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The Relationship of Selected Health Beliefs and Exercise Adherence 8 to 12 Months After a Cardiac Event

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THE RELATIONSHIP OF SELECTED HEALTH BELIEFS AND EXERCISE ADHERENCE 8 TO 12 MONTHS AFTER A CARDIAC EVENT

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ABSTRACT

THE RELATIONSHIP OF SELECTED HEALTH BELIEFS AND EXERCISE ADHERENCE 8 TO 12 MONTHS AFTER A CARDIAC EVENT

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The purpose of this study was to examine differences between health beliefs and cardiac exercise adherence at 6-12 weeks after a cardiac event as compared to 8-12 months post event. Twenty five subjects participated at time one and time two by answering mailed questionnaires designed to measure perceived benefits, perceived barriers, self-efficacy, exercise adherence, and demographic data.

Data analysis did not reveal a significant difference in exercise adherence or perceived benefits, but results did support a statistically significant difference in perceived barriers ($p=.02$) and self-efficacy ($p=.03$) from time one to time two. Subjects perceived higher levels of barriers related to exercise, and less ability to accomplish the prescribed regimen after 8-12 months. This study supports the dynamic nature of health beliefs, and the need for continuous reassessment when determining interventional strategies to assist individuals in regimen adherence. Several implications for health professionals were identified.

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CHAPTER I

INTRODUCTION

Coronary artery disease (CAD) is a complex process that affects more than 11 million Americans. Approximately 70% of the adult population in this country have some degree of atherosclerotic changes in their coronary arteries (Consensus Panel Report, 1995). As the leading cause of death in the United States, it seems prudent that society investigate preventative behaviors that might reduce the incidence of CAD (Carroll, 1995). While there are many contributing factors to the development of CAD, one major risk factor that can be modified is sedentary lifestyle behaviors. Research has demonstrated that individuals with CAD who increase their level of exercise can inhibit further progression of the disease, decrease related clinical events, and in some instances even initiate a regression of the disease (LaFontaine, 1995).

In 1996 the first surgeon general's report on physical activity and health was published. The Center for Disease Control in collaboration with experts in exercise science, physiology, epidemiology, public health and the behavioral sciences prepared this report that describes scientific and medical evidence linking physical inactivity to cardiovascular, metabolic and other diseases. A direct connection was identified between moderate levels of regular exercise, and

lower death rates from heart attacks, stroke, high blood pressure, diabetes, brittle bones, selected cancers, anxiety and depression.

Typically after a cardiac event individuals with CAD are prescribed a regimen of physical exercise, dietary and medication instruction, smoking cessation, and stress modification. Most of these recommendations involve major lifestyle changes, which for some individuals can be difficult to accomplish. Cardiac Rehabilitation programs have developed around the country to aid individuals in making the required lifestyle or behavior changes necessary to prevent recurrence of cardiac events, and restore optimal medical, physiological, psychological, and vocational performance. While these programs are highly recommended after a cardiac event by most health professionals, studies have shown that by the end of a 12 month period the drop out rate can be as high as 50 - 60% (Mullinax, 1995). Program success is dependent on the individual's ongoing participation and commitment to both the program, and the modifications in lifestyle. Attention to enhancing patient adherence is an integral part of any risk reduction program. One way to achieve a better understanding of adherence to recommended regimens is to consider the psychological variables that affect health behaviors (Becker, 1974). Therefore, it seems reasonable for health professionals to examine the influence of health beliefs on exercise adherence after a cardiac event. Behavioral changes required after an event are

typically a lifetime commitment for those diagnosed with CAD. Health beliefs need to be assessed not only initially after the event, but also over time.

The Health Belief Model (HBM) is a psychosocial theory that has been used in numerous research studies to explain and predict adherence behaviors (Champion, 1984, 1985, 1987; Kison, 1992; Mirotznik, Feldman, & Stein, 1995; Murdaugh & Verran, 1987; Robertson & Keller, 1992; Tirrell & Hart, 1980). The model outlines specific components that influence a person's decision to take preventative actions. According to Rosenstock (1974) health-related behavior occurs as a result of a combination of attitudes related to the five concepts: susceptibility, seriousness, benefits, barriers, and motivation. Rosenstock hypothesized: (a) a positive relationship exists between preventative health behaviors and the strength of health beliefs related to susceptibility, seriousness, benefits and motivation, and (b) a negative relationship exists between preventative behaviors and the strength of health beliefs related to barriers. The concept of self-efficacy was later added to the HBM framework enhancing the predictability of explaining health behaviors (Rosenstock, Strecher, & Becker, 1988).

Although research using the HBM is growing in the area of cardiac disease, there are few studies available that investigate the model and its relationship to cardiac disease (Mirotznik, Feldman, & Stein, 1995). More

research is necessary if specific interventional strategies are to be developed using the HBM and self-efficacy as a guiding theoretical framework for cardiac exercise adherence. Health professionals need to examine the processes that influence motivation to initiate and sustain cardiovascular health behaviors. Interventions to assist risk factor modification must include an awareness of the forces behind individual choices. Information gained can improve the care of cardiac clients by expanding knowledge in the areas of health beliefs and adherence to prescribed therapies. Exploring these areas can aid health professionals in understanding the processes that influence patients in long term positive health behaviors. This study was the second part of a study initiated by Bianconi (1999), and examined the relationship of health beliefs and adherence to a cardiac exercise regimen from time one (6-12 weeks after a cardiac event), as compared to time two (8-12 months post event).

Purpose

The purpose of this study was to (1) determine if there is a difference between the health beliefs perceived benefits, barriers and self-efficacy, and cardiac exercise adherence, and (2) determine if the strengths of health beliefs and adherence changes from time one to time two.

CHAPTER II

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

Conceptual Framework

The Health Belief Model (HBM) was developed in the 1950's by Hockbaum, Leventhal, Kegeles, and Rosenstock in an attempt to explain why individuals engage or do not engage in a wide spectrum of preventative health actions (Rosenstock, 1974). Later the model was adapted to enhance the predictability of medical regimen adherence by introducing motivation and self-efficacy as separate concepts (Becker, 1974; Rosenstock, Strecher, & Becker, 1988). The model assumes that a person's attitudes and beliefs are important determinants of health behaviors. According to the HBM, individuals are more likely to engage in recommended health behaviors if they perceive themselves as vulnerable to a threatening condition or illness, believe there is an advantage or benefit to performing a given action, perceive few deterrents or barriers to accomplishing the recommended actions, are motivated to participate in health behaviors, and believe they are capable of accomplishing the behavior.

