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Risk Factors Associated With Coronary Artery Disease In Individuals After Coronary Artery Bypass Graft Surgery

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RISK FACTORS ASSOCIATED WITH CORONARY
ARTERY DISEASE IN INDIVIDUALS AFTER
CORONARY ARTERY BYPASS
GRAFT SURGERY

by

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Risk Factors Associated with Coronary
Artery Disease in Individuals after
Coronary Artery Bypass
Graft Surgery

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Abstract

Since the early 1960s coronary artery disease (CAD) has been the nation's leading killer of middle-aged men. Even with development of coronary artery bypass graft (CABG) surgery, the recurrence rate remains high. The research question addressed in this descriptive study was what risk factors associated with CAD can be identified in individuals after CABG surgery? Using Becker's Health Belief Model as a theoretical framework, a convenience sample of 69 postoperative CABG clients from a rural Mississippi cardiac rehabilitation program completed researcher-developed surveys. Descriptive analysis i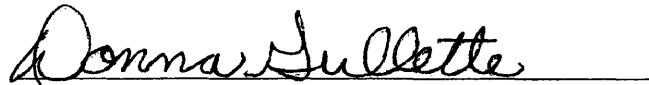dentified the following risk factors in the sample: Forty-three (63%) of subjects reported eating fried foods, 26 (39%) reported whole milk consumption, and 49 (65%) eat regular cheese. Twenty (29%) reported smoking. Thirty-five (51%) reported hypertension, yet 45 (61%) reported use of regular salt on their food. Additionally, 35 (51%) reported various levels of stress, while only 19 (26%) reported using relaxation techniques to help the stress.

Family history was identified as a risk factor with 55 (79%) reporting a parent with heart disease, and 40 (57%) reported a sibling with heart disease. Findings from this study indicate that perceived health status and demographic variables may influence compliance to recommended treatment programs. Implications for nursing include assessment of perceived health status and demographic variables and individualizing educational plans for clients based on these data. The researcher recommends replicating this study with a pilot test of the instruments and using a larger, more randomized sample and a longitudinal study.

Dedication

In Loving Memory of
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The Honorable Harvey T. Benderman
(October 20, 1934 - April 14, 1995)
My Daddy

You could always answer any question, fix

anything that was broken, and you set a

wonderful example of what could be achieved with

hard work and dedication. Because you and mother

loved me enough to teach me discipline, respect,

and the value of an education, I dedicate this

endeavor to you, the gentleman from District One

of the Great State of Mississippi.

Acknowledgments

I would like to express my sincere gratitude to those friends and family who helped me throughout this endeavor.

To my family, Mike, Emilee, and Anna, I could never have made it without your encouragement, love, and support. You will never know how proud I am of you and how much I appreciate all you have helped me. And yes, I probably will start cooking again.

To my mother, Betty Benderman, who has loved and supported me my whole life, thank you would not be enough. I have never asked you for anything you did not do, and you have given me so many things I probably did not deserve. Thank you for teaching me the value of hard work and discipline.

To my great friend, Suz, who read countless boring papers and helped me find my files when I could not. Organization is a virtue that you were certainly blessed with, and I was blessed to have you.

To my research committee members, Bonnie Lockard and Lorraine Hamm, thank you for your advice and encouragement.

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Chapter I

The Research Problem

Several studies have been conducted to identify risk

factors for the development of coronary artery disease

(CAD). Even though researchers have found a relationship

between CAD and high-fat, high-cholesterol diets,

sedentary lifestyle, smoking, high levels of stress, and

hypertension, more than half of Americans continue their

high-risk lifestyle. Prevention of the pathological

progression of CAD requires risk factor modification of

the individual's lifestyle, and treatment success directly

depends on the individual's adherence to the prescribed

program (Multiple Risk Factor Intervention Trial Research

Group [MRFIT], 1982).

Despite the copious amounts of information regarding

risk factor changes that inundate the public daily, many

individuals simply do not use preventive health measures

or even comply with prescribed medical treatment regimens.

This study will identify risk factors associated with CAD

in individuals after coronary artery bypass graft (CABG)
surgery.

Establishment of the Problem

Coronary artery disease remains the leading cause of
death in both men and women in the United States today.
Current research has shown that 80% of all cardiac deaths
are related to arteriosclerotic coronary disease.
Management of CAD requires risk factor modification of the
individual's lifestyle. Knowledge of the disease and the
related perceptions about that disease seem to directly
affect an individual's motivation to participate in
lifestyle changes (Ornish et al., 1990). The individual
has to be cued to action by a stimulus, such as symptoms
of a heart attack, diagnosis of CAD, or the individual's
perception of the illness. The individual must then be
motivated to change in order to facilitate the
individual's perception to treatment benefits (Becker,
1974).

Health beliefs are affected by family, peers,
society, socioeconomic influence, and education level of
the individual (Becker, 1974). Some variables have already
been defined by previous studies about compliance to
medical regimens in general.

Although CAD risk factor modification has become known throughout the country and treatment programs are available to clients with heart disease, many individuals choose not to adhere to the treatment programs. This nonadherence to treatment continues to directly affect the death rate from heart disease in the United States.

Previously, most research addressed one or two risk factors, and almost no research could be found to determine the risk factors of postoperative CABG surgical individuals. Since the post-CABG individual is at an increased risk for progression of the disease, it is crucial that modifiable risk factors are identified and methods determined to decrease the risk factors of all Americans, especially the post-CABG surgical individual.

Significance to Nursing

Findings from this research contribute to the existing body of nursing knowledge regarding CAD risk factors. Results of this study may help the family nurse practitioner (FNP) develop treatment plans that effectively increase compliance in post-CABG surgical clients by understanding whether demographic variables and perceptions of health relate to compliance. This study

also will help the FNP more effectively utilize the
client's perception of his or her personal health,
personal risks, and perceived susceptibility to illness.
The FNP can then, in cooperation with the client, work
toward identifying and developing cues to slow the
progression of or reverse CAD. FNPs must identify risk
factors and more effectively promote the prevention of
diseases, especially CAD.

Using Becker's (1974) Health Belief Model as a
theoretical framework for assessing and identifying
barriers to compliance of recommended lifestyle changes,
such as education, socioeconomic factors, previous illness
and personal beliefs, the FNP can assist the individual in
developing a plan for increasing compliance or effectively
planning a treatment regimen. Based on this data, the
study will help expand the knowledge of health care
professionals who work with cardiac clients. The education
of nurse practitioners, physicians, nurses, and health
care providers in the primary care setting will be
especially useful for practitioners who work with
noncompliant individuals.

Theoretical Framework

Becker's (1974) Health Belief Model was utilized as the theoretical framework for this study. Becker believed that an individual's health behaviors could be predicted through that person's health beliefs and the expression of those beliefs. Components of the model include the individual's perception of illness, the chance of developing the disease, and the possible severity of the disease. According to Becker (1974), the more serious the problem, the more likely an individual would be cued to some type of action to prevent further damage and improve health.

Becker's model also takes into account the perceived benefits of treatment and the barriers to treatment related to compliance (Becker, 1974). The Health Belief Model was chosen for this study because the model can be applied to variables related to compliance analyzed by the researcher. The main objective of this research was to identify the risk factors in the postoperative CABG surgical client and determine what, if any, demographic variables impact the number and kind of risk factors.

The Health Belief Model is based on the assumption that an individual's perceptions influence his or her

health status and compliance to prescribed care such as weight loss, smoking cessation, exercise prescription, and stress management. Individual perceptions refer to an individual's perceived susceptibility and the seriousness of that illness if and when obtained. Perceptions of risk factors may vary greatly among individuals. The variance may be attributed to modifying factors such as personality, sociological variables, demographics, and prior knowledge and experiences (Becker, 1974).

Perceived susceptibility and the severity of illness may motivate an individual into action. Action cues which motivate a person can be internal or external. Some examples of action cues are health care professionals, current or previous illnesses, friends, or medical campaigns. The stimulus or cue to action indicates an individual's health promotion activities such as compliance to a cardiac rehabilitation program, smoking cessation, or adherence to the recommended diet (Becker, 1974).

Assumptions

This study was based on the following assumptions:

1. Individuals with CAD have modifiable risk factors.

2. Modification of risk factors is based on an individual's perception of personal health, personal risks, personal susceptibility, seriousness, and cues to action.

3. Individuals will answer questions honestly.

Statement of the Problem

CAD and cardiovascular disease continue to be the leading causes of death in the United States. Even though researchers have found a relationship between high-fat, high-cholesterol diets, sedentary lifestyle, smoking, high levels of stress, and hypertension, over one half of Americans continue their high-risk lifestyle. Previous studies suggest that compliance with risk factor modification changes is poor. The following problem was addressed in this study: What risk factors associated with CAD do individuals have following CABG surgery?

Research Question

The following research question guided this study: What risk factors associated with CAD do individuals have following CABG surgery?

Definition of Terms

For the purpose of this study, the following terms were defined and operationalized as follows:

Risk factors: those lifestyle behaviors that may affect the development of CAD. For the purposes of this study, risk factors are the scores on the King Cardiac Risk Factor Survey.

Individuals: those clients who responded to the questionnaire and had previous CABG surgery. For the purposes of this study, individuals are clients of a cardiac rehabilitation clinic located in Northeast Mississippi who had CABG surgery.

Coronary artery bypass graft surgery: an operation in which a harvested vein graft or internal mammary artery is used to bypass a blocked area in a coronary artery.

Summary

In Chapter I the foundation for this study was established, significance to nursing described, and theoretical framework explained. Definition of terms, problem statement, and research question were also presented. The review of the literature will be presented in Chapter II, followed by the empiricalization and design

in Chapter III, findings in Chapter IV, and finally the outcomes of this study in Chapter V.

Chapter II

Review of the Literature

The review of current literature focused on demographic variables, such as age, perceived health status of the individual with coronary artery disease (CAD), and compliance to prescribed risk factor recommendations. The present research study was conducted to determine what coronary artery risk factors were found in individuals after coronary artery bypass graft (CABG) surgery.

