabilitation, to assure a home exercise program had been given to the patient. The researcher approached subjects meeting the criteria, in the hospital setting. A brief explanation of the purpose of the study, methodology, risks, potential benefits, voluntary participation and the right to withdraw at anytime, was explained. A written consent was obtained. See Appendix E for sample of consent. Results of the study were made available to the subjects upon request to the researcher.

At six-eight weeks following discharge, a mailed envelope, including patient instruction, the instruments, a demographic data collection sheet and a stamped, return envelope was sent to the patient. The six-eight week delay is to allow for

appropriate healing and time to begin the recovery exercise program recommended during hospitalization.

Human Subject Consideration

Before data collection began, the proposal was submitted to and approved by the Grand Valley State University Human Research Review Committee and study hospitals. There were no expected risks to the subjects in this study. Fatigue or boredom may have been a risk due to the number of questions to be answered on the tool. Psychologic or emotional anxiety may have occurred resulting from self assessment and self-disclosure in answering questions on the tool. A possible benefit resulting from participation may have been the subject's heightened awareness of the importance of exercise in recovery following a cardiac event.

CHAPTER IV

RESULTS

Data were collected during a eight month period from August 15, 1994 to April 15, 1995. During this period 90 individuals met the sample selection criteria and participated in the project. These individuals were recruited from two hospital sites.

Characteristics of the Subjects

Of the 90 participants, 77% (n = 69) of the sample were male and 23% were female (n = 21). Their ages ranged from 43 to 81 years with a mean age of 62 years (SD = 10.22). Ninety-five percent of the sample were Caucasian (n = 85), with 3% Native American (n = 3), 1% Black (n = 1), and 1% Hispanic (n = 1). Seventy-eight percent of the sample were married (n = 70) and 22% were reported non-married (n = 20). Employment status of the sample included 41% working full-time (n = 37), 4% part-time (n = 4) and 55%, retired (n = 49). Of the 84 reported occupations, 44% were professionals (n = 37), 32% semi-professional (n = 27) and 24% (n = 20) as unskilled labor.

The demographic data of the adherent and non-adherent subjects were analyzed. The number and percentages of adherent and non-adherent groups by gender and martital status are presented in Table 1. Of 60 adherent subjects, 87% were males and 13% were females. In the non-adherent group, 57% were males and 43% were females. These statistics demonstrate a significant difference between males and

females and their compliance to an exercise program post cardiac event ($p < .01$). The data support that male subjects were more likely to be adherent to an exercise program post cardiac event than females.

Marital status was analyzed for statistical significance. The data suggest that married subjects were more likely to be adherent to an exercise program post cardiac event than non-married subjects ($p < .05$).

Table 1

Number and Percentages of Adherent and Non-adherent Groups by Gender and Marital Status (N = 90)

	Group					
	Adherent (n = 60)		Non-adherent (n = 30)		Total (N = 90)	
	n	%	n	%	n	%
Gender[a]						
male	52	87	17	57	69	77
female	8	13	13	43	21	23
Marital Status[b]						
Married	51	85	19	63	70	78
Non-married	9	15	11	37	20	22

[a] $X^2(1, N = 90) = 10.06, p < .01$.

[b] $X^2(1, N = 90) = 5.43, p < .05$.

In Table 2 the age and education data of the two groups are presented. The results show that the two groups were not statistically different from each other with respect to age or education ($p > .05$).

Table 2

Age and Education Comparison of Two Groups

	Group						
	Adherent (n = 60)		Non-adherent (n = 30)				
Characteristic	M	SD	M	SD	t	df	p
Age (years)	62.01	10.22	60.26	9.72	.78	88	.44
Education	13.86	2.68	13.40	2.69	.78	88	.44

In Table 3 the number and percentages of adherent and non-adherent groups by employment status and occupation are presented. Analysis of the employment status of the two groups did not differ significantly from each other in regards to adherence to exercise ($p > .05$). Review of the occupational data suggests a difference between the two groups ($p < .05$). In the sample reporting a specific occupation the adherent group is comprised of sixteen percent (n = 9) unskilled labor, thirty-seven percent semi-professional (n = 21) and forty-seven percent professional (n = 27). In the non-adherent group, forty-one percent (n = 11) unskilled laborer, twenty-two percent (n = 6) semi-professional and thirty-seven percent professional (n = 10).