Outlined in the HBM are specific concepts that influence an individual's decision to perform health-related behaviors. (Becker, 1974; Rosenstock, Strecher, & Becker, 1988). These include and are defined as:

Perceived Susceptibility. An individual's belief that he or she is at risk or threatened by a particular disease or illness.

Perceived Seriousness. An individual's degree of emotional arousal created by the thought of a particular disease or illness, and its implications for work, family life, social relationships and commitments.

Perceived Benefits. The individual's belief that specific behaviors will prevent or reduce the occurrence of a particular disease or illness.

Perceived Barriers. Real or perceived factors that interfere with an individual's decision to follow a prescribed regimen.

Health Motivation. An individual's consciousness related to general health and participation in health-related behaviors.

Modifying Factors. Demographic, structural and psychological variables that alter perceptions, and indirectly affect health-related behaviors.

Cues to Action. A stimulus or trigger that initiates an individual's decision to take appropriate action. These include both internal and external factors such as pain, advice and mass media.

Self-Efficacy. An individual's perception of his or her capabilities to initiate, maintain and accomplish specific actions or behaviors.

The usefulness of the HBM over the last 40 years has been well documented in numerous research studies that examined chronic illness and

health-related behavior adherence (Dai & Cattanzaro, 1987; Janz & Becker, 1984; Kiley, D.J., Lam, C.S., & Pollak, R., 1993; Nelson, 1991; Redeker, 1988). The HBM has also been used as a basis for research in cardiac disease adherence behaviors (Foster, 1995; Kison, 1992; Mirotznik, Feldman, & Stein, 1995; Robertson & Keller, 1992). Past research has used the model's constructs in analyzing cardiac health-related behaviors such as exercise adherence, smoking cessation, weight reduction and dietary compliance. The concepts perceived benefits, barriers and self-efficacy have been identified as strong dimensions when examining adherent behaviors (Foster, 1995; Hiatt, Hoenshell-Nelson, & Zimmerman, 1990; Janz & Becker, 1984; Kim, Horan, Gendler, & Patel, 1991; Robertson & Keller, 1992; Tirrell & Hart, 1980). Janz (1988) examined the HBM's use in explaining various cardiovascular risk reduction behaviors in 12 studies. The relationship of the HBM's four core dimensions: perceived susceptibility, severity, benefits and barriers were analyzed. Significant relationships were consistently found between perceived barriers and the desired behavior in every study that measured the dimension. In studies that evaluated exercise adherence, perceived benefits were determined to be a strong predictor of behavior. Although the HBM has been the basis for generating increased research on cardiac patients' behavior initially after a cardiac event, few studies exist that examine an individual's long term adherence to these behaviors. The

focus of this study was to examine exercise adherence behaviors of cardiac patients over time by comparing data from time one to time two, with emphasis on the HBM concepts: perceived benefits, barriers and self-efficacy.

Literature Review

Numerous studies have utilized the HBM as a framework to explain adherence behaviors in both preventative and chronic illness. In select studies the concept of self-efficacy has also been included because of its strong correlation with health-related behaviors. While there are few studies that specifically analyze the HBM and cardiac regimen compliance, more continue to emerge as the model's popularity expands. The intent of this literature review was to focus on the HBM and self-efficacy in explaining cardiac regimen adherence behaviors.

Kison (1992) used a descriptive correlational design to investigate the relationship of perceived benefits and barriers to the degree of compliance of cardiac patients with prescribed diet, activity, medications, stress reduction, smoking cessation, and follow up appointments. Kison examined 31 individuals with CAD who had sustained a cardiac event 2 months prior to the study. The HBM tool developed by Champion (1984) was modified by Kison to assess benefits and barriers with follow up appointments. The Miller Health Behavior Scale was also modified and used to measure adherence to prescribed cardiac regimens. The highest degree of adherence was reported with prescription

medication, and correlated with higher levels of perceived benefits. Stress reduction had the lowest degree of adherence, and was associated with low levels of perceived benefits, and high levels of perceived barriers. Subjects with a college education described more benefits of checkups, and a higher level of adherence to activity regimens than those with a high school education. A limitation of the study was the use of two tools that were modified by the author, but not retested for validity and reliability. This methodological problem supports the need for developing and testing tools that specifically examine the variables to be tested.

Biggs and Fleury (1994) in a naturalistic design, identified and described specific categories of perceived barriers that influence cardiovascular risk reduction behaviors. Data from 29 subjects were examined in an effort to identify and describe the relationship of perceived barriers to cardiovascular risk reduction behaviors. The investigators found similarities in subject's responses when describing obstacles to health behavior change. Subject responses related to barriers were grouped into 5 categories: affective responses, physical response patterns, environmental factors, social relationships, and resources. Affective responses are the negative emotional states that perpetuate a sense of lack of control over self or environment. Physical response patterns indicate the subject's perceived physical capability to initiate and maintain a health behavior

change. The social and situational events that trigger habitual risk behavior are the environmental factors that influence behavior change. An individual's relationship with spouse, friends, family or employers describes the social relationships. An individual's resources include finances, insurance, and information to support the health behavior change. If subjects perceived barriers in any of the categories described, less motivation was noted to initiate and sustain health preventative behaviors. Biggs and Fleury recommended that health team members identify potential barriers with patients, and provide information, materials and encouragement to overcome these barriers. Although the researchers found similarities in the categories of perceived barriers, the study was limited due to the small sample size (n=29). The study does reinforce the need to examine specific, individualized barriers to risk reduction behaviors so that interventions can be appropriately designed.

In a descriptive study by Hiatt et al. (1999) the HBM was used to examine patient participation in a Cardiac Rehabilitation (CR) program. A significant correlation was found between perceived benefits, perceived barriers, and participation in the CR program (p <.001). Subjects with high perceived benefits and low perceived barriers were more likely to participate in the CR program. The researchers reported that there was no significant difference in subject's perceived susceptibility and severity between the participating and

nonparticipating groups. Limitations of the study included a small sample size (n=39), and the use of a modified tool that was not retested for validity and reliability.