Haskell et al. (1994) tested the hypothesis that intensive multiple-risk reduction over 4 years would significantly reduce the rate of progression of atherosclerosis in the coronary arteries of men and women compared with subjects randomly assigned to the usual care of their physicians. The study was a randomized trial of 300 subjects who were referred to one of four local hospitals near Stanford University. After baseline arteriography, subjects received medical treatment, percutaneous transluminal coronary angioplasty (PTCA), or

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CABG surgery and had the study protocol explained to them. They then signed an informed consent form. Participants were randomly assigned to one of two groups: the usual care of their personal physician or to an individualized, multifactor, risk reduction program managed by the Stanford Coronary Risk Intervention Project (SCRIP) staff in cooperation with the patient's personal physician.

Immediately after randomization, each subject in the risk-reduction group met with a SCRIP nurse to design an individualized risk-reduction program based on the subject's risk profile, his or her motivation, and resources for making specific changes. All subjects were instructed by a dietitian in a low-fat, low-cholesterol, high-carbohydrate diet with a goal of less than 20% intake from fat, less than 6% from saturated fat, and less than 75 mg of cholesterol per day. A physician activity program was recommended consisting of an increase in daily activities and a specific endurance exercise training program based on the subject's treadmill exercise test performance. Current or recent ex-smokers were provided an individualized stop smoking and relapse prevention program by a staff psychologist. If the SCRIP staff determined that a risk-reduction subject would not meet the maximal

LDL-C goals within the first year without drug therapy, a cholesterol-lowering drug regimen was added at no cost to the subject.

To track the progress, contact was maintained with the SCRIP staff via telephone and mail, and risk-reduction subjects returned every 2 or 3 months to the clinic to have their progress evaluated and receive additional assistance. During these visits, lipids, body weight, and blood pressure were measured, and diet, exercise, and smoking cessation assistance was provided. Hyperlipidemic drug therapy was evaluated and revised as needed.

Haskell et al. (1994) found that high levels of physical activity were reported in both groups and increased during the study in the risk-reduction group to a greater extent than in the usual-care subjects. Risk-reduction subjects achieved large reductions in total fat, saturated fat, and cholesterol intake, whereas no significant changes were identified in the usual-care group. At one year, 11.0% of the usual-care subjects were prescribed lipid medications by their personal physician.

In contrast, 70.6% of the risk-reduction subjects in each group were taking antiplatelet drugs, including aspirin. Antianginal and antihypertensive drugs were used

equally in both groups at baseline and during study in both groups, with similar reductions in the use of beta blockers and calcium antagonists on-study in both groups.

During this study significant changes in risk factor status occurred for patients in the risk-reduction group from baseline as compared with the usual-care group. Significant differences were also achieved in blood pressure, body composition, exercise test performance, plasma lipoprotein concentrations, glucose, and insulin; therefore, the Framingham risk score was decreased by 22%. Among smokers, the number of cigarettes smoked per day decreased by 12.2% per day in risk-reduction subjects, which was not significantly different from the usual-care subjects. Risk factor changes in the usual-care group were minimal with several showing significant improvement and others becoming significantly worse.

During Haskell et al.'s (1994) study, 6 patients died, 3 from each group. In the usual-care group there were 3 cardiac or sudden explained deaths and 2 cardiac or sudden unexplained deaths and one death from cancer in the risk-reduction group. The total number of patients with a primary cardiac event over the 4 years in the usual-care group was 35 and 20 in the risk-reduction group.

Interestingly, in the risk-reduction group most of the clinical cardiac events occurred in the first year the patients were enrolled in the study, compared with only 9 events in the usual-care group. During the next 3 years, however, risk-reduction patients were hospitalized for clinical cardiac events only 8 times compared with 35 times for the usual-care patients. This was attributed to the close (2 to 3 months) follow-up by the risk-reduction group.

Haskell et al. (1994) concluded that the combination of lifestyle changes and use of lipid-lowering medications individualized to meet each patient's needs resulted in a highly significant improvement in the overall risk profile of the risk-reduction patients compared with only small changes in risk status of patients assigned to the usual care of their physician. This risk factor reduction significantly decreased angiographically defined progression of coronary atherosclerosis as well as hospitalizations for clinical cardiac events. The researchers noted that very limited improvement in most risk factors occurred in the usual-care subjects considering that all patients had known CAD and the

results of their annual evaluations were returned to them and their personal care physician.

SCRIP results support the hypothesis that patients with CAD who maintained substantial improvement in risk factors decrease the rate of progression of their coronary atherosclerosis and hospitalizations for cardiac events. Haskell et al. indicated that consideration should be given to including intensive multiple risk factor modifications in the treatment of patients with CAD.

In the current study risk factors were examined in clients who are post-CABG and are participating in or have participated in cardiac rehabilitation. These clients were likely to have multiple risk factors.

The National Heart, Lung, and Blood Institute organized a task force to develop a broad long-range plan for the study, control, and possible prevention of arteriosclerosis. The Multiple Risk Factor Intervention Trial Research Group (MRFIT)(1982) was a randomized primary prevention trial to test the effect of a multifactor intervention program on mortality from CAD in 12,866 high-risk men, ages 35 to 57 years. This research was a longitudinal, timed study with data gathered over a period of 7 years.

The subjects selected to participate in the study were all men, considered to be at an increased risk of death from CAD, but had no clinical evidence of CAD. Persons were considered "increased risk" if the levels of three risk factors (cigarette smoking, serum cholesterol, and blood pressure) were sufficiently high at the first screening visit to place then in the upper 15% of a risk score distribution based on data from the Framingham heart study. The men were randomized in two approximately equal groups. One group received a special intervention which aimed at cessation of cigarette smoking and reduction of blood pressure and cholesterol levels. Men in the usual-care group were referred to their personal physician or community-based medical facility for appropriate treatment of their risk factors.

In the MRFIT (1982) study no intervention was offered to the usual-care group, but they were invited to return once a year for medical history, physical examination, and laboratory studies, and the results were provided to their personal physicians. Immediately after randomization to the special intervention group, each smoker was counseled individually by a physician to attempt smoking cessation. Individual counseling by an intervention team headed by a

behavioral scientist, and including nurses, physicians, nutritionists, and general health counselors, became the general approach in all three modalities. Subjects in the special intervention group were seen every 4 months, or more often if needed for intervention.

Each subject in the special intervention group was encouraged to obtain his or her optimal weight. The information focused on the development of an eating plan for life rather than a structured diet. Eating patterns were recommended that reduced saturated fat to less than 10% of calories and dietary cholesterol intake to less than 300 mg/day.

The smoking cessation program urged special intervention smokers to quit cigarettes only. Conventional behavioral modification techniques were used, and no effort was made to alter the smoking habits of those who smoked pipes and cigars. Blood pressure was controlled with various medications, along with weight reduction and low-sodium diet in some subjects.

The MRFIT study (1982) identified four key endpoints:(a) death from coronary heart disease (the primary endpoint), (b) death from cardiovascular disease, (c) death from any cause, and (d) the combination of fatal

coronary heart disease and nonfatal myocardial infarction. Application of logistic function, with coefficients estimated from Framingham data to the observed risk factor combinations of the men randomized, projected a 6-year coronary heart disease death rate of 29.0 deaths per 1,000 men in the usual-care group. Among the special intervention subjects, an overall reduction of 21.3 per 1,000 could be detected. The reductions were determined by using the following anticipated intervention effects:

1. A 10% reduction of serum cholesterol level of 220 mg/dl or higher, otherwise no change.

2. A 10% reduction of diastolic blood pressure of 95 mm/Hg or higher, otherwise no change.

3. Graded reductions in cigarette smoking were as follows: 25% reduction for smokers of 40 or more cigarettes per day, 40% for smokers of 20 to 39 per day, and 55% for smokers of less than 20 per day.

During the MRFIT study (1982) all participants were followed for a minimum of 6 years, with an average of 7 years. Deaths were determined by the clinic staff through contact with family or friends of the deceased, follow-up of missed clinic visits, response to postcards requesting change of address information sent twice yearly to usual-

care participants, and searches of publicly accessible files of deceased persons.

Cause of death was ascertained by a Mortality Review Committee, a three-member panel of cardiologists not associated with any MRFIT center and with no access to trial results. The MRFIT Committee reviewed clinic records, hospital records, death certificates, interviews with families, and reports of autopsies to classify the deaths into one of the four endpoint groups. There were 269 deaths among the usual-care men, 124 of which were attributed to coronary heart disease and 145 attributed to cardiovascular causes (including coronary heart disease). Of the special-intervention group, there were 265 deaths, 115 assigned to coronary heart disease and 138 to cardiovascular disease. The key mortality endpoints of coronary heart disease and cardiovascular disease were 7.1% and 4.7% less, respectively, in the special-intervention group compared with the usual-care group, and the death rate from all causes was 2.1% higher for the special-intervention men.

The number of deaths in the usual-care group was short of the expectation for the 7-year study. Based on the design risk factors, change assumptions, and

Framingham risk functions, 442 deaths were expected by the end of 6 years, yet only 219 occurred.

The MRFIT (1982) study did not identify any relationship between morbidity and multifactor risk factor changes; however, some interesting findings were discussed. Substantial changes occurred in the special-intervention group with cigarette smoking cessation, weight management, and lower cholesterol levels. Also, substantial unanticipated changes occurred in the usual-care group. Contributing factors may have included the following: (a) the psychological impact on the usual-care men of enrollment in a trial limited to persons at high risk for heart attacks, (b) the possibility that persons volunteering for a 6-year trial are very health conscious and motivated to change, (c) sensitization of the usual-care men to their personal risk factor status resulting from annual visits to the MRFIT centers, and (d) the broad influence of health education in the United States aimed at modifying all three risk factors. Due to ethical considerations, physicians of the usual-care group were notified of the findings of each annual visit, although no recommendations were made for change.