Table 3

Number and Percentage of Adherent and Non-adherent Groups by Employment Status and Occupation (N = 90)

	Group					
	Adherent (n = 60)		Non-adherent (n = 30)		Total (N = 90)	
	n	%	n	%	n	%
Employment Status[a]						
Retired	31	51	18	60	49	55
Full-time	25	42	12	40	37	41
Part-time	4	7	0		4	4
Occupation[b]						
Unskilled	9	16	11	41	20	24
Semi-professional	21	37	6	22	27	32
Professional	27	47	10	37	37	44

[a] $X^2 = 2.26$, df = 2, p = .32

[b] $X^2 = 6.45$, df = 2, p = .03

The demographic questionnaire inquired if any physical limitations were present that may inhibit participation in a exercise program. Of the sample (N = 90), four percent (n = 4) answered yes. Of these four subjects, two were adherent to an exercise program and two were not. Reasons sited as physical limitations were arthritis, stroke and post surgical wound infection. Statistical analysis was not performed due to the small number of subjects with physical limitations.

Questions regarding insurance benefit coverage were asked on the demographic sheet. Of the sample (N = 90), 97% were insured (n = 87) and 3% (n = 3) were

not. Of the non-insured sample, two subjects were adherent and one subject non-adherent. Due to the small number of non-insured, statistical analysis was not performed.

Summary of the demographic data between the adherent group and the non-adherent group suggests differences. Specifically the data suggest that there is a statistical difference between the adherent and non-adherent group in relation to gender, marital status and occupation. The groups do not differ significantly from each other in regards to age or education.

Hypothesis Testing

The hypothesis of this study is the perceived benefits, perceived barriers and self-efficacy of individuals adherent to exercise post cardiac event will differ from those individuals non-adherent to an exercise program. The sample was divided into two groups: adherent and non-adherent, from the results of the Exercise Compliance Questionnaire (ECQ). The sample yielded 67% (n = 60) reporting adherence to an exercise program and 33% (n = 30) reporting non-adherence to an exercise program.

Using t-tests, the scores of perceived benefits, perceived barriers and self-efficacy of the two groups were compared. In the statistical analysis of self-efficacy data, the mean score of individual subject was used, with possible score range of 0 to 100. For analysis of benefit and barrier data, the total score was used with possible score range of 10 to 50.

In Table 4, the variables of self-efficacy, perceived benefits and perceived barriers are compared statistically between the adherent and non-adherent groups.

The results of the t-test show that the groups were significantly different from each other in regards to the variables of self-efficacy ($p = .000$), perceived barriers ($p = .006$), and perceived benefits ($p = .000$).

Table 4

Comparison of Two Groups in Regards to Perceived Self-efficacy, Benefits, and Barriers (N = 90)

	Adherent (n = 60)		Non-adherent (n = 30)				
Variable	M	SD	M	SD	t	df	p
Self-efficacy	80.70	12.56	57.96	23.46	4.97	37.5	.000
Benefits	44.33	4.58	40.20	4.82	3.97	88	.000
Barriers	22.95	5.00	27.03	6.89	2.89	44.8	.006

CHAPTER V

DISCUSSION/IMPLICATIONS/LIMITATIONS

Discussion

Cardiovascular health behavior, such as exercise, is a concept with many hypothesized explanatory variables. The purpose of this study was to demonstrate a difference between the health beliefs of individuals who were adherent to an exercise program post cardiac event and those who were not. The results of the data analysis suggest a significant difference between these two groups.

The most significant difference appears to be the individual's perception of their self-efficacy, or ability to perform the prescribed exercise program. The subjects of this study who believed, or were convinced, they were able to initiate and maintain a program of exercise were more compliant.

This study supports self-efficacy as a pivotal indicator of health behavior. It supports the significance of the individual's perception of his/her ability and self-confidence to perform the activity. This is consistent with current research in this area (Stanley & Maddux, 1986; Taylor, Bandura, Ewart, & DeBusk, 1985).

The study subjects also demonstrated a difference in the variable of perceived barriers. Subjects who perceived fewer barriers to exercise were more adherent to their program. Subjects who perceived more barriers to exercise were less adherent. These impressions are consistent with the findings of Janz and Becker's (1984)

review of the HBM studies, in which perceived barriers were considered the most powerful HBM dimension. It also supports Tirrell and Hart (1980) findings of a strong relationship between perceived barriers and exercise compliance one year following coronary artery bypass graft surgery.