The HBM has been used to explore a variety of chronic disease states. Kim et al. (1991) developed the Osteoporosis Health Belief Scale to measure health beliefs in patients with osteoporosis. Exercise behavior and calcium intake were examined in 150 geriatric subjects. The investigators determined that individual's perceived barriers and health motivation were important concepts in explaining health behaviors.

Champion has used the HBM as a basis for evaluating risk reduction behaviors in numerous research studies. In 1984 she developed and tested an instrument to measure HBM variables as they related to breast self-examination (BSE). The results supported the usefulness of perceived seriousness, benefits, barriers, and health motivation as indicators in the frequency of BSE (Champion, 1985). A more recent study included knowledge as a variable to be examined in BSE (Champion, 1987). A convenience sample of 585 women were recruited from an outpatient clinic to complete a questionnaire evaluating the relationships of HBM variables, knowledge of BSE, and frequency of BSE. Champion reported an increased frequency of BSE among subjects who perceived fewer barriers (p <.001), and who had received education by a health professional. This

research supports the relationship of adherence and patient knowledge that is obtained from health professionals (i.e. Cardiac Rehabilitation programs).

Redeker (1988) reviewed research that focused on the use of the HBM and chronic illness states including: hypertension, diabetes, end-stage renal failure, pulmonary disease, paraplegic skin care regimen, and coronary disease. While the author acknowledges the model's usefulness, she also identifies several methodological problems with the model: the wide variation of operationalizing the model's concepts, the lack of reliable and valid scales specific to the condition studied and the use of retrospective self reporting information. Redeker suggests that definitive interventional strategies based on these studies cannot be recommended until further research addresses and clarifies these issues.

Specific research that includes the HBM and self-efficacy as a basis for describing cardiac regimen adherence has been limited. Robertson and Keller (1992) examined the relationship of the HBM variables perceived severity, barriers, benefits, self-efficacy and cues to action with exercise adherence in individuals with CAD. Fifty-one subjects were studied who had undergone Coronary Artery Bypass Grafting (CABG) or Percutaneous Transluminal Coronary Angioplasty (PTCA) within 4 to 8 months. Perceived barriers contributed the greatest amount of variance in exercise adherence ($p=.04$). Subjects who perceived high barriers had low levels of exercise adherence.

Perceived benefits and severity were not statistically significant in explaining adherent behavior in the study. Only 31% of the exercise adherence variance could be accounted for, suggesting that exercise behavior may be explained by many other factors. Robertson and Keller recommend that a longitudinal design would be beneficial in determining the dynamic state of health beliefs and self-efficacy.

Tirrell and Hart (1980) studied the relationships of the HBM variables severity, susceptibility, health motivation, barriers and self-efficacy, to exercise compliance ten to twelve months after CABG. The strongest relationship was identified between barriers and exercise compliance. The investigators concluded that higher levels of perceived barriers were associated with lower levels of adherence.

Foster (1995) described the relationship of perceived benefits, barriers and self-efficacy to cardiac exercise adherence. Ninety individuals were studied six to eight weeks after a cardiac event. The cardiac exercise adherent group had 60 subjects, and non-adherent group had 30 subjects. The t-test was used to examine differences between the scores of perceived benefits, barriers and self-efficacy of both groups. The two groups were significantly different in regards to self-efficacy ($p < .05$), perceived barriers ($p = .006$) and perceived benefits ($p < .05$). Increased self-efficacy expectations, fewer perceived barriers and higher

perceived benefits were all associated with increased exercise adherence. Gender, marital status and occupation were also found to correlate with exercise adherence behaviors. Married subjects, males, and professionals were more likely to be adherent to an exercise program.

Self-efficacy has been utilized as a determinant for health-related behavior adherence in the following areas: smoking cessation, weight reduction, contraceptive use and exercise compliance (Strecher, Devellis, Becker, & Rosenstock, 1986). When used in past studies where multiple psychosocial constructs were examined, self-efficacy consistently emerged as a strong predictor of behavior, especially when the behavior is believed to lead to desired outcomes, but the changes are difficult to make (Perkins and Jenkins, 1998; Foster, 1995). In a prospective study involving 213 subjects, Strecher et al. (1985) examined the relationships between perceived susceptibility, self-efficacy, anxiety, social support and subsequent smoking behaviors. Individuals with high susceptibility combined with high self-efficacy exhibited the highest average smoking reduction. ($p < .03$). Subjects with high levels of susceptibility and low levels of self-efficacy reported low levels of smoking cessation behaviors.

Carroll (1995) explored the influence of self-efficacy expectations on the functional recovery of 133 patients who had undergone coronary artery bypass surgery. Data were collected at 6 and 12 weeks after discharge. Based on the

results, the researcher concluded that self-efficacy expectations for all the recovery behaviors (walking, climbing stairs, general activities, and role performance) increased over time. This reinforces the presumed dynamic nature of self-efficacy, and supports the idea that the construct of self-efficacy can be used to predict behavior performance.

While many studies have examined cardiac adherence behaviors shortly after a cardiac event, few longitudinal studies have been done to examine health beliefs of individuals with CAD over time. If behavioral attitudes are dynamic, one would suspect that an individual would exhibit different adherent behavior immediately after a major cardiac event as compared to 6 to 12 months later. However, Miller et al. (1989) investigated the relationship of intentions, attitudes and perceived beliefs on regimen compliance, and found no statistically significant differences at 30 days, 60 days or one year following a myocardial infarction.

A longitudinal study by Worthington (1997) investigated the relationship of health beliefs and cardiac exercise adherence in thirty five subjects at six to eight weeks and eighteen to twenty four months post cardiac event. No significant differences were noted in the health beliefs of adherent or non-adherent subjects ($p>.05$), and adherence behavior between groups did not significantly change over time. Worthington's hypothesis that adherence would

change over time was not supported, but this may have been a result of sample bias with adherent subjects being more inclined to respond to health questionnaires. Worthington acknowledges that results may have been skewed by the small sample size. The researcher recommended that further studies addressing cardiac exercise adherence and health beliefs needs to occur.