The group comparisons indicated that, among men with normal baseline EKGs, the MRFIT intervention may have had a favorable effect on coronary heart disease mortality. The data also suggest that men with hypertension, especially those with resting EKG abnormalities, had no favorable, and possibly an unfavorable, response to the intervention. Researchers also concluded that men who stopped cigarette smoking had lower coronary heart disease and total mortality than those who continued to smoke (MRFIT, 1982).

In contrast, the purpose of the Lifestyle Heart Trial conducted by Ornish et al. (1990) was to determine whether patients outside the hospital could be motivated to make and continue comprehensive lifestyle changes, and, if so, whether regression of CAD could occur as a result of lifestyle changes alone. Numerous clinical trials have been conducted to determine whether the progression of CAD can be modified. In all of these, cholesterol-lowering drugs, plasmapheresis, or partial ileal bypass was the primary intervention.

Patients were selected based on the following criteria: (a) residing in the greater San Francisco area with angiographically documented CAD, (b) had no other

life-threatening illnesses, (c) had no myocardial

infarction during the preceding 6 weeks, (d) had no

history of receiving streptokinase, (e) were not currently

receiving lipid-lowering drugs, and (f) not scheduled for

CABG surgery. Permission was granted by the patient's

cardiologist and primary care physician.

The experimental group (n = 53) represented a cross-

section of age, gender, race, ethnic group, socioeconomic

status, and educational level. Patients were asked to stop

smoking, eat a low-fat vegetarian diet for at least a

year, limit cholesterol intake to 5 mg/day or less, and

eliminate caffeine. Alcohol was limited to no more than 2

units per day. Stress management techniques, including

stretching, breathing techniques, meditation, progressive

relaxation, and mental imagery, were used to increase the

patient's sense of relaxation, concentration, and

awareness. Subjects were asked to practice these stress

management techniques for at least 1 hour per day. Ornish

et al. (1990) asked participants to exercise for a minimum

of 3 hours per week and spend a minimum of 30 minutes per

session exercising within their target heart rates. The

subjects in the control group (n = 43) were not asked to

make any lifestyle changes, although they were free to do

so. Progression or regression of coronary artery lesions was assessed in both groups by quantitative coronary angiography at baseline and after about a year.

To reduce the possibility that knowledge of group assignment might bias the outcome measurements when performing all medical tests, Ornish et al. (1990) remained unaware of the patient group assignment and the order of the tests. Different people provided the lifestyle intervention, carried out the tests, analyzed the results, and performed statistical analyses. Differences in baseline characteristics of the two groups were tested for statistical significance by the conventional t test. Comparisons of the two study groups' baseline coronary artery lesion characteristics (measured by quantitative angiography) and changes in lesion characteristics after interventions were examined using a mixed-model analysis of variance. These analyses used lesion-specific data, but allowed for the possibility that the lesion data could be statistically dependent. Mean changes in other endpoint measures were analyzed for statistical significance by repeated-measures analysis of variance.

The Lifestyle Heart Trial researchers documented some remarkable outcomes. Adherence to the diet, exercise, and stress management components of the lifestyle program in the experimental group was excellent. The control group made moderate changes in lifestyle consistent with more conventional recommendations. In the experimental group, total cholesterol decreased by 224.3% and LDL-cholesterol decreased by 37.4%. In the Ornish et al. (1990) study patients in the experimental group reported a 91% reduction in the frequency of angina, a 42% reduction in the duration of angina, and a 28% reduction in the severity of angina. Conversely, the control group reported a 165% increase in frequency of angina, a 95% increase in duration of angina, and a 39% increase in severity of angina.

All lesions were included in the quantitative analysis. The average percentage diameter stenosis decreased from 40.4% (SD = 16.9) to 37.8% (SD = 16.5) in the experimental group but progressed from 42.7% (SD = 15.5) to 46.1(SD = 18.5) in the control group (p = .001, two-tailed). To assess whether program adherence was related to lesion changes, the experimental group and the combined study group were divided into tertiles based on

overall adherence score. The degree of adherence directly correlated with changes in percentage diameter stenosis.

This clinical trial has demonstrated that a group of subjects with CAD can be motivated to make comprehensive lifestyle changes for at least one year outside the hospital. Since coronary atherosclerosis occurs over a period of decades, one would not expect to find such change in only one year. Since degree of stenosis changes was correlated with extent of lifestyle change across the whole range, small changes in lifestyle may slow progression of atherosclerosis, whereas substantial changes in lifestyle may be required to halt or reverse CAD. Ornish et al. (1990) also found that severely stenosed lesions showed the greatest improvement.

The Ornish et al. (1990) study has been criticized by some researchers due to the inclusion of all risk factors, rather than limiting the study to two or three. Only two other randomized controlled trials showing regression of CAD have been reported, both used cholesterol-lowering drugs as the primary interventions. These findings suggest that adherence to the lifestyle program needs to be very good for overall regression to occur, although more moderate changes may have some beneficial effects.

Throughout the literature, researchers recommended more research on ways to achieve reduction in risk factors for CAD. Heart disease remains the number one disease related to deaths in rural Mississippi as well as the nation. More research is needed to understand the factors and variables that influence noncompliance. This current research study seeks to expand the data available to the health care profession so that the risk factors identified among the postoperative CABG surgical client may be targeted in individualized plans of care. The current study also included a considerable number of demographic variables rather than limiting the study to a few variables.

Angina occurring after CABG surgery is discouraging because this one symptom alone is the most frequent indication for CABG surgery. Cameron, Davis, and Rogers (1995) in the Coronary Artery Surgery Study (CASS) Registry studied ways to evaluate the prevalence, predictive factors, and prognosis of angina occurring after CABG surgery. The study took place at 15 participating centers during a 4- to 8-year follow-up period.

From the CASS Registry of 24,958 patients, 9,447 patients who underwent CABG surgery without other associated cardiac surgery within 3 years were identified. Two study groups were defined, one for the analysis of the predictors of angina and the second one for the analysis of prognosis of angina after CABG surgery.

Follow-up for the study subjects by Cameron et al. (1995) was conducted at annual intervals after enrollment angiography so that the first follow-up after CABG surgery could have occurred any time during the first postoperative year. For the analysis of angina predictors, the study group included 5,289 patients who were alive and had follow-up one year after CABG surgery ± 90 days. The analysis of the relation of angina to survival and incidence of repeat CABG surgery included 6,158 patients who had a follow-up visit at any time within one year after CABG surgery 90+ days. Annual follow-up was accomplished via mail and telephone interviews according to a CASS protocol for up to 8 years (M = 5.5 years).

The presence of angina was determined according to a standardized protocol defined as definite, probable, probably not, and definitely not. For this study, patients who complained of definite or probable angina were

considered to have angina. When the analysis was repeated, including only the patients who ranked as having definite angina, the same results were obtained.

Cigarette smoking was determined at baseline. Classified as a smoker were those smoking more than one half pack per week and those who had smoked within the past 3 months. History of diabetes included all diabetic patients regardless of insulin dependence. Surgical priority was classified as elective, urgent, or emergency. The patients were analyzed according to the presence or absence of postoperative angina, with the 1,253 patients having angina at the first postoperative year compared with the remaining 4,039 patients.

Baseline characteristics of patients who did or did not develop angina postoperatively were compared using the standard t test or chi-square tests for continuous and categoric variables, respectively. A stepwise logistic regression was used to develop a multivariate model in which all variables listed in the multivariate table were allowed to enter the model. For recurrent angina in the second and third years, angina status in the previous years was also used as a predictor variable.

Cameron et al. (1995) obtained annual follow-up in 99.5% of patients. After CABG surgery, 24% (1,253 of 5,289) had angina at the first annual follow-up visit and their numbers increased to > 40% by the sixth postoperative year. The univariate analysis indicated that patients who had angina during the first postoperative year were younger, more likely to be smokers, and/or had preoperative angina or a myocardial infarction. There was a reduction in postoperative angina associated with smoking cessation. Postoperative angina was present in the first year in 27% of current smokers, 23% of former smokers, and 21% of those who never smoked ($p < .001$). Angina documented early in the first year was more common with the use of vein grafts only and with incomplete revascularization. The beneficial effect of the internal mammary artery (IMA) was seen only in the first postoperative year and only in those who had preoperative angina (93%).

Cameron et al. (1995) used multivariate analysis to demonstrate that the most significant predictors of angina in the first postoperative year were minimal coronary disease, preoperative angina, use of vein grafts only, previous myocardial infarction, incomplete

revascularization, female gender, smoking, and younger age. Predictors of angina in the second postoperative year included angina in the first postoperative year as well as female gender, diabetes, hypertension, and younger age. The third as well as subsequent postoperative years suggested that the presence of angina can nearly all be explained by the status of angina in previous years. Incomplete revascularization and female gender remain significant predictors.

The incidence of angina after CABG surgery varies among reported studies. In this study, angina was reported as angina even if just one episode occurred per year. The incidence may be higher in other studies due to different definitions. Conversely, the actual incidence may be underestimated because those clients who died before their follow-up visit had unknown postoperative anginal status and could not be included. The appearance of angina in the first postoperative year could be attributed to incomplete revascularization or technical factors leading to perioperative or early graft failure, since progression of the disease generally would not have an early angina effect.

Women were more likely to have angina in the second and subsequent postoperative years. The female gender has a higher mortality rate after CABG surgery, presumed to be related to small body size, and therefore smaller vessels, as well as more risk factors such as diabetes, hypertension, and older age.

Cameron et al. (1995) found that the predictors of postoperative angina are either features that are known before CABG surgery such as preoperative angina, previous myocardial infarction, younger age, female, hypertension and diabetes, or are features that might be anticipated before CABG surgery (i.e., incomplete revascularization or use of vein grafts only). Clients with these specific problems could be advised before CABG surgery that they would be more likely to experience postoperative angina than one without these features. Smoking cessation should be emphasized because its benefit is apparent even in the postoperative client. Finally, the adverse clinical implications of postoperative angina, such as increased risk of myocardial infarction and/or need for repeat CABG surgery, mandate further clinical evaluation of those clients with postoperative angina.