In reviewing studies of the HBM, Janz and Becker (1984) also demonstrated a significant relationship between perceived benefits and compliance to a health behavior. This study supports that relationship. An individual who perceives the benefits of exercise post cardiac event, is more likely to choose to comply with prescribed therapies. The individual's knowledge of the actual benefits of exercise may play a role in adherence. Knowledge has been demonstrated in research as a significant variable (Tirrell & Hart, 1980; Champion, 1987) in compliance with health behaviors.

The results of this study suggest that subjects who are married are more likely to be adherent to the exercise program. Hiatt et al. (1990) study also indicated married participants were more likely to perceive more benefits to exercise and less barriers; therefore they were more likely to comply with cardiac rehabilitation. Muench (1987) study also suggested a relationship between compliance and a strong family support. Individuals whose positive health behaviors are encouraged and supported are more likely to adopt and maintain those behaviors.

The current study statistics suggest a significant difference between males and females and their compliance to an exercise program. The data demonstrate that male subjects were more likely to be adherent than females. This supports

Oldridge's (1992) study which also found poor compliance to exercise among female participants in cardiac rehabilitation exercise programs. As with much of the cardiovascular research, males make up the majority of the sample, seventy-seven percent, in this study. Current research needs to continue to look at women and heart disease.

This study demonstrated a relationship between occupation and adherence. Subjects listing professional or semi-professional occupations were more adherent to exercise than unskilled laborers. Yet education was not significant as a indicator of adherence. An explanation may be that professionals and semi-professionals often have more flexiblility in their daily schedules to allow time for exercise. A strict work schedule of an unskilled laborer may present the subject with a barrier to exercise.

Limitations

There may be other variables that could influence adherence to an exercise program. For example, as the presence of another chronic disease may inhibit exercise, as would complications as a result of the cardiac event. It is necessary to control these threats through the sample selection, or identify through questions on the demographic sheet given to each subject, as done in this study. The demographic questionnaire only inquired as to physical limitations. It is recommended that a question be added allowing the subject to explain the reason for non-adherence to the exercise program, physical or otherwise.

Mortality and history are two other potential threats to the internal validity of the study design. Mortality was not a factor in this study. The effect of history on this study is difficult to assess since prior exposure to an exercise program was not measured. This may be a worthwhile consideration in future research in this area of adherence.

The majority of the study participants demonstrated compliance to an exercise program. A possible explanation may be that compliance is high following a cardiac life threatening event. The researcher could also speculate that the individuals most likely to respond were those who were compliant. Initial plan included use of a postcard reminder two weeks post mailing. While these were not used in this current study, efforts to obtain responses from non-respondents should be encouraged.

The main limitation of convenience sampling is available subjects may be highly atypical of the population with regards to the variables being measured (Polit & Hungler, 1991). For example, in this study, 95% of the sample possessed a high school education or higher. Therefore, the results of this study are limited to the study participants and cannot be generalized to the entire population of cardiac clients. Random sampling procedures with larger sample sizes in future research would enhance generalizability. Advantages of utilizing this study design is one of convenience and efficiency.

Recommendations

The purpose of this study was to look at adherence to a exercise program six to eight weeks post cardiac event. It was hypothesized that by this time interval individuals would be well enough to have begun the exercise program prescribed to them. This beginning phase is an important stage when looking at adherence. While evaluating adherence and the health beliefs of the individual, information on the effectiveness of patient teaching may also be apparent. Yet, it does not address long term adherence to exercise. It is recommended that individuals be re-evaluated at a future date, possibly eight months to one year following a cardiac event and assess the relationship of health beliefs and self-efficacy to adherence to cardiac exercise at that time.

In this study subjects were to have experienced a cardiac event. Information on the specific type of event was not requested. Future research should elicit this information for a comparison study, to look at any possible relationship with type of cardiac event and adherence to exercise. It may be the healing time of a post coronary artery bypass patient versus the healing time of a post myocardial infarction patient has an effect on recovery time. The coronary artery bypass patient is recovering from a surgical procedure, which has resulted in improved coronary flow. The myocardial infarction patient is recovering from muscle damage to his myocardium. While the healing time is similar, the wound or outward sign of injury may be more apparent to the surgical patient.