Cardiovascular risk reduction behaviors including regular physical exercise is typically recommended to all individuals with CAD. Recently many researchers examined the influence of risk reduction behaviors on the progression of CAD. The Lifestyle Heart Trial (1990) was the first randomized, controlled, clinical trial to support the regression of CAD as a result of comprehensive lifestyle changes. Ninety four patients were randomly assigned to an experimental group, and prescribed a lifestyle program of diet, exercise, stress management, smoking cessation, and group support. The control group were given "usual-care" instruction, and were free to make lifestyle changes on their own. Angiographic studies of the subjects' coronary arteries were done at baseline and 1 year later to quantitatively measure progression or regression of CAD. Eighty two percent of the subjects that adhered to the prescribed lifestyle program had regression of their CAD, supporting the benefit of healthy lifestyle changes in the treatment of CAD.

The Stanford Coronary Risk Intervention Project (1994) examined the effects of intense multiple risk factor reduction on the rate of progression of atherosclerosis in coronary arteries over a period of 4 years. Three hundred subjects were randomized to a control group of "usual care" and an experimental group of multifactor risk reduction. The risk reduction group was given individualized programs of low fat and cholesterol diet, exercise, weight loss, smoking cessation, and medications to favorably alter lipoproteins. Subjects in the risk reduction group attended clinics every 2 months the first 2 years, and every 3 months during the last 2 years. The experimental group had a significant decrease, as angiographically defined, in the progression of CAD ($p = .05$). The study supports the benefit of organized multifactor risk reduction groups such as cardiac rehabilitation in reducing CAD.

A study by Schuler et al. (1991) evaluated CAD and selected preventative health behaviors (regular physical exercise and low fat diet). Investigators analyzed the effects of these variables on coronary artery lumen diameter and myocardial perfusion after 1 year. One hundred thirteen subjects were randomly assigned to a control group of "usual care" and given instruction on diet and exercise. Compliance was left to the subjects own initiative. The intervention group participated in an intense 3 week program of instruction on diet and daily exercise. Subjects were asked to keep a daily record of adherence to the regimen,

and group sessions were conducted 5 times throughout the year to offer support and information related to diet, exercise, and psychosocial issues. Although no net regression of atherosclerotic lesions were reported after 1 year, the authors did determine that subjects in the intervention group had a significantly slower rate of CAD progression ($p < 0.05$), based on angiographic measurements of coronary artery lumen diameter. This suggests that "usual care' has a less than optimal effect on modifying certain risk factors that affect the progression of CAD.

Part one of this study was conducted by Bianconi (1999), and examined the relationship of cardiac exercise adherence and perceived benefits, barriers, and self-efficacy and 6-12 weeks after a cardiac event. Bianconi recruited 25 subjects who had participated in cardiac rehabilitation phase I (inpatient) for her descriptive, correlational study. Questionnaires to evaluate selected health beliefs, exercise adherence and demographic data were sent to subjects 6-12 weeks after a cardiac event (myocardial infarction, cardiac surgery, angina pectoris, coronary angioplasty or stenting). No statistical differences were noted between adherent and non-adherent subjects in relationship to perceived benefits ($p=.96$), perceived barriers ($p=.80$), or self-efficacy ($p=.47$). These results could be explained by limitations in Bianconi's study. Initially 70 packets were mailed, and only 25 subjects (2%) responded, limiting data analysis. Seventy six percent of the respondents were adherent, which could represent a skewed population,

since non-adherent individuals may be less likely to complete questionnaires. Bianconi recommends that research in this area continue, including more diverse samplings, optimizing data collection with direct contacts (telephone calls) and studies to determine if adherence and health beliefs change over time. Part two of this study addressed adherence and health beliefs at 8-12 months after the cardiac event.

The benefit of cardiovascular risk reduction behaviors is supported in the literature, but what are the mechanisms that drive an individual to seek and maintain these behaviors? Preventative health should be a major focus of all health professionals, and research that aids in understanding the motivation of adherence to health prevention behaviors should be a primary goal.

Implications for Study

The incidence of coronary artery disease in the community is growing. If primary preventative strategies are to be developed by health professionals then attention needs to be focused on understanding health beliefs and attitudes that facilitate adherence behaviors. Research supports the usefulness of the HBM and self-efficacy in analyzing psychological variables that influence behavior. Ongoing research needs to continue to identify variables that influence behavior, thus allowing for modifications that can affect long term lifestyle changes. Many studies exist that examine individual's with CAD who are faced with difficult

behavioral changes in the initial phases immediately after a cardiac event, but few studies evaluate adherence in the months and years after the event. Do the variables that effect adherence behaviors remain static or do these change over time? These issues must be addressed in future research if specific interventional strategies are to be developed by health professionals when assisting the individual with CAD to accomplish lifestyle change.

Research Hypothesis

The following hypotheses were tested for this study: (1) perceived benefits, barriers, and self-efficacy of individuals who are adherent to an exercise regimen 8-12 months post cardiac event will differ from those who are non-adherent, and (2) there will be a difference in perceived benefits, barriers, self-efficacy, and exercise adherence from time one (6-12 weeks) to time two (8-12 months) post cardiac event.

CHAPTER III

METHODOLOGY

Research Design

This study is the second part of a study initially conducted by Bianconi (1999). A longitudinal, descriptive, correlational design was utilized for this study to evaluate the differences between selective HBM variables (perceived benefits, perceived barriers, and self-efficacy), and the adherence of individuals with CAD to prescribed exercise regimens, from part one (6-12 weeks after a cardiac event) as compared to part two (8-12 months post event). Past research has effectively used this type of design for examining complex relationships between attitudes, beliefs, and behaviors. It is appropriate, convenient, and efficient to use a correlation design when examining psychological variables that are not easily controlled or manipulated as in an experimental design (Polit & Hungler, 1987). Disadvantages of this design are the limitations of correlating results due to the inter-relationships between variables, and the potential presence of alternate variables that could influence exercise adherence (chronic disease states other than CAD, multiple subsequent cardiac events during the study, or program dropout). To strengthen the study the demographic sheet was modified to include the subject's perceptions of the seriousness of various cardiac

conditions, and changes in physical limitations, income, employment, and recreational activities as a result of the cardiac event.