While postoperative angina was not a variable of interest in the current study, the current sample consisted of post-CABG clients. The focus of the current study, risk factors following CABG surgery, served to reevaluate many of the high-risk variables in the Cameron et al. (1995) study.

There has been concern that women with CAD are managed differently from men and that men and women have a different prognosis. Utilizing the CASS Registry, a large data base of well-characterized patients with long-term follow-up, Davis, Chaitman, Ryan, Bittner, and Kennedy (1995) sought to compare the rates of CABG surgery and 15-year survival for men and women after initial medical or surgical management.

The CASS registry, as previously mentioned, had a data base of 18,876 men and 6,082 women from which the information for the Davis et al. (1995) study was drawn. Patients in the Registry underwent cardiac catheterization at 1 of 14 hospitals from 1974 to 1979. Bypass surgery rates were based on 12,452 men and 2,366 women. Survival results were based on 6,018 men and 1,095 women with operable CAD and initial medical management and 6,922 men and 1,291 women initially managed surgically.

Initially, the men appeared to have a higher rate of surgical intervention. But with restriction to a population appropriate for bypass surgery and adjustment for both clinical and angiographic characteristics, the rates for men and women were not different. Davis et al. (1995) noted that at 15 years the bypass surgery rates were 75% for men and 72% for women (p = .91). The 15-year survival rate was 50% for men and 49% for women with initial medical treatment (p = .53) and 52% for men and 48% for women with p = .0001. Survival was improved by bypass surgery in most subgroups with the largest relative risks for high-risk patients. Relative risks were similar for men and women. Davis et al. asserted, therefore, that it was crucial for studies that compare rates of procedural utilization in men and women to adjust for both symptoms and severity of CAD. Without simultaneous adjustment, rate estimates may be seriously biased.

Davis et al. (1995) concluded that the rate of bypass surgery did not differ between men and women. There were few differences in the survival of men and women. In general, both men and women with initial surgical treatment survived longer, although benefits were clinically and statistically significant only in those at

high risk. The benefit was similar in both men and women. However, since entry into the CASS Registry began only after cardiac catheterization, more studies are warranted to determine whether there is a difference in the treatment of stable or unstable angina in men and women.

The current study did not involve the variable of angina but did examine post-CABG risk factors in both men and women who were participating in a cardiac rehabilitation program. Information from the Davis et al. (1995) study was utilized in the current study to underscore differences in risk factors and treatment between men and women post-CABG.

Although dietary habits have been implicated in CAD and previous dietary trials revealed inconsistent results, deLorgeril et al. (1996) sought to study the concept of the traditional ethnic cardioprotective diet. The Lyon Diet Heart Study is a secondary prevention trial that demonstrated a protective effect of a Mediterranean diet in survivors of a first and recent myocardial infarction. The aim of this study was to report the various cardiovascular events that occurred in the control and study groups during the Lyon trial, analyze their relationship with the associated drug treatment, and gain

understanding into the possible mechanisms present in the beneficial effects of the Mediterranean type of diet tested in the trial.

deLorgeril et al.'s study was a randomized single-blind trial with 605 subjects to test the hypothesis that a Mediterranean type of diet may reduce the risk of cardiovascular complications in survivors of a first acute myocardial infarction. Patients who agreed to be followed for 5 years by the Research Unit signed a first consent form and were randomly assigned to a control group or a study group. The annual visit included clinical examination by a cardiologist, electrocardiogram (EKG), and blood sampling for routine biologic measurements. At this stage, patients of both groups were not fully informed about the study and only patients randomized to the study group were invited to sign a second consent form in which they agreed to adopt a Mediterranean type of diet. The design was chosen to avoid between-group contamination, a major difficulty in dietary trials, and to avoid influencing physicians' follow-up and treatment of patients in the event of new symptoms or a heart attack. Control subjects did not receive dietary information from the investigators of the study. They were

expected to follow the dietary advice of their physicians, similar to the Step I Diet of the American Heart Association.

Patients of both groups of deLorgeril et al.'s study were scheduled to be seen 2 months later and then annually at the Research Unit. These visits did not replace regular visits to their attending physician who was responsible for all aspects of treatment, including use of medication and of invasive diagnostic and therapeutic procedures.

The Mediterranean type diet tested in this study was designed to supply < 35% of energy as fat, < 10% of energy as saturated fat, < 4% of energy as lineolic acid, and > 0.6% of energy as alpha-linolenic acid. The dietary instructions were personalized and described in detail to each subject. Subjects were advised to modify their regular diet in two stages. Stage 1 was to prepare patients to accept the detailed instructions given in Stage 2. The second stage was conducted by the study dietitian and was comprised of helping patients and their family adapt their usually diet to the Mediterranean type of diet tested in the trial. The dietitian took into account such factors as the wishes and gastronomic preferences of the patients, the job of the patient,

number of persons at home, financial resources, and community where the family lived. Instructions were detailed, easy to execute, safe, not expensive, and compatible with the way of living, race, gender, and religion of each patient.

Even though cardiovascular death and nonfatal acute myocardial infarction were the primary endpoints of the deLorgeril et al. trial, secondary endpoints were also documented and recorded if they required hospital admission. These endpoints included (a) episodes of unstable angina (defined as spontaneous rest angina, decubitus, and nocturnal angina or exercise angina that recently increased in frequency or duration or that was increasingly resistant to antianginal therapy), (b) recurrent stable angina whose severity required invasive investigations, (c) episodes of overt heart failure (New York Heart Association functional Class III or IV), (d) transient or permanent cerebral stroke, (e) pulmonary embolism, (f) peripheral arterial embolism, (g) thrombophlebitis, (h) need for myocardial revascularization (angioplasty or bypass surgery, or both), and (i) postangioplasty restenois (diagnosis based

on the association of recurrent angina and confirming angiography).

Only those who underwent coronary angiography to document severity and aspects of coronary lesions were included in the analysis. The need for myocardial revascularization (bypass surgery or percutaneous coronary angioplasty) and periprocedural complications (myocardial infarction and clinically significant coronary artery restenois after angioplasty) was also considered secondary endpoints.

Analyses were performed according to the intention-to-treat principle and with the use of two-sided tests. In life-table analyses and the Cox model, the time of the first event (either major primary, secondary, or minor endpoint) was used. The log-rank test was used to compare survival curves, and adjusted risk ratios were calculated by the Cox proportional hazards model. deLorgeril et al. (1996) also examined the protective role of the anti-ischemic or major cardiac drugs, including anticoagulants, aspirin, beta-adrenergic blocking agents, calcium-channel blocking agents, and inhibitors of the angiotensin-converting enzyme (ACE).

In analyzing the relationship between drug treatment and the occurrence of new complications, calculations included only the major complications: the combination of cardiac death and nonfatal infarction, and this combination plus cerebral stroke, unstable angina, heart failure, pulmonary and peripheral embolism.

In the deLorgeril et al. (1996) study a total of 605 patients (303 control subjects and 302 study patients) were randomized and included into the analysis. Patients were primarily male, with a male/female ratio of 90/10 in both groups. The mean age was 53.5 ± 10 years in both groups. Other baseline characteristics, except for smoking, were similar in both groups. The proportion of smokers at randomization was higher in the study group (7.6%) than in the control group (4.9%); after one year, the difference (19% vs. 15%) was not significant and continued to be insignificant in subsequent years.

The use of ACE inhibitors and anti-ischemic drugs did not differ between the groups. Aspirin use was stable and well tolerated during follow-up, whereas the use of anticoagulant agents decreased slightly after one year. There was a small but insignificant ($p < .05$) reduction in the use of beta-blockers in both groups which suggests

that either these agents were not well tolerated or that physicians were not persuaded of their usefulness beyond the first year after infarction. For the calcium channel blockers and ACE inhibitors, there was a nonsignificant tendency to decrease use after one year, possibly to compensate for the reduced use of beta blockers.

The difference between the groups in the number of new infarctions and episodes of unstable angina was significant. When primary and major secondary endpoints were combined in the proportional hazards model, there were 59 events in the control group and 14 in the study group. These data extend the finding that the Mediterranean type of diet was protective in survivors of a first infarction. The absolute number of events is a critical point to be considered when examining the results of any trial.

deLorgeril et al. (1996) determined that the greatest differences between groups occurred with nonfatal myocardial infarction (17 events vs. 5) and unstable angina (21 events vs. 4). Because the two complications are related to similar pathogenetic mechanisms, this finding was not surprising.

In order to evaluate the plausibility of the results of the deLorgeril et al. (1996) trial, it was important to identify which biologic factors in the Mediterranean diet may have been cardioprotective. Two major biologic factors were identified by the intervention: (a) the antioxidant factors alpha-tocopherol and ascorbic acid, which were increased in the plasma of the study patients, and (b) the plasma fatty acid profile, with a noticeable increase in omega-3 fatty acids and a decrease in omega-6 fatty acids in the study group. Other factors such as the antioxidant flavonoids, arginine, and vitamins of the B group (especially folic acid) were not measured in the study but may have played an important role.

Interestingly, several lines of evidence indicate that the major mechanisms leading to acute arterial manifestations, in particular, sudden death, unstable angina, and myocardial infarction, are localized inflammation and immune-mediated processes with macrophage infiltration preceded or followed, or both, by lipid modification and accumulation. These events eventually lead to lesion hemorrhage, plaque ulceration and rupture, and ultimately occlusive or subocclusive coronary thrombosis.

deLorgeril et al. (1996) concluded that the present data supported the view that comprehensive dietary modifications can rapidly induce a multitude of significant biologic changes at various cellular and molecular levels. These changes are possibly capable of interfering with the pathogenesis of acute coronary events.

The deLorgeril et al.'s (1996) findings related to changes in diet were pertinent to the current study as variables related to diet were closely examined by this researcher. Specifically the variables of fat in the diet comparable to the low-fat Mediterranean diet, were examined.