Conclusions

The findings of the present study support the usefulness of the HBM in describing health beliefs of subjects in relation to exercise post cardiac event. The results suggest that identification of an individual's perception of benefits, barriers and self-efficacy may support compliance to an exercise program. The self-efficacy component is a worthwhile addition to the HBM for it broadens the understanding of adherence to prescribed therapies.

Results of this study support the early assessment of individuals post cardiac event, for their perceptions and self-efficacy related to health behaviors and utilizing this data to guide nurse/patient interactions. Nurses and other health providers can provide educational information on the possible physiological and psychological benefits of exercising and the need to incorporate regular exercise into their lifestyle to maintain these benefits. Assisting patients in realistically identifying barriers to exercise compliance can lead to mutually developing strategies to address barriers. Knowledge is power. Nurses educating patients in strategies to improve and maintain their health following a cardiac event could reduce the risk of future cardiac events. Health promotion and education can and has impacted the incidence of cardiovascular disease in the United States. Continued study of self-efficacy and the HBM variables will further assist nurses in positively affecting patient outcomes.

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APPENDICES

APPENDIX A

I.D. NO:_____

Cardiac Exercise Health Belief Scale

This is a questionnaire designed to determine the way in which different people view certain issues related to exercise and heart disease. The questionnaire includes belief statements with which you may agree or disagree. Read each statement carefully, then CIRCLE the letter(s) to the left of the item which most closely represents your personal beliefs. This is a measure of your personal beliefs. There are no right or wrong answers.

The letter(s) to the left of each statement stand for the following responses:

SD Strongly Disagree
D Disagree
N Neutral
A Agree
SA Strongly Agree

In this questionnaire:

HEART DISEASE includes any of the following: myocardial infarction (heart attack), angina (chest pain with exertion), and coronary artery bypass graft (CABG) .

CARDIOVASCULAR EXERCISE is exercise that keeps your heart rate raised for twenty to thirty minutes and is performed three to four times a week.

EXERCISE when used in this questionnaire means cardiovascular exercise.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree		
SD	D	N	A	SA	1.	I feel exercising regularly will strengthen my heart muscle.
SD	D	N	A	SA	2.	Exercising regularly helps to keep my arteries open.
SD	D	N	A	SA	3.	I feel exercising regularly is vital for my health.
SD	D	N	A	SA	4.	Exercising regularly reduces my risk of another heart problem.
SD	D	N	A	SA	5.	I can slow the progression of my heart disease by exercising regularly.
SD	D	N	A	SA	6.	When I exercise regularly I feel good about myself.
SD	D	N	A	SA	7.	Exercising regularly reduces my risk of future heart problems by helping me control stress.
SD	D	N	A	SA	8.	Exercising regularly reduces my risk of future heart problems by helping me lose weight.
SD	D	N	A	SA	9.	I feel better when I exercise regularly.
SD	D	N	A	SA	10.	My family feels my exercise program is important in reducing my risk of future heart problems.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree		
SD	D	N	A	SA	11.	I am not strong enough to exercise regularly.
SD	D	N	A	SA	12.	Exercising regularly can be time consuming.
SD	D	N	A	SA	13.	Exercising regularly requires starting a new habit which is difficult.
SD	D	N	A	SA	14.	I dislike exercising regularly.
SD	D	N	A	SA	15.	There is no place for me to exercise regularly.
SD	D	N	A	SA	16.	I am too busy to exercise regularly.
SD	D	N	A	SA	17.	I dislike exercising regularly because it makes me sweat.
SD	D	N	A	SA	18.	I am afraid I will have symptoms such as chest pain or shortness of breath if I exercise regularly.
SD	D	N	A	SA	19.	Exercising regularly interferes with other activities I need to do.
SD	D	N	A	SA	20.	I don't have anyone to exercise regularly with me.
SD	D	N	A	SA	21.	My family and friends think I am foolish to exercise regularly since I had my heart problem.

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APPENDIX B

I.D. NO:_____

Exercise Compliance Questionnaire

The following eight questions relate to the prescribed home exercise program outlined by the physical therapist before you were discharged from the hospital. Please look over each question carefully and respond by placing a check mark by one of the five possible responses that **BEST** describes how you exercise. Please **CHECK ONLY ONE RESPONSE** to each question. If you have stopped exercising, please answer the question **FOR NON-EXERCISERS ONLY.** Thank-you.