Sample and Setting

This study recruited subjects from Bianconi's convenience sample selected from a large cardiology office of 11 cardiologists. The office has affiliation with 6 hospitals and clinics in southwestern Michigan. Data were collected from participants of part one of the study by Bianconi (1999). Subjects received Phase I or inpatient Cardiac Rehabilitation instruction that included: diet, stress management, exercise and smoking cessation, and completed questionnaires for Bianconi (1999) at 6 to 12 weeks after a cardiac event.

All subjects prior to enrollment, met eligibility criteria, and consented to participate in the study. Subjects were asked to complete instruments that measure health beliefs, self-efficacy, and exercise adherence 8 to 12 months following a hospitalized cardiac event. This data were compared to previous data obtained from time one by Bianconi (1999) from the same sample group. Eligibility criteria for time one included:

1. Age 21 or older.
2. Have documented CAD with a diagnosis of myocardial infarction, angina pectoris, or have undergone a cardiac procedure such as coronary angioplasty, stenting or coronary artery bypass grafting.

3. Lack of significant cerebral, renal, pulmonary, or cardiac complications that would prohibit participation in an exercise program.
4. Literate in the English language or with access to an interpreter who is literate in the English language.
5. Have received in-hospital Cardiac Rehabilitation instruction.
6. Written consent to participate in the study, and to be contacted for participation in part two.

Eligibility criteria for time two included:

1. Participation in time one of the study.

Instruments

The instruments used to collect data on the selected variables in this study were: (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 utilized in this study to measure health beliefs to cardiac exercise regimen adherence (Appendix A). McGinn (1995) developed the scale from the Self Breast Examination instrument (Champion, 1984) and the Osteoporosis Health Belief Scale (Kim,

Horan, Gendler, & Patel, 1991; Kim, Horan, & Gendler, 1992). Most of the language used in these instruments was preserved by McGinn, however, key words such as breast cancer and osteoporosis were changed to reflect cardiac exercise adherence. Items on the CEHBS were specifically designed to measure the HBM variables of perceived benefits and perceived barriers. A five point Likert scale was used to rate the 20 items on the CEHBS from strongly disagree (1) to strongly agree (5), with a minimum possible score on the scale of 10, and a maximum score of 50.

Cardiac rehabilitation experts reviewed the CEHBS to test for face validity. The level of language and understandability of the questions were evaluated by elementary school teachers. The instrument was found to have a high degree of internal consistency with reported Cronbach alpha coefficients of .84 for the ten item barrier subscale, and .90 for the ten item benefit subscale (McGinn, 1995).

Exercise Compliance Questionnaire

Radtke (1989) developed the Exercise Compliance Questionnaire (ECQ) to measure adherence to prescribed home exercise regimens (Appendix B). The first six questions were specifically designed to evaluate the frequency, method, intensity, and duration of exercise. Questions like, "How many times do you exercise (walk and/or bike) each week?" are scored in numerical order from 1 to

5 depending on the selection made. A score of 2 or more on questions one and two, or a total score of 5 or more on questions one through four indicates adherent exercise behavior. A total score of 5 or less on these items would be considered non-adherent behavior. This is the same scoring as utilized by Foster (1995) and Worthington (1997). Questions five through eight were descriptive information only, and were not designed to be computed into the subject's compliance score.

The content of each item in the ECQ was reviewed for face validity by physical therapists responsible for prescribing home exercise programs. The reliability of the instrument was not reported in the original study by Radtke (1989), however, Worthington (1997) analyzed the reliability of the ECQ, and reported a Cronbach alpha of .60.

Cardiac Exercise Self-Efficacy Scale

Foster (1995) adapted the Cardiac Exercise Self-Efficacy Scale (CESES) from the Osteoporosis Self-Efficacy Scale (OSES) by Horan, Kim, and Gendler (1993). The basic language of the OSES was maintained in the CESES, but the items were specifically selected to address exercise behaviors. (Appendix C). The six item instrument is a visual analog scale with the lower anchor, "not confident at all", representing a score of 0, and the upper anchor, "very confident", corresponding to a score of 100. A summative score is obtained from the six items with a possible score range of 0 to 600.

A review of the literature and input from nursing experts were utilized to establish content validity for the items. Reliability of the instrument was evaluated by using data from Foster (1995) and Worthington (1997). Internal consistency of the scale was supported by Foster (1995) who reported a Cronbach alpha coefficient of .94, and Worthington (1997) who reported a Cronbach alpha coefficient of .90.

The Demographic Data Sheet

The demographic data sheet was developed by Foster (1995) and McGinn (1995), and items included: age, sex, race, marital status, education, employment, income level, cardiac risk factors identification, medical insurance status, discharge date, type of cardiac event, and physical limitations. The demographic sheet was modified after part one of the study to include questions that would identify the subject's perception of seriousness of a variety of cardiac conditions and procedures (Appendix D). Questions were added to determine any changes in the subject's physical limitations, income, employment and recreational activities that might influence a person's decision to adhere to an exercise regimen "As a result of your cardiac event has your exercise ability increased, decreased, or stayed the same?" Data from the questions were included in the demographic frequencies to examine other variables that could influence adherence (Table 2).

Procedure for Data Collection

Subjects from time one of the study by Bianconi (1999) were recruited to participate in time two, 8 to 12 months following their cardiac event. These individuals received a home exercise program after completing Phase I Cardiac Rehabilitation as an inpatient. Subjects were mailed a packet that included: a brief explanation of the purpose of the study, methodology, risks, potential benefits, voluntary participation, and the right to withdraw or decline to participate. Subjects signed a written consent form prior to time one (Appendix E). Completed questionnaires were returned in a preaddressed, postage paid envelope contained in the packet. Subjects were allowed to obtain results of the completed study upon written request to the researcher.

Follow up postcards were mailed to the subjects, two weeks after the initial mailings, thanking them for participation in the study. Those subjects who had not returned their questionnaires were encouraged to do so. After four weeks, any subjects who had not returned their packets were mailed a second complete packet. Since subject participation in time one was limited to 25 subjects, a follow up telephone call was made after six weeks of the initial mailings to encourage participation in time two.