High serum total and low density lipoprotein cholesterol, hypertension, and smoking have been shown to be the main risk factors for coronary heart disease among middle-aged persons. Unfavorable lipoprotein levels have been associated with increased coronary mortality among middle-aged, especially among those who already had coronary heart disease. Tervahauta, Pekkanen, and Nissinen (1995) sought to determine if the effect of these risk factors diminishes with aging in term of relative risk. These researchers suspected that the decrease may be due

to high absolute risk of coronary heart disease among the aging, competitive causes of death, progression of atherosclerosis with advancing age, and the effect of other risk factors. In terms of attributable risk, however, the traditional risk factors appear to retain, or increase in, importance among the elderly, especially in men. Tervahauta et al. (1995) looked at the association between the classic risk factors (total and high density lipoprotein [HDL] cholesterol level, blood pressure, body mass index, and smoking), fatal and nonfatal myocardial infarction, other manifestations of coronary heart disease, and total mortality among men aged 65 to 84 years. Subjects for the study were drawn from among participants in a seven-country cohort study begun in 1959. Another study had been conducted on the same sample in 1984, allowing Tervahauta et al. (1995) to take a longitudinal view of the subjects and their risk factors as they aged.

The sample consisted of men born between 1900 and 1919 from two geographically defined rural areas, Illomanisi in the East and Poytya-Mellila, Finland, in the West. At the 25-year follow-up, the men were between the ages of 65 and 84 years. Of the original cohort of 1,711

men, 766 were still alive in 1984, and 716 (93%) had the medical examination at that time. There was full information on the electrocardiogram (EKG) and medical examination information was available for 686 men. Thirteen subjects with rheumatic heart disease or cor pulmonale and 26 subjects with missing values were excluded from the study group; therefore, 647 men were included in the 1995 study. The group consisted of 31 men with a Q wave present on the EKG and 140 men with a definite history of previous myocardial infarction or typical angina as assessed by a questionnaire. The other 476 men without signs and symptoms were considered to be free of coronary heart disease at baseline.

The original study protocol was followed as closely as possible without changes by Tervahauta et al. (1995). Questionnaires concerning medical history, socioeconomic information, health status, and health habits were administered. Subjects were asked to fast for at least 4 hours and a physical examination was conducted.

Venous blood was obtained and total and high density lipoprotein was analyzed from fresh serum. Body weight was recorded to nearest 100 g with the subject wearing light

clothing. Body mass index was calculated by dividing weight in 1984 by the squared height measured in 1969.

Subjects were classified into four categories by smoking: men who had never smoked (never smokers), former smokers (ex-smokers), current smokers of < 10 cigarettes daily, and current smokers of > 10 cigarettes daily. Men who had stopped smoking within one year before the current evaluation were classified as current smokers according to their past smoking habit.

Men who in 1984 had a systolic blood pressure > 160 mm/Hg or diastolic pressure > 95 mm Hg, or both, or who used antihypertensive medication in 1984 were considered to have hypertension. Information on use of antihypertensive medication was obtained using a questionnaire.

Hospital records and death certificates were collected for all the men who had died between the 25-year (1984) and 30-year (1989) follow-up examinations. The vital status of all subjects in the 30-year follow-up was ascertained. The follow-up rate was 100% in this respect. Tervahauta et al. (1995) also reviewed hospital records for all men who reported possibly having a myocardial infarction during the last 5 years.

Fatal events coded as definite or possibly myocardial infarction were considered a fatal myocardial event. Non-fatal events coded as definite myocardial infarction were considered nonfatal myocardial infarctions. Three endpoints were defined for the analysis: fatal myocardial infarction, any myocardial infarction (fatal or nonfatal), and any coronary heart disease (fatal or nonfatal myocardial infarction) during the follow-up period, newly developed, definite or probably angina based on a questionnaire. Researchers also determined the incidence of cancer deaths.

Statistical analyses were performed using SAS software. Differences in the mean levels of continuous variables were tested by using analysis of variance, and differences in the prevalence of categoric risk factors were tested using log-linear models. The relative risk of risk factors studied was analyzed using logistic regression. All analyses by Tervahauta et al. (1995) were first conducted by adjusting for age and area of residence and then by adjusting for other risk factors. Interactions between all risk factors and area of residence were tested. When the interaction was of least borderline

statistical significance (p < .01), results of continuous risk factors were reported within each area separately.

Of the 647 men included in the 1995 analysis, 171 men (26%) had prevalent CAD in 1984. For the men with and without CAD, the 5-year incidence rates (per 100) were 26 and 6 for fatal myocardial infarction, 33 and 9 for any myocardial infarction, and 45 and 23 for total mortality, respectively. The 5-year incidence rate of any CAD was 17 (per 100) among men free of CAD at baseline. The noncoronary heart disease mortality rate was similar in both groups: 19 and 17 per 100 men with and without CAD, respectively. Among the men without CAD at baseline, the risk of any coronary heart disease event was significantly (p < .05) higher in men from the East. Non-significant differences were detected in the incidence of other coronary endpoints and total mortality between the two regional cohorts.

The mean serum HDL cholesterol level was lower and the total HDL cholesterol ration was higher among subjects with CAD at the 1984 baseline. Mean age and mean levels of serum total cholesterol, systolic and diastolic blood pressure, and body mass index were similar between groups. Current smoking, hypertension, and antihypertensive

medication were more prevalent in the group with CAD than in the group without CAD at baseline.

Tervahauta et al. (1995) noted a significant ($p <$ .05) interaction between serum cholesterol level as a continuous variable and area of residence. In a multivariate analysis, smoking more than nine cigarettes daily, but with none of the continuous risk factors studied, was a significant predictor of total mortality. Low levels of HDL, high total/HDL cholesterol ratio, and smoking more than nine cigarettes daily showed some indication of increasing the risk for coronary endpoints. All nonlinear relations between risk factors and studied endpoints were statistically insignificant.

Serum total cholesterol was a significant risk factor for all three coronary endpoints but not for total mortality. The difference in risk between tertiles of serum total cholesterol was not significant. Prevalent antihypertensive medication use was a significant ($p <$ .05) risk factor for total mortality. A significant interaction was found between the level of HDL cholesterol and area of residence of any coronary heart disease.

Tervahauta et al. (1995) also tested the possible statistical significance of the differences in predictive

power of coronary risk factors between men with and without coronary heart disease in the 1984 evaluation. No significant ($p < .05$) interactions between baseline CAD status and risk factors were detected for any of the three common endpoints.

Among men without previous CAD there was a lower prevalence of smoking and hypertension than among men with previous CAD in 1984. The similarity in the mean values of blood pressure was probably primarily due to variation in the use of antihypertensive and antianginal medications. This result was consistent with previous studies.

Cross-sectionally, most previous studies have suggested that total cholesterol levels are significantly higher among elderly men with CAD than in men free of disease. This study did not support such an association, but found that HDL cholesterol was significantly lower and total/HDL cholesterol ratio significantly higher among men with CAD than among men without CAD. The more unfavorable lipoprotein levels may be partially explained by the more prevalent use of antihypertensive medication among men with CAD. Thiazide diuretic agents, in particular, have been shown to increase serum lipid levels.

In terms of absolute increase in risk, serum cholesterol was deemed to be especially important for CAD. Among men with CAD, smoking > 10 cigarettes per day and leanness were associated with high all-cause mortality. A previous analysis by the Tervahauta et al. (1995) study group at the 25-year follow-up period suggested that a full analysis of the association between serum cholesterol and all-cause mortality requires a long follow-up period because it can take up to 10 years before the positive association of cholesterol with CAD mortality overcomes the negative association with early mortality due to other causes. The 5-year follow-up interval of the present study was probably too short to conclusively determine the importance of coronary risk factors on total mortality.

In the Tervahauta et al. (1995) study, the use of antihypertensive medication significantly increased the risk of all-cause mortality among men without CAD at the 1984 baseline. Among men with CAD, the relative risk was similar but did not reach statistical significance. Adverse effects of antihypertensive drugs may also contribute to mortality. In the original Seven Countries Study, men with hypertensive blood pressure levels 10 to 15 years earlier and decreased levels thereafter were at

higher risk for coronary events than men with relatively stable blood pressure levels.

Primary and secondary prevention of CAD has demonstrated effectiveness among the middle-aged. Lowering unfavorable lipid levels and treating hypertension primarily with a healthier lifestyle are probably advantageous in all ages. In the Tervahauta et al. (1995) study, low HDL cholesterol, high ratio of total to HDL, and smoking were significant risk factors for coronary events among those with CAD at baseline, and only total cholesterol was a significant risk factor among men without CAD. These differences in the importance of risk factors between men with and without CAD did not reach statistical significance.

The current study was conducted to identify what risk factors could be identified in the postoperative CABG surgical client. Other variables, such as age, perception of health status, race, sex, and religion, were also considered. Several research articles have referred to smoking and hypertension as significant factors related to CAD. The current study also evaluated smoking and hypertension as well as the demographic variables already

cited as possible risk factors in the postoperative CABG surgical client.

In summary, a number of studies have been conducted which have described or examined relationships between CAD and the identification of modifiable risk factors (Haskell et al., 1994; Ornish et al., 1990). Diet has been studied in an effort to determine an individual's predisposition to CAD (deLorgeril et al., 1996). The current study sought to determine if dietary factors could be identified in the postoperative CABG surgical client.

Even though research has been conducted in various parts of the United States, no studies could be found that included all the risk factors associated with CAD and the postoperative CABG surgical client. None of the studies in the literature were conducted in the rural South, which was the site of the current study.

Throughout the literature, researchers recommended more research in the area of compliance. Heart disease remains the number one killer in the United States and the rural South; therefore, more research is needed to identify the variables and factors that influence risk factors for heart disease in the United States and rural Mississippi. The current research served to expand the

data available to the health care profession regarding the

risk factors identified in the postoperative CABG surgical

client.

Chapter III

The Method

The purpose of this study was to determine what risk factors for coronary artery disease (CAD) would be identified in the postoperative coronary artery bypass graft (CABG) surgical client. The design, instrumentation, data collection, and data analysis procedures are described in this chapter. The variables of interest are presented, and population, setting, and sampling are described.