1. How many times do you exercise (walk and/or bike) each week?

_____ 1. Fewer than 3 times a week
_____ 2. 3 times a week
_____ 3. 4 times a week
_____ 4. 5 times a week
_____ 5. More than 5 times a week

2. When you exercise (walk and/or bike), how long does this specific activity take you?

_____ 1. Less than 20 minutes
_____ 2. 20 to 29 minutes
_____ 3. 30 to 39 minutes
_____ 4. 40 to 49 minutes
_____ 5. 50 minutes or more

If you **WALK ONLY**, answer question #3. If you **BIKE ONLY**, answer question #4.
If you **BOTH WALK AND BIKE**, answer questions #3 **AND** #4.

3. **WALKERS** - When you walk for exercise, approximately how fast do you go in miles per hour (mph)?

_____ 1. Less than 2 mph
_____ 2. 2 to 2.9 mph
_____ 3. 3 to 3.9 mph
_____ 4. 4 mph
_____ 5. More than 4 mph

4. **BIKERS** - When you bike for exercise, approximately how fast do you go in miles per hour (mph)?

_____ 1. Less than 5 mph
_____ 2. 5 to 5.9 mph
_____ 3. 6 to 7.9 mph
_____ 4. 8 mph
_____ 5. More than 8 mph

5. When you exercise, how often do you take your pulse before you warm up?

_____ 1. Never
_____ 2. Occasionally
_____ 3. Sometimes
_____ 4. Most of the time
_____ 5. Always

6. How often do you take your pulse after you cool down from exercise?

_____ 1. Never
_____ 2. Occasionally
_____ 3. Sometimes
_____ 4. Most of the time
_____ 5. Always

7. Did you exercise before your heart attack?

_____ 1. No
_____ 2. Yes, occasionally
_____ 3. Yes, 1 to 2 times a week
_____ 4. Yes, 3 to 4 times a week
_____ 5. Yes, more than 4 times a week

FOR NON-EXERCISERS ONLY

8. Did you ever start the excercise program recommended to you in the hospital?

_____(1) Yes _____(2) No

IF YES, please state:

Date you stopped exercising:_____

Reason for stopping exercising:_____

Modified from Radtke, K. L. (1989). Exercise compliance in cardiac rehabilitation. Rehabilitation Nursing, 14, 182-186.

APPENDIX C

I.D.NO:_____

CARDIAC EXERCISE S-E SCALE

We are interested in learning how confident you feel about doing the following activities. Everyone has different experiences which will make each person more or less confident in doing the following things. Thus, there are no right or wrong answers to this questionnaire. It is your opinion that is important. In this questionnaire, EXERCISE means activity that keeps your heart rate raised for twenty to thirty minutes and is performed three to four times per week.

Place your "X" anywhere on the answer line that you feel best describes your confidence level.

If it is recommended that you do any of the following THIS WEEK, how confident or certain would you be that you could:

1. begin a new or different exercise program

Not at all confident |——————————————————————| Very confident

2. put forth the effort required to exercise

Not at all confident |——————————————————————| Very confident

3. change your exercise habits

Not at all confident |——————————————————————| Very confident

4. do exercises even if they are difficult

Not at all confident |——————————————————————| Very confident

5. exercise for the appropriate length of time

Not at all confident |——————————————————————| Very confident

6. do the type of exercises that you are supposed to do

Not at all confident |——————————————————————| Very confident

Modified from Osteoporosis S-E Scale. Horan, M., Kim, K., & Gendler, P. (1993). Development and evaluation of the Osteoporosis Self Efficacy Scale. A paper presented at the Midwest Nursing Research Society Conference, Cleveland, OH.

APPENDIX D

I.D. NO._____

DEMOGRAPHIC QUESTIONNAIRE

The following personal information is needed for our data analysis. This information is completely confidential. For each question, choose only ONE answer unless otherwise indicated.