Human Subject Consideration

Approval for part one and two was obtained from the Human Research Review Committee at Grand Valley State University, and the Research Review Committee of the cardiology practice. The cover letter and changes on the demographic questionnaire were submitted to both committees for review. Known psychological or emotional risks were minimal, and were limited to fatigue or boredom as a result of completing the numerous questionnaires. A cover letter reassured subjects that information obtained would in no way effect the subject's cardiology care, and individual identification would only be known by Stone and Bianconi. Consent to participate was on a voluntary basis, and subjects were given the opportunity to withdraw at any time, without effecting their care.

CHAPTER IV

RESULTS

Data Analysis

Data were collected from cardiac patients at two time intervals following a cardiac event. Part one of the study was conducted by Bianconi (1999), with data collection at 6 - 12 weeks post cardiac event (July 23, 1998 to October 23, 1998). Part two data collection was at 8 - 12 months after the cardiac event from April 18, 1999 to June 18, 1999. Twenty five subjects participated in part one, and 100% of the subjects ($\underline{n} = 25$) responded to part two of the study. Participants completed four questionnaires at both time intervals, the Cardiac Exercise Health Belief Scale (CEHBS), Cardiac Exercise Self-Efficacy Scale (CESES), Exercise Compliance Questionnaire (ECQ), and a Demographic Questionnaire. Each instrument was scored separately. A detailed description of the scoring and the instruments was presented in chapter three.

Likert or visual analog scales were used to measure the variables: perceived benefits, barriers, self-efficacy, and exercise adherence. Summative scores were obtained for interval level data. Demographic data were measured at the nominal level. Paired t-tests were utilized to determine differences between variables from time one to time two. Statistical analysis and instrument reliability

measurements were obtained by using the Statistical Package for the Social Sciences. Time two of the study determined reliability of the CEHBS to be .886 for the perceived benefit portion of the scale, and .729 for the perceived barrier portion. The CESES reliability analysis was a Cronbach alpha of .920. Statistical significance level for data analysis was set at $p < .05$.

Characteristics of the Subjects

One hundred percent of the subjects from time one ($n = 25$) participated in time two of the study. Twenty subjects responded to the initial mailings, while five required an additional mailing and follow up telephone call prior to returning the questionnaires. The sample ranged in age from 36 - 78 years (M 58; SD 11.83). Ninety two percent were Caucasian ($n = 23$), and two were African-American. Twenty participants were male, and five were female. A detailed description of the subjects is outlined in Table 1. Educational status of the sample ranged from 12 to 18 years (M 15.5; SD 2.30). The majority of the subjects had incomes greater than $60,000 per year, and reported no change in income, employment or recreational abilities post event. Forty four percent of the subjects reported higher exercise ability, while 28% perceived decreased exercise ability after their cardiac event. Of the four cardiac events listed more participants selected myocardial infarction as the most serious cardiac event. A complete list of selected demographic data frequencies are presented in Table 2.

Table 1

Characteristics of Subjects (N = 25)

Characteristic	n	%
Gender		
Male	20	80%
Female	5	20%
Ethnicity		
Caucasian	23	92%
African-American	2	8%
Marital Status		
Married	23	92%
Non-married	2	8%
Work Status		
Employed	16	64%
Unemployed	9	36%
CR Insurance Coverage	25	100%
First time in CR	23	92%

Table 2

Frequencies of Selected Demographic Characteristics

Characteristic	Frequency	Percent
Occupation		
Maintenance Superintendent	2	8%
University Profession	1	4%
Executive	1	4%
Receptionist	1	4%
Police Officer	1	4%
Supervisor	1	4%
School Psychologist	1	4%
Realtor	2	8%
Pharmacist	1	4%
Attorney	3	12%
Retail Representative	1	4%
Meat Cutter	1	4%
Truck Driver	1	4%
Dispatcher	1	4%
Manager	1	4%
Professional Engineer	1	4%
Paint Blender	1	4%
Sheet Metal Worker	1	4%
Teacher	1	4%
Plumber	1	4%
County Drain Commissioner	1	4%
Employment Change Post Event		
Yes	1	4%
No	24	96%

Characteristic	Frequency	Percent
Income Change Post Event		
Increased	1	4%
Decreased	2	8%
Stayed the same	22	88%
Education in years		
12	4	16%
13	2	8%
14	3	12%
15	1	4%
16	5	20%
17	1	4%
18	8	32%
No answer	1	4%
First time in CR		
Yes	23	92%
No	2	8%
Other exercise exposure		
Yes	6	24%
No	19	76%
CR Insurance Coverage		
70%	1	4%
80%	3	12%
90%	1	4%
100%	15	60%
Unsure	5	20%
Physically Unable to Exercise		
Yes	2	8%
No	22	88%
No answer	1	4%

Recreational Ability Change Post Event	3	12%
Increased	9	36%
Decreased	13	52%
Stayed the same		
Exercise Ability Change Post Event		
Increased	11	44%
Decreased	7	28%
Stayed the same	7	28%
Actual Cardiac Event		
Myocardial Infarction	7	28%
Coronary Artery Bypass Surgery	4	16%
Balloon Angioplasty and Stent	6	24%
Angina Pectoris	8	32%
Perceived Most Serious		
Myocardial Infarction	19	76%
Coronary Artery Bypass Surgery	6	24%
Balloon Angioplasty and Stent	0	0%
Angina Pectoris	0	0%

Comparison of Variables from Part One to Part Two

Paired t-tests were used to examine differences in perceived benefits, barriers, and self-efficacy from part one to part two (Table 3). There were no differences in subject's perceived benefits after 8 - 12 months ($t = .63$; $df - 24$; $p = .53$). A statistically significant increase in perceived barriers was noted from time one to time two ($t = -2.62$; $df = 24$; $p = .02$). This correlates with higher levels of perceived barriers related to exercise over time. Self-efficacy scores decreased after 8 to 12 months ($t = -2.38$; $df = 22$; $p = .03$), indicating that subjects perceived less ability to perform or adhere to a cardiac exercise program. Exercise adherence did not change from time one to time two. Seventy six percent ($n = 19$) of the sample were adherent, and 24% were non-adherent. These results are identical to those obtained by Bianconi (1999) for time one. Three subjects adherent in time one were non-adherent in time two, and three different subjects shifted from non-adherent in time one to adherent in time two. Analysis between the adherent and non-adherent group in time two could not be done due to the small number of non-adherent subjects.