Design of the Study

A descriptive study was conducted to determine the CAD risk factors that could be identified in the CABG surgical client. By using the descriptive method, the researcher collected and measured data without introducing treatment or manipulating variables. In this descriptive study only the variables of interest were investigated and no causal relationship was implied. This design posed no threat or ethical harm to the subjects since there was no manipulation of variables (Polit & Hungler, 1995).

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Variables

The selected demographic variables for this study were age, race, gender, income, marital status, and perceived health status of subjects. Additionally, the date of the CABG procedure, family history of heart disease, and third-party reimbursement were considered as demographic variables for the purpose of this study. Intervening variables may have included the honesty of the participants.

Setting, Population and Sample

The setting for this research study was a cardiac rehabilitation department in rural Northeast Mississippi. The cardiac rehabilitation included Phases II and III cardiac rehabilitation, and all subjects were previous or current participants of the program.

The accessible population for this study was a list of more than 200 previous clients who had CABG surgery in the past. The convenience sample consisted of 69 volunteer post-CABG surgical clients who completed and returned the questionnaire.

Instrumentation

The instruments utilized for data collection in this study included a demographic questionnaire (see Appendix A) and the King Cardiac Risk Analysis Survey (see Appendix B) which were researcher designed. The instruments had no established reliability or validity but had been determined to have face validity based on review by a panel of expert researchers.

Demographic data were collected using the demographic questionnaire, which was designed to elicit information specific to the variables of interest in this study. The King Demographic Survey was designed to assess demographic characteristics of the study population. Items 1-11 address variables such as age, ethnicity, gender, income, education, and religion. Additional questions more specific to the time of CABG surgery and family history for heart disease were also on the survey.

Item 12 of the demographic sheet was a question on perceived health status. This question assessed the individual's perceived health status by using a visual analogue scale. The visual analogue scale was a straight line 10 cm in length and labeled with the extremes of health. The participant was asked to place a mark on the

line at the point of the participant's perceived health status. The researcher then measured the distance in millimeters of the participant's mark, which was utilized as a score for data analysis. The higher participant scores indicated a more positive perception of health.

The King Cardiac Risk Analysis Survey measured the presence of coronary artery risk factors through self-reporting by the research study participants. The King Cardiac Risk Analysis Survey was developed as a 10-item, 5-point Likert scale survey. The instrument has an absolute score ranging from 10 to 50. Items 6 and 7 on the King Cardiac Risk Analysis Survey were reverse coded. The compliance survey addressed sedentary lifestyle habits, diet issues, exercise, and stress. A composite score was compiled from the participants' answers, with the lower scores indicating less CAD risk factors.

Method of Data Collection

Approval to conduct the study was obtained from Mississippi University for Women's Committee on Use of Human Subjects in Experimentation (see Appendix C) and the director of the participating cardiac rehabilitation program (see Appendix D). Data were obtained from the cardiac rehabilitation program for the currently enrolled

clients, and questionnaires were mailed to approximately 200 previous participants.

Data collection took place over a period of 3 weeks. Questionnaires were handed out to the postoperative CABG surgical clients who were currently enrolled in the program, which included Phases II and III cardiac rehabilitation. Names and addresses of previous cardiac rehabilitation clients who had undergone CABG surgery were obtained from the staff of the program, and questionnaires were mailed to them along with a self-addressed, stamped envelope. Each participant was informed that participation in the study was voluntary and that confidentiality would be maintained. The demographic sheet and the King Cardiac Risk Analysis Survey were distributed to participants of the study after informed consent was obtained (see Appendix E). Those participants who responded by return mail also signed informed consent and returned questionnaires by mail.

Method of Data Analysis

Descriptive statistics of frequency and percentages were utilized to analyze the demographic variables. The demographic variables and compliance data then were analyzed using frequency and percentage statistics.

Additionally, data were analyzed to determine if there was a relationship between subjects' health perceptions and selected demographic variables. The Pearson r was utilized to ascertain the correlation between health perceptions and demographic variables.

Summary

The empiricalization of the study was described in Chapter III. Procedures, data collection methods, population, sample, setting, and instrumentation were discussed. Research design variables and data analysis were also discussed in Chapter III to conclude the overall design of the study. In Chapter IV, the findings from the data analysis will be presented, followed by the conclusions from the research in Chapter V.

Chapter IV

The Findings

The purpose of this study was to explore and identify risk factors associated with coronary artery disease (CAD) in individuals following coronary artery bypass graft (CABG) surgery. A descriptive study was conducted with clients at a cardiac rehabilitation program in rural Northeast Mississippi. In Chapter IV, findings from the study will be presented. Demographic characteristics of the sample will be presented, followed by results of data analysis related to the research question.

Description of the Sample

A convenience sample (N = 69) was obtained from a target sample of 240 individuals who had previously participated, or were currently participating, in a Phase I or Phase II cardiac rehabilitation program in rural Northeast Mississippi. All participants met the research criteria. Descriptive statistics regarding age, gender, ethnicity, marital status, income, education, and religion may be found in Table 1.

Table 1

Summary of Sample Characteristics by Frequency and
Percentage

Demographic data	f	%
Gender		
Male	53	76.8
Female	16	23.2
Age (years)		
31-40	1	1.0
41-50	8	11.6
51-60	14	20.3
61-70	26	37.7
71 and up	20	28.9
Race		
African American	8	11.6
Caucasian	60	86.9
Oriental	1	1.0
Marital status		
Married	53	76.8
Single	1	1.0
Divorced	4	5.8
Widowed	11	15.9
Income		
< $10,000	22	31.8
$10,000-$20,000	17	24.6
$21,000-$30,000	15	21.7
$31,000-$40,000	6	8.7
$41,000-$50,000	5	7.2
$51,000 and over	4	5.8

(table continues)

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Table 1 (Cont'd)

Demographic data	f	%
Education		
Elementary	6	8.7
Junior high	20	29.0
High school	26	37.7
GED	3	4.3
2 to 3 years of college	8	11.6
4 or more years of college	5	10.1
Religion		
Protestant	65	94.2
Catholic	4	5.8

Note. N = 69.

The average age of respondents was 64.11 years with a
range of 38 to 86 years. Subjects were asked the date of
their CABG surgery. Using that date, it was determined
that the average length of time since surgery was 6.39
years for all subjects.

Participants were also surveyed regarding family
history of heart disease. Item 9 of the King Demographic
Survey was designed to elicit data about each
participant's family history of heart disease. Nineteen
(27%) of the subjects reported that their mother had heart
disease, while 36 (52%) reported that their father had a
history of heart disease. Ten (14%) reported that their

sister had heart disease, and 30 (43%) reported that a
brother had heart disease.

Data were collected regarding subjects' health
insurance coverage. The greatest percentage of
participants (62%) reported coverage by Medicare.
Additionally, 31 (45%) of the sample reported coverage by
private insurance, while 4 (6%) were covered by Medicaid
and 6 (9%) reported coverage by other, citing supplemental
insurance policies.

Subjects' health perception was assessed using a
health perception analogue. Subjects were instructed to
place a mark on a line which was precisely 10 cm in length
as to where they perceived their health, with 0 being
unhealthy and 10 being very good health. Subjects had a
mean perceived health score of 7.14.

Results on Analysis of Cardiac
Risk Analysis Scores

The King Cardiac Risk Analysis Survey was
specifically designed to measure the CAD risk factors in
those subjects who were post-CABG surgery. The questions
on the survey related to all aspects of CAD risk factors
including diet, exercise, relaxation, smoking, stress, and
hypertension. Each client was asked to rank the 10

questions on a 5-point Likert scale with 1 being never and 5 being always. For simplicity purposes, scores of Items 2, 3, and 4 are presented collectively. Items 6 and 7 were reverse coded and a score of 10 was ideal. The items were then studied individually to determine which ones were most likely to be identified in the post-CABG surgical client.

Smoking. Forty-seven (68%) of the subjects said they never smoke cigarettes, cigars, or a pipe. Conversely, 7 (10%) said they always smoked while 13 (19%) reported smoking occasionally.

Drinking whole milk. Forty-one (61%) of the subjects reported they never drink whole milk, and 11 (16%) reported they always drink whole milk. Fifteen (23%) reported occasionally drinking whole milk.

Eating regular cheese instead of low-fat versions. Thirty-two (46%) of the subjects reported always eating regular cheese instead of low-fat versions while 24 (35%) said they never ate regular cheese, choosing low-fat versions instead. The remaining 17 (19%) reported that they occasionally ate regular cheese instead of low-fat versions.

Eat bacon, ham, sausage, lunch meat. Twelve (17%) of respondents reported never eating bacon, ham, sausage, or lunch meat while 22 (32%) said they always ate these meats. The majority (35, 51%) reported some level of consumption of bacon, ham, sausage, and lunch meat.

Add regular table salt when cooking or at the table. Twenty-six (38%) respondents reported never adding table salt when cooking or at the table while 14 (20%) reported always adding table salt. However, 31 (41%) responded that they sometimes used table salt when cooking or at the table.

Walk or exercise briskly. There was a positive and expected trend toward exercise since some of the participants were currently in a cardiac rehabilitation program and the others had also participated in the same program. Twenty-six (38%) reported exercising briskly for 30 minutes at least 5 days a week. Only 5 (7%) reported never exercising.

Use relaxation techniques. Surprisingly, only 10 (14%) reported using relaxation techniques, such as mental imagery or meditation, whereas 49 (71%) reported never using relaxation techniques. Additionally, 9 (12%) responded they occasionally used techniques to relax.

Have stress in life. One explanation for only 14%
using relaxation techniques may be that only 9 (13%) felt
they always had stress, and 26 (38%) reported no stress.
The remainder (34, 49%) reported stress at varying levels.

Eat fried foods. Twenty-seven (39%) reported never
eating fried foods, and 14 (20%) reported they always eat
fried foods. An additional 29 (43%) reported they
occasionally eat fried foods.