1. What is your present age in years? _____years

2. What is your sex?

   ( ) 1. male ( ) 2. female

3. What is your present marital status?

   ( ) 1. single
   ( ) 2. married
   ( ) 3. divorced
   ( ) 4. separated
   ( ) 5. widowed

4. Are you presently employed? ( ) 1. yes ( ) 2. no

5. If employed, do you work ( ) 1. full-time ( ) 2. part-time

6. What is (or was) your occupation? _____
   (please specify)

7. What is your average household annual income?

   ( ) 1. less than $10,000
   ( ) 2. $10,001 - 20,000
   ( ) 3. $20,001 - 30,000
   ( ) 4. $30,001 - 40,000
   ( ) 5. $40,001 - 50,000
   ( ) 6. $50,001 - 60,000
   ( ) 7. Greater than $60,000

8. What is the highest grade or year of school you have completed?

	years completed	PLEASE CIRCLE
none	00	
Elementary	01 02 03 04 05 06 07 08	
High school	09 10 11 12	
College/technical school	13 14 15 16	
Some graduate school	17	
Graduate or professional degree	18	

9. Which of the following personal behaviors or characteristics apply to you?.

( ) 1. smoking
( ) 2. use a lot of table salt
( ) 3. eat a diet high in fat
( ) 4. overweight
( ) 5. under a lot of stress

10. What race do you consider yourself to be?

( ) 1. Asian
( ) 2. Black
( ) 3. Caucasian
( ) 4. Hispanic
( ) 5. Native American
( ) 6. Other _____
(please specific)

11. Do you have health insurance?

( ) 1. yes
( ) 2. no

12. If you do have health insurance, what portion of a cardiac rehabilitation program does your insurance cover?

( ) 1. 0%	( ) 5. 40%	( ) 9. 80%
( ) 2. 10%	( ) 6. 50%	( ) 10. 90%
( ) 3. 20%	( ) 7. 60%	( ) 11. 100%
( ) 4. 30%	( ) 8. 70%	( ) 12. unsure

13. Do you have any physical limitations which prevent you from participating in CARDIOVASCULAR exercise. Cardiovascular exercise is exercise that keeps your heart rate raised for twenty to thirty minutes and is performed three to four times per week.

( ) 1. yes
( ) 2. no

If yes, please describe your physical limitations

14. On what date were you discharged from the hospital?

_____

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APPENDIX E

Information and Informed Consent
for
Research Project Participants

The purpose of the study in which you are being asked to participate is to examine the relationship of health beliefs of individuals with heart disease and how they take care of themselves. The results of this study will help test the assessment tool that may be helpful in early identification of problems related to an individual adopting a regular exercise program following the onset of angina, a heart attack, or heart surgery.

This research is being conducted by Marianne Foster R.N./Ginger McGinn R.N., as course work in completion of a master of science degree in nursing through Grand Valley State University. Any questions can be directed to Ms. Foster at 935-6865 (days) or 943-3674 (evenings).

As a participant, I understand I will be asked to complete the questionnaires sent to me in the mail, six to eight weeks following my hospitalization. I understand that the questionnaires will take 15-30 minutes to complete. I will be provided with directions. It is not anticipated that participation will result in any physical, psychological or economic risk. I understand I will receive no direct benefits as a result of participation. I understand that my participation is voluntary and I may withdraw from the study at anytime.

I understand that every effort will be made to protect my confidentiality and the results of the study will be made available to me on my request to the researcher.

I have read and understand the information presented. I consent, of my free will, to participate in this study.

_____ _____

Participant Signature Witness Signature

_____

Date

Appendix F

Verbal Explanation

Hello, my name is _____. I am a nurse at _____. I am conducting a research project as part of the requirements for completion of my masters degree in nursing with the permission of _____. If you have a few moments I would like to explain the research project to you. Please feel free to say no. You are under no obligation to listen to my explanation or participate in the research.

I will be using a group of patients with known heart disease. I am looking at patients perceptions or beliefs about benefits and barriers to performing a recommended exercise program after discharge from the hospital. Hopefully, information we gain will help health care workers to be better able to remove barriers and increase patients understanding of the benefits of exercise after a cardiac event. There is no negative risk to anyone who participates in this study.

Six to eight weeks after your discharge from the hospital I will mail you a set of questionnaires. I will want you to complete them and mail them back to me in the stamped, addressed envelope I will provide. It should take you about 20 to 30 minutes to complete all the questionnaires. All responses will be kept totally confidential. The information is identifiable by a number only. At no time is your name attached to your responses. Your responses are not shared with your physician, nurses, or family. You may have a copy of the completed research if you so wish. As I stated before, participation is completely voluntary.

Do you have any questions?

Would you be willing to sign a consent form agreeing to participate in this research?

Principal Investigator -- Marianne Foster