Table 3

Benefits, Barriers, and Self-Efficacy (SE) Comparison of Time One and Time Two

	Time One (n = 25)		Time Two (n = 25)				
Variable	M	SD	M	SD	t	df	p
Benefit	45.76	3.73	45.32	4.42	.63	24	.53
Barrier	23.76	6.06	26.04	5.62	-2.62	24	.02
SE	425.83	126.45	479.26	83.40	-2.38	22	.03

Hypothesis Testing

The hypotheses of this study were (1) perceived benefits, barriers, and self-efficacy of individuals who are adherent to an exercise regimen 8 to 12 months after a cardiac event will differ from those who are non-adherent, and (2) there will be a difference in perceived benefits, barriers, self-efficacy, and exercise adherence at 6 to 12 weeks and 8 to 12 months post event. Hypothesis 1 could not be statistically analyzed due to the small number of subjects in the non-adherent group (n = 6). Hypothesis 2 was partially supported by the data.

Statistically significant differences were noted between time one and time two for perceived barriers ($p=.02$) and self-efficacy ($p=.03$). Perceived barriers increased and self-efficacy decreased over time. Exercise adherence and perceived benefits did not result in significant changes from time one to time two.

CHAPTER V

DISCUSSION AND IMPLICATIONS

Discussion

Cardiac Rehabilitation (CR) programs that include exercise are a standard of care integrated into the overall treatment plan of patients with coronary artery disease (CAD). These programs target the reduction of cardiac patient's risks, and can reduce cardiovascular mortality, improve functional capacity of the heart, reduce the risk of further coronary events, retard CAD progression, and promote reversal of coronary atherosclerosis (Haskell et al., 1994; Lafontaine, 1995; Ornish et al., 1990; Schuler et al., 1991). The long term success of these programs is directly related to patient adherence, but studies have described declining adherence rates from 80% in the first three months, to 45 - 60% at 12 months, and 30% after 2 years (Balady et al., 1994; Mullinax, 1995). To achieve patient goals and successful outcomes health professionals need to focus on individuals specific health beliefs that motivate them to seek and maintain recommended health regimens.

The purpose of this study was to determine if health beliefs and adherence levels of individuals with CAD change over time (6-12 weeks versus 8-12 months after a cardiac event). Although the findings from this study did not support a

difference in exercise adherence over time, results did indicate that perceived barriers and self-efficacy did change from time one to time two. Subjects perceived higher levels of barriers, and lower levels of self-efficacy after 8 - 12 months. The expectation of this trend would be for adherence rates to decline as perceived barriers increase and self-efficacy decreases. If subjects were followed over a longer time period would adherence eventually decrease? Clinical experience and previous research would support that long term behavior changes are less likely to occur than changes initially post cardiac event

Most subjects perceived less ability to maintain or perform the recommended exercise regimen (decreased self-efficacy) in part two. One explanation for these results could be the amount of direct supervision that occurred during exercise. Time one exercise guidelines included 12 weeks of supervised exercise regimen 2-3 times per week. Subject's heart rhythm, blood pressure, and pulse were monitered by CR personnel. Although the exercise guidelines did not change for time two, the amount of direct supervision and monitering decreased. Subjects might have perceived less ability to perform the exercise regimen due to apprehension in exercising in a less monitered situation. Qualitative studies that elicit specific reasons for decreased self-efficacy could be done in future research.

The majority of subjects (76%) listed myocardial infarction as the most serious condition or procedure as compared to coronary artery bypass surgery, balloon angioplasty and stent, and angina pectoris. No correlation was determined between perceived seriousness and actual cardiac event, since subject's actual cardiac event were evenly distributed between the various categories. Subsequent research in this area might limit the sample to individuals with myocardial infarction, to determine if health beliefs and adherence are different in this selective population.

Limitations

Results of the study were limited due to the small sample size, and use of a convenience sample. Sample size was a concern, since only subjects who responded to time one could be recruited for time two ($n = 25$). No attrition was noted in time two primarily due to the addition of the follow up telephone call. Twenty subjects responded to initial mailings, and the final five subjects participation occurred after a follow up telephone call. The small sample size limited statistical analysis, and the generalizability of the results to the larger population.

The homogeneous characteristics of the convenience sample may have skewed results, since the majority of the subjects were white, middle aged, professional men with incomes greater than $50,000 per year. This sample is not

reflective of the entire population making generalizability difficult, however it does allow comparison between similar populations. The majority of the sample were adherent to a cardiac exercise regimen. A potential explanation may be that adherent subjects are more likely to respond to health questionnaires, or that white, middle aged, professional men have more resources available to them, allowing for higher exercise adherence.

Results may have been influenced by the "Hawthorne effect". Subjects completed the same questionnaires for time one and time two, and subjects were informed at time one that they would be recruited for time two. The knowledge of being included in time two, and the familiarity of the questionnaires may have influenced subject's behavior and responses.

Recommendations

Future studies in the area of cardiac exercise adherence and health beliefs can be refined and improved. To enhance generalizability random sampling with larger, more diverse population is recommended. The use of different racial groups, greater range of educational and socioeconomical levels, and more age strata would improve future studies. Data collection can be optimized by using follow up telephone calls in time one, during the initial phases of a study. More elaborate data collection methods such as face to face interviews could also be used to elicit greater subject response.

In this study subjects' perceived barriers and self-efficacy changed over the 8 - 12 month period, but exercise adherence did not decrease. Additional longitudinal studies are needed over longer time periods. Perhaps analysis of exercise adherence and health beliefs 2 - 4 years following a cardiac event would be more revealing. Qualitative studies that identify subjects' specific barriers, and reasons for decreased self-efficacy could also be valuable in understanding changes in health beliefs and adherence.