Have high blood pressure. Thirty-two (47%) responded
they had never had high blood pressure, and 24 (35%)
stated they had high blood pressure. An additional 11
(16%) reported having occasional high blood pressure.

Results of the Data Analysis Related
to the Research Question

The following research question guided this study:
What risk factors associated with CAD do individuals have
following CABG surgery? Data analysis by frequency and
percentage revealed several risk factors in the post-CABG
surgical client.

A risk factor related to family history was
identified in the results of this research since 19 (27%)
of the subjects reported that their mother had heart
disease, 36 (52%) reported heart disease in their father,

10 (14%) reported that their sister had heart disease, and 30 (43%) reported that a brother had heart disease.

A second risk factor that was revealed by analysis of data was smoking. While 47 (68%) of subjects reported that they do not smoke, 7 (10%) of subjects reported that they always smoke and 13 (19%) reported that they occasionally smoke. These findings are in individuals who have had a CABG surgical procedure for heart disease and participated in a cardiac rehabilitation program.

A third risk factor that was revealed is related to a high fat diet. Eleven (16%) subjects continue to drink whole milk all the time, while 15 (23%) drink whole milk occasionally. Thirty-five (51%) reported some level of consumption of bacon, ham, sausage, and lunch meats; 32 (46%) eat regular cheese always, and 17 (19%) eat regular cheese occasionally instead of the low-fat versions of cheese. Twenty-nine (43%) of subjects reported they occasionally eat fried food, and 14 (20%) reported they always eat fried foods in their diet.

A fourth risk factor identified in this study was hypertension. Twenty-four (35%) of subjects reported that they have high blood pressure all the time, while 11 (16%) reported having high blood pressure occasionally. A

previous finding which contributes to hypertension is that 45 (61%) subjects reported using regular table salt when cooking or at the table at least sometimes.

Additional Findings

Eleven of the subjects reported more than one CABG surgery. A formula to develop a relative Likert score was developed to compare this subgroup of respondents. The formula consisted of the Likert value minus the minimum possible Likert value divided by the maximum possible Likert value minus the minimum possible Likert value multiplied by 100.

Lower scores for the individuals who had more than one CABG surgical procedure were noted in the area of smoking, drinking whole milk, eating fried foods, and stress. Higher scores for the greater than one CABG surgical procedure subgroup were identified in the area of using relaxation techniques indicating that this group used relaxation techniques more than the group who had only one CABG surgical procedure. Little or no difference was demonstrated between the two groups regarding eating regular cheese instead of low-fat, eating bacon, ham, lunch meat, and exercising regularly. These scores indicate that individuals who had more than one CABG

surgical procedure for coronary artery disease as compared to those having one CABG surgical procedure were less likely to smoke, drink whole milk, eat fried food, and experience stress but were more likely to use relaxation techniques. The seriousness of their condition and threat to their life may be more internalized after a second CABG surgical procedure is required to treat CAD. Table 2 indicates the distribution of scores.

Table 2

Likert Relative Score

	1 CABG	> 1 CABG
Smoke	40.0	17.1
Drink whole milk	40.9	24.6
Eat regular cheese	56.8	56.1
Eat bacon, sausage, ham, lunch meat	56.8	53.9
Add salt	38.6	31.6
Exercise regularly	29.5	31.6
Use relaxation techniques	65.0	81.0
Eat fried foods	45.5	35.8
Have stress	37.9	29.5
Have hypertension	41.4	52.3

Summary

The characteristics of the population sample and the research findings were presented in Chapter IV. Selected demographic data including perception of health status and length of time since CABG surgery were revealed. Analyses of demographic information and responses recorded on the King Cardiac Risk Analysis Survey have been described in this chapter. The sample was 69 post-CABG surgical individuals. Findings on the risk factors in these individuals were defined as well as a comparison to a subgroup that had more than one CABG surgery. Descriptive statistics included frequencies and percentages. Chapter V will include a discussion of the research findings along with implications for practice, conclusions, and recommendations for future research.

Chapter V

The Outcomes

In spite of advanced medical technology, death from
heart disease remains the leading cause of death in
Mississippi and the United States. Although educational
campaigns are widely used to teach Americans the risk
factors for heart disease, as well as how to avoid heart
disease, many individuals do not adhere to
these recommendations.

The purpose of this descriptive study was to explore
and identify the coronary artery disease (CAD) risk
factors found in individuals after coronary artery bypass
graft (CABG) surgery. Becker's (1974) Health Belief Model
served as the theoretical framework for the investigation.

In this chapter the findings of the study are
presented. Conclusions and implications for practice also
are included. Recommendations for future nursing research
and practice are made.

The convenience sample (N = 69) was obtained from a
cardiac rehabilitation program which included Phase II

and Phase III cardiac rehabilitation in rural Northeast
Mississippi. The participants completed the King Cardiac
Risk Analysis Survey and the King Demographic Survey,
which included a 10-cm health perception analogue.

Summary of Findings

The mean age of the participants was 64.11 years with
a range of 38 to 86 years. The ethnic distribution of the
sample was 87% Caucasian, 12% African American, and 1%
Oriental. Of the participants, 76.8% were male and 23.2%
were female.

Data analysis revealed that 53 (76.8%) of the study
participants were married. Eleven (15.9%) were widowed,
and 4 (5.8%) were divorced. One of the subjects was
single.

The largest number of respondents with regard to
income was in the < $10,000 income bracket with 22
(31.8%). Closely following was the $10,000-$20,000 bracket
with 17 (24.6%) and the $21,000-$30,000 with 15 (21.7%).
The remaining 21.9% was evenly distributed among the three
brackets over $31,000, resulting in a relatively low
income sample.

The educational level of the participants ranged from
6 to 20 years of formal education. The largest group of 26

(37.7%) had completed high school, followed closely by those who completed junior high school (n = 20, 29%), 6 (8.9%) completed elementary school, and 3 (4.3%) who had obtained a GED. Eight (11.6%) had completed 2 to 3 years of college and 5 (10.1%) had completed 4 or more years of college.

Sixty-five (94.2%) of the participants were Protestant. Four (5.8%) categorized themselves as Catholic.

Research Question

One research question guided this study: What risk factors associated with CAD can be identified in the individual after CABG?

Forty-three (62.3%) of respondents reported eating fried foods at least occasionally with 14 (20%) of those responding they always eat fried foods. Fifty-seven (82.6%) responded positively to eating bacon, ham, sausage, and lunch meats while only 12 (17.4%) reported they never ate those foods. Also, 44 (63.8%) reported eating regular cheese instead of low-fat varieties with 32 (46.4%) reporting they always eat regular cheese, and only 24 (34.8%) reporting they never eat regular cheese instead of low-fat varieties.

An interesting trend emerged relating to stress and the use of relaxation techniques such as mental imagery or meditation. Although 43 (62.3%) reported stress to some degree, only 9 (13%) reported always having stress with 26 (38.0%) reporting they never have stress. Only 10 (14%) reported always using relaxation techniques with 49 (71%) reporting they never use relaxation techniques.

When questioned regarding hypertension, 46 (53.6%) reported some degree of hypertension while 32 (46.5%) reported never having hypertension. Smoking did not appear as a significant risk factor in the group as 47 (63%) of subjects reported never smoking. Seven (10%) reported always smoking, while 13 (19%) scored smoking as occasionally.

It was notable that 53 (76.8%) of the respondents reported a family history of heart disease with the largest number (n = 36, 52.1%) reporting their father with heart disease. Mothers were second with 19 (27%). Ten (14%) reported a sister had heart disease, and 30 (43%) signified that a brother had heart disease.

Discussion

Despite copious amounts of information regarding risk factor changes, many individuals do not use preventive

health measures. This research study sought to identify the CAD risk factors that could be found in individuals after CABG surgery.

There is evidence in the current literature to support the effectiveness of a risk reduction program for those individuals with CAD. Haskell et al. (1994) and Ornish et al. (1990) demonstrated a reduction of CAD symptoms in individuals who modify their individual coronary risk factors. In this study, despite the subjects' participation in cardiac rehabilitation, over half of the participants admitted to eating fried foods, processed meats, and regular cheese. This finding indicates that in spite of interventions individuals do not understand or are not motivated to adhere to the dietary restrictions which are also recommended for post-CABG surgical patients. One possible explanation for the differences in the findings of this and previous studies could be geographic area in which the current study took place. In the rural South, most social interactions revolve around food. In addition, southern U.S. cooking is traditionally high-fat. Most of the participants in this study were in their seventh decade of life. While geographic origin was not addressed, interactions with the

participants led this researcher to assume that many of the sample had spent most of their years in Mississippi.

However, in the comparison of the study subgroup who had more than one CABG surgical procedure, smoking, high-fat diet, stress, and hypertension were identified as less prevalent risk factors. This supports the findings of the Cameron et al. (1995) study in the CASS Registry study who found that smoking and hypertension were among the predictors for angina after CABG surgery. It is evident that in spite of interventions and smoking cessation programs nicotine use continues to be one of the most difficult CAD risk factors to change.

The findings of this study suggest that family history of heart disease is probably associated with one's risk of developing CAD. The majority of participants (n = 53, 76.8%) had family history of heart disease, and over half (n = 36, 52.2%) having a father with CAD. Almost half (n = 30, 43%) had brothers with CAD. Female family members, including mothers (n = 19, 27%) and sisters (n = 10, 14%), also were positive for CAD, but a lower percentage than their male counterparts. While family history is not a modifiable risk factor, the prevalence of these findings among post-CABG surgical individuals serves

to underscore the importance of thorough history-taking among clients. Client education concerning the significance of family history may also be utilized as a cue to healthier actions, especially in clients who have already undergone the serious procedure of CABG.

Findings from this study revealed a number of significant risk factors identified in the post-CABG client. Nurse practitioners in the primary care setting could initiate health-promoting programs to address these risk factors. Individualization of treatment programs could enhance or improve compliance to the prescribed medical regimen.

