LEVEL OF KNOWLEDGE FOLLOWING A MYOCARDIAL INFARCTION

by

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This thesis is lovingly dedicated to my mother and father who have encouraged and supported me through all these years... and especially to my son, Eric, that he may someday understand.
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ABSTRACT

The principles of the teaching-learning process served as the basis for the conceptual framework of this study. Specific application of the teaching-learning principles to the health-care setting have been instrumental in making clients more capable of dealing adequately their environment. This study was designed to determine the level of knowledge subjects have about their disease and its management following hospitalization for a myocardial infarction.

Fifteen subjects participated in this study by completing a questionnaire which focused on seven component areas related to cardiac disease and its rehabilitative process: the nature of cardiac disease, emergency treatment of an acute myocardial infarction, resumption of physical activity, diet and smoking, psychological factors important in coronary disease, and problems encountered when returning to home and to work.

The findings revealed that the subjects were most knowledgeable with regards to emergency treatment and least knowledgeable with regards to psychological factors important to CHD and the return to home and to work situations. The variable of years of education was negatively correlated with the knowledge score at the .001 level of significance.
CHAPTER 1

INTRODUCTION

The past decade of technological advances has revolutionized the care of the patient with cardiovascular disease. The use of advanced monitoring equipment, correction of life-threatening arrhythmias, and prevention of complications have decreased the mortality rate of the patient with a myocardial infarction. Surgical revascularization, and even transplantation, have given many individuals 'a new lease on life.'

Despite these advances, coronary atherosclerotic heart disease (CAHD) is the major cause of death and disability in our society today. An aspect of this illness which is sometimes overwhelming to the patient and his family is learning to live with the disease and to cope with the necessary changes in his lifestyle. With the possible exception of cancer, coronary disease has more implications for teaching and support of the patient than any other disease (Kos 1969).

In general, health education is concerned with learning to live life in the healthiest way possible. It is possible to prevent, promote, maintain or to modify a number of health-related behaviors by means of teaching (Redman 1976). Naughton (1973) has defined cardiac rehabilitation as "that process by which a patient is restored to and maintained at optimal physiological, social and vocational status" (p. 337).
The number of persons who are candidates for active rehabilitative programs is immense. According to Nicolli and Brammel (1976), "if the average CCU mortality for acute myocardial infarction (MI) is 20 percent, then up to 80 percent of employable patients with MI are candidates for post-MI rehabilitation" (p. 237).

That rehabilitation is inseparable from both the philosophy and the programming of comprehensive continuing health care has been well supported (Hurst 1978, Winslow 1976, Nicolli and Brammel 1976). In order to accomplish this goal, various rehabilitation programs have been established across the country to meet the needs of the post-myocardial infarction patient. However, it has become increasingly apparent to this investigator that despite such program development, implementation, and even publication, patients still display a marked degree of ignorance about their prescribed plan of care and their disease process. This situation became evident to this investigator when, as a CCU nurse in several different hospitals, it was observed that a large number of post-MI patients were being readmitted to the hospital for re-infarction, congestive heart failure, and unstable angina. Initial admission evaluations revealed a large number of these patients were unfamiliar with their past medical history, their current medical regimens, diet alterations, and for what symptoms they should seek additional medical attentions. Upon questioning these patients it was evident that they were lacking in even the most basic knowledge regarding their heart disease.
This situation was brought more acutely to the attention of this investigator when working with three different cardiologists as part of her master's program. Two of the patient populations were from a clinic setting in a University teaching hospital and the other patient sample was seen with a private cardiologist. During the course of multiple follow-up visits it again became apparent that a significant number of patients were lacking important information regarding their disease management. Patients, as well as spouses, displayed evidence of emotional stress and anxiety. Some had not been informed of the prescription for physical activity at home, how to take their pulse daily, or even when to resume sexual intercourse with their spouse.

Because of this imbalance of patient management, this study was developed to determine what post-myocardial infarction patients do know following hospitalization. Basic to this endeavor is the assumption of the patient's right to knowledge.

Statement of the Problem

What level of knowledge do post-myocardial infarction patients have about their disease following hospitalization?

Statement of the Purpose

The purpose of this study is to determine the level of knowledge post-myocardial infarction patients have regarding their disease following hospitalization.
Significance of the Problem

Coronary atherosclerotic heart disease (CAHD) is the major health problem in the United States today. Manifestations of CAHD occur at a rate of approximately two million per year and deaths approach 700,000 per year from myocardial infarction (American Health Association 1978). To this information add the following facts:

1. Of these deaths, 170,000 occur in people less than 65 years of age.
2. Twenty percent of the deaths occur outside the hospital.
3. For survivors, the likelihood of dying in the subsequent five years is increased five-fold.
4. Half of the subsequent deaths will be sudden.
5. Ninety percent of the subsequent deaths will result from recurrent cardiovascular catastrophies (Stamler 1978).

The economic stakes are also high. CAHD accounts for the majority of the 20 billion dollars annual cost of diseases of the heart and blood vessels. If it were possible to delay or prevent acute events, great gains could be made in national productivity and the dollar savings would be substantial (Nicolli and Brammel 1976).

As a result of advances in the management of CAHD, almost four million people are living today with a history of heart attack and/or angina pectoris (American Heart Association 1978). Although a greater number of persons are surviving heart attack and living with symptomatic CAHD, there is ample evidence that patients are inadequately prepared
to meet the realities of daily living after discharge (Winslow 1976). Crawshaw (1974) found that patients' lack of knowledge about myocardial infarction led to unnecessary invalidism. She attributed the basic problem to fear, which was aggravated by the lack of a definite program for activity and return to work.

Cardiac rehabilitation is nothing more than an organized approach to comprehensive care. Basically, the patient should be taught all the pertinent aspects of his disease: the nature of CAHD, the facts of the acute clinical event, related anatomy and physiology, hospital care, risk factor modification, medications, warning signals, and long-range health plans and goals (Nicolli and Brammel 1976). The rationale for such a comprehensive program according to Winslow (1976) is that "patients and their families who understand their illness and its treatment can more ably maintain health, prevent illness, and cope with disability. As a result, they can live fuller, happier, more active lives" (p. 211). According to Goldberg (1973) the objectives of rehabilitating the coronary patient are two-fold: (1) to restore optimal function (physical, mental, and social) to the patient so that he may live a useful life, and (2) to prevent further occurrence of ischemic heart disease. In order to accomplish this dual purpose, Wenger (1973) recommended a cardiac rehabilitation program that included progressive physical activity and patient education. The results of most studies support the conclusion that the training effect for patients with coronary artery disease who participate in an exercise program includes the ability to do more work with fewer heart beats and a lower blood
pressure. The lowered heart rate and blood pressure reduce the oxygen consumption demands on the heart (Bjernulf 1973). Naughton (1973) concluded that a lower heart rate at comparable oxygen demands indicates an improved oxygen uptake which reflects an increased cardiovascular efficiency. In addition, patients have reported that exercise promoted relief of tension and greater self-confidence in the ability to perform activities of daily living (Johnston, Cantwell and Fletcher 1976).

The second area of cardiac rehabilitation focuses on patient education about the underlying disease process and prevention of further ischemic trauma to the myocardium. Wenger and Gilbert (1978) outlined an educational program for the coronary patient. "The patient's understanding and acceptance of his or her illness helps in the understanding of the plan of therapy and in the acceptance of the prescribed changes in behavior" (Hurst 1978, p. 1307). Although primary prevention of coronary disease is the ultimate goal, it is felt that secondary prevention can retard the development of CAHD (Hurst 1978). The term 'secondary' prevention implies that preventative measures are used after clinical evidence of CAHD has appeared so that subsequent extension of the lesions may