A large amount of diversity was noted in the literature review when defining cardiac exercise adherence. The overall scores on the Exercise Compliance questionnaire for this study were higher than expected. An explanation may be that the ECQ was not reflective of the individual guidelines given to patients initially in the CR program. Specific instruments that measure cardiac exercise adherence need to be developed, tested, and utilized to decrease variability.

Subjects in this study were not asked about subsequent cardiac events within the 8 - 12 month period. If further events occurred, results could have been influenced. This information could be obtained in future research by additional questions on the demographic questionnaire.

Conclusions

This study supports the usefulness of the HBM in identifying perceived benefits, barriers, and self-efficacy in cardiac preventative behaviors. Results did not support a relationship between those health beliefs and exercise adherence, but this may be reflective of limitations of the study. Exercise adherence and perceived benefits did not change, but self-efficacy and perceived barriers did adversely change after 8 - 12 months. These findings suggest that certain health beliefs are not static, and continuous reassessment by health professionals needs to occur.

Health team members must recognize opportunities and responsibilities to participate in patient risk reduction management and regimen adherence. Individual health beliefs need to be analyzed if specific, unique interventions are to be developed. The result can improve long-term adherence goals, quality of life, and patient outcomes.

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 feel my exercise program is important in reducing my risk of future heart problems.
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.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree		
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 do.
SD	D	N	A	SA	20.	I do not 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.

Please review all questions one more time to make sure ALL questions have been answered.

McGinn, V. (1995). Development and evaluation of the cardiac exercise health belief scale. Unpublished Master's thesis, Grand Valley State University, Allendale, MI. Used with permission.

APPENDIX C

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 you 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 per week
_____ 4. Yes, 3 to 4 times per week
_____ 5. Yes, more than 4 times per week

FOR NON-EXERCISERS ONLY

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

_____ 1. Yes _____ 2. No

9. IF NO, please state:

Reason for not exercising_____

Modified from Radtke, K. L. (1989). Exercise compliance in cardiac rehabilitation. Rehabilitation Nursing, 14. Used with permission.

APPENDIX C

I.D. NO_____

CARDIAC EXERCISE SELF-EFFICACY 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.

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

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 suppose to do

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

Modified from Osteoporosis S-E Scale. Horan, M. L., Kim, K. K., Gendler, P., Froman, R. D., & Patel, M. D. (in press). Development and evaluation of the osteoporosis self-efficacy scale. Research in Nursing & Health. Used with permission.

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?_____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_____?

7. Has your employment changed as a result of your cardiac event?
   ( ) 1. Yes ( ) 2. No

8. As a result of your cardiac event, has your exercise capabilities:
   ( ) 1. Increased ( ) 2. Decreased ( ) 3. Stayed the same

9. As a result of your cardiac event, has your income:
   ( ) 1. Increased ( ) 2. Decreased ( ) 3. Stayed the same

10. As a result of your cardiac event, has your recreational abilities:
    ( ) 1. Increased ( ) 2. Decreased ( ) 3. Stayed the same

11. 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

12. 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 or technical school	13 14 15 16
Some graduate school	17
Graduate or professional degree	18

13. 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

14. What race do you consider yourself to be?

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

15. Do you have health insurance? ( ) 1. Yes ( ) 2. No

16. 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

17. Do you have any physicial 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 you physical limitations: _____

_____

_____

18. On what date were you discharged from the hospital?_____

19. Is this your first time in a cardiac rehabilitation program?

( ) 1. Yes ( ) 2. No

20. Have you participated in, or had exposure to any other type of exercise program?

( ) 1. Yes ( ) 2. No

If yes, please describe _____

21. Of the following procedures or conditions which do you feel is more serious?

( ) 1. Myocardial infarction or heart attack

( ) 2. Coronary artery bypass surgery or open heart surgery

( ) 3. Balloon angioplasty and stent

( ) 4. Angina pectoris or chest pain

Modified from Foster, M. (1995). The relationship of health beliefs to adherence to cardiac exercise following a cardiac event. Unpublished Master's thesis, Grand Valley State University, Allendale, MI.

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 health beliefs of individuals with heart disease and how they take care of themselves. The knowledge gained will help nurses and physicians provide health care in a manner that will be more in tune to the needs of men and women experiencing coronary artery disease.

Kristi Bianconi, R.N. is conducting this study, and part two will be conducted by Jill Stone, 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 the investigator, Kristi Bianconi at 454-5551. In addition, concerns may also be addressed to Dr. Robert Hendersen, chairman of the Human Research Review Committee or Dr. Charlotte Torres, thesis chairman. Dr. Hendersen may be reached at 895-2195. Dr. Torres may be reached at 895-3873, or via mail at 227 Henry Hall, Grand Valley State University.

I also understand that:

1. participation in this study will involve completion of questionnaires sent to me by mail 6-12 weeks after discharge from the hospital and again after 8-12 months.
2. I will be asked questions about my adherence to my exercise program, beliefs about my heart condition, how confident I feel about performing the exercises, and general demographic information.
3. I have been selected for participation because I am enrolled in a Cardiac Rehabilitation home exercise program.
4. it is not anticipated that this study will lead to any physical or emotional risk to my family or myself.
5. the information I provide will be kept strictly confidential and only the investigators will have access to the data; no individual names will be used in publication.
6. a summary of the results will be made available to me upon my request to the researcher.
7. I will be one of approximately 60 participants in this study.

I acknowledge that:

I have been given an opportunity to ask questions regarding this research study, and that these questions have been answered to my satisfaction.

In giving my consent, I understand that my participation in the study is voluntary and that I may withdraw at any time using the postcard provided by Kristi

Bianconi without affecting the care I receive from my physician or the staff at Grand Valley Cardiology Specialists, P.C.

The investigator, Kristi Bianconi, R.N. has my permission to review the medical record held by Grand Valley Cardiology Specialists, P.C. for the purpose of confirming diagnosis, date of illness, and to ensure that there is no other medical problems that would make me ineligible for this study.

In 8-12 months I will be contacted by master's student Jill Stone, R.N., requesting my participation in part two of this study.

I have received a copy of this consent form.

My signature below indicates that I have read and understand the above information, and that I agree to participate in this study.

_____	_____
Participant Signature	Witness
_____	_____
Date	Date

_____ I am interested in receiving a summary of the study results.

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