Nurse practitioners need to improve health promotion while taking into consideration clients' unique demographic characteristics. Collaboration between the primary caregiver and the client is crucial. Any approach that improves compliance with prescribed treatment regimens will ultimately help clients move toward a higher level of wellness, which is the goal of the nurse practitioner.

Conclusions

Based on the findings from this study, the following conclusions were drawn.

1. Dietary intake of high-fat foods was a risk factor identified in the post-CABG surgical client.

2. Failure to use relaxation techniques, such as mental imagery or meditation, was a risk factor identified in the post-CABG surgical client.

3. Hypertension was a risk factor identified in the post-CABG surgical client.

4. Smoking was a risk factor identified in the post-CABG surgical client, especially in those who had more than on CABG surgery.

5. Positive family history was a risk factor identified in the post-CABG surgical client.

Limitations

The study was conducted in one cardiac rehabilitation program in rural Northeast Mississippi; therefore, the results may not be representative of the population at large. The King Cardiac Risk Analysis Survey was utilized for the first time in this study; therefore, the tool has no established validity and reliability.

Implications

Nursing practice. With the increasing rate of heart disease, it is important for nurse practitioners to

emphasize health promotion and help clients develop healthy plans for reducing risk factors. When assessing and planning programs for clients with heart disease, nurse practitioners cannot overlook individual characteristics that influence compliance. Treatment regimens must be individualized to meet each client's needs. More individualized treatment programs may lead to better compliance and subsequently decrease fatalities from heart disease. Findings from this study indicate that age, gender, family history of heart disease, high-fat diet, hypertension, and smoking deserve attention when assessing an individual's risk for heart disease.

Findings from this study indicate that an individual's perceived health status and demographic variables may influence compliance to recommended treatment plans; therefore, the nurse practitioner would do well to be thorough in this phase of the assessment. Nurse practitioners need to identify ways to improve compliance to treatment programs. Individualized education of clients, based on specifically identified demographic variable, enhance compliance. Because of the holistic nature of nurse practitioner practice, health promotion should be a major focus of health care interventions.

Nurse practitioners are presented with a multitude of opportunities to influence a client's health behaviors, including cardiac risk factors, through education and counseling. Also, nurse practitioners can provide interventions that may decrease a client's perceived barriers to promotion of health.

Theory. The utilization of the Health Belief Model contributed to enhancing the model as a theoretical framework. The concepts of the Health Belief Model were supported by this study in that cues to action, such as family history of heart disease, were associated with an increased risk for heart disease. Findings from the current study serve to promote continued utilization of the Health Belief Model for assessing cues to actions and barriers to compliance for those individuals with CAD.

Education. Findings from this study underscore the importance of comprehensive assessment, including compliance, familial, financial, and perceived health status data. The current study illustrates the importance of enhancing nursing curricula to include comprehensive demographic assessment as well as compliance issues. It is essential that future nurse practitioners be educated to provide the most recent and most effective strategies for

improving compliance to treatment regimens which involve health promotion activities.

    Research. This study provided empirical data for understanding the coronary artery risk factors that could be identified in the post-CABG surgical client. To date, literature on CAD risk factors identified in the post-CABG surgical client is fragmented. Most studies do not address all the identifiable risk factors. Findings from the current study helped to expand knowledge and data available to the health care professionals who serve primary care populations. Findings from this study also suggest that continued research is needed regarding risk factor reduction in the post-CABG surgical client. Overall, risk reduction of CAD clients must be researched further to develop nursing interventions which will lead to an increased compliance in all health-seeking populations.

Recommendations

    Based on the findings of this study, the following recommendations are made for future research and practice:

    1. Utilization of a larger and more randomized sample.

2. Utilization of a more diverse sample with regard to race, age, and gender.

3. Conduction of a longitudinal study to assess how compliance and health perceptions change over time.

4. Conduction of research utilizing the King Cardiac Risk Analysis Survey to establish reliability and validity of the tool.

5. Conduction of a comparison study to determine relationships between demographic factors and CAD risk factors.

6. Continued utilization of the Health Belief Model for assessing cues to action and barriers to compliance among cardiac clients.

7. Continued assessment of compliance issues among cardiac clients in a primary practice care setting.

8. Conduction of research to develop health improvement programs that are individualized with respect to specific demographic characteristics which affect compliance.

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APPENDIX A

KING DEMOGRAPHIC SURVEY

King Demographic Survey

1. Date of coronary artery bypass surgery:_____

2. Age (years):_____

3. Sex
   _____ Male
   _____ Female

4. Race
   _____ African American
   _____ Caucasian
   _____ Oriental
   _____ Other (please specify):_____

5. Marital status
   _____ Married
   _____ Single
   _____ Divorced
   _____ Widowed

6. Income
   _____ Less than $10,000
   _____ $10,000 - $20,000
   _____ $21,000 - $30,000
   _____ $31,000 - $40,000
   _____ $41,000 - $50,000
   _____ $51,000 and over

7. Education (last grade completed)
   _____ Elementary school
   _____ Junior high school
   _____ High school
   _____ GED
   _____ 2-3 years of college
   _____ 4 or more years of college
   _____ Other (please specify):_____

8. Religious affiliation
   _____ Protestant
   _____ Catholic
   _____ Jewish
   _____ Other (please specify):_____

9. Did any member of your immediate family have heart disease?
   _____ Yes
   _____ No

10. Please indicate which member:
    _____ Mother
    _____ Father
    _____ Sister
    _____ Brother
    _____ Other (please specify):_____

11. Do you have insurance which helps cover part of your medical expense?
    _____ Private insurance
    _____ Medicare
    _____ Medicaid
    _____ Other (please explain):_____

12. Please place a mark where you believe your health status falls on this scale, with 0 being the worst possible health and 10 being the best possible health.

_____

0   10
Unhealthy   Healthy

APPENDIX B

KING CARDIAC RISK ANALYSIS SURVEY

King Cardiac Risk Analysis Survey

Please read the following statements and then circle one of the numbers on each line to indicate how the statement applies to you.

	Never	Sometimes	Usually	Some of the time	Always
1. I smoke cigarettes, cigars, or pipe.	1	2	3	4	5
2. I use whole milk.	1	2	3	4	5
3. I use regular cheese.	1	2	3	4	5
4. I eat bacon, sausage, ham, lunch meat once a week.	1	2	3	4	5
5. I use regular table salt for cooking or at the table.	1	2	3	4	5
6. I exercise regularly every day.	1	2	3	4	5
7. I take my prescribed medications every day.	1	2	3	4	5
8. I use relaxation techniques.	1	2	3	4	5
9. I make and keep my regular appointments to see my doctor.	1	2	3	4	5
10. I sleep 8 hours each night.	1	2	3	4	5
11. I eat fried foods.	1	2	3	4	5

APPENDIX C

APPROVAL OF COMMITTEE ON USE OF HUMAN
SUBJECTS IN EXPERIMENTATION OF
MISSISSIPPI UNIVERSITY FOR WOMEN

MISSISSIPPI UNIVERSITY FOR WOMEN

Columbus, MS 39701

Office of the Vice President for Academic Affairs
Eudora Welty Hall
P.O. Box W-1603
(601) 329-7142

April 1, 1997

Ms. Deborah Benderman King
c/o Graduate Program in Nursing
Campus

Dear Ms. King:

I am pleased to inform you that the members of the Committee on Human Subjects in Experimentation have approved your proposed research upon the condition that you add the following statement to your consent form: "return of the survey indicates your agreement to participate and your agreement is entirely voluntary."

I wish you much success in your research.

Sincerely,

Susan Kupisch, Ph.D.
Vice President
 for Academic Affairs

SK:wr

cc: Mr. Jim Davidson
     Dr. Mary Pat Curtis

Where Excellence is a Tradition

APPENDIX D

PERMISSION TO CONDUCT STUDY

Agency Consent

Title of Study

　　　Risk Factor Changes in Individuals After Coronary
　　　Artery Bypass Graft Surgery

Name of Agency

　　　Magnolia Regional Health Center

Study discussed with and explained to:

　　　Tommy Bain, Cardiology Director
　　　Lee McDuffy, RN, Cardiac Rehabilitation

The nature and purpose of this study have been

defined. I understand that all information will be kept

confidential and that this institution may withdraw at any

time during data collection.

　　　　　　　　　　　　　MAGNOLIA REGIONAL HEALTH CENTER

　　　　　　　　　　　　　By_____
　　　　　　　　　　　　　　　Director, Cardiology

_____
Date

　　　　　　　　　　　　　_____
　　　　　　　　　　　　　Signature of Researcher

_____
Date

APPENDIX E

INFORMED CONSENT

Route 2, Box 399-A
Corinth, MS   38834

Dear Former Cardiac Rehab Client:

I am currently a graduate nursing student at Mississippi
University for Women, and I need your help for a research
study. The study is a requirement for a Master of Science
in Nursing degree. I have chosen to study which risk
factors individuals change after they have bypass surgery,
since I have worked with cardiac rehab patients for many
years.

In order to complete this study, I need you to complete
two short questionnaires. You can change your mind about
participating up to the point of turning the
questionnaires in to the researcher (me), because when the
questionnaires are received by me, they will be placed in
a box. Once the forms are in the box, the researcher will
have no way of identifying them. All information obtained
will be held confidential. The researcher will not even
know the identity of the respondents. Only group data will
be reported, and your participation will not affect your
care in our program at all. Return of the survey indicates
your agreement to participate and your agreement is
entirely voluntary.

Thank you for your cooperation in this study. If you have
any questions, please contact me at (601) 293-1086.

Thank you,

Debbi King, Registered Nurse
Director, Cardiac Rehabilitation

Consent Form

I willingly agree to participate in the research study being conducted by a graduate nursing student at Mississippi University for Women. I have been informed and understand the requirements and purpose of the study. I understand that confidentiality will be maintained. I understand that I will be in no physical or psychological danger by participating in this study. The researcher has answered my questions satisfactorily.

_____
Signature of Participant

_____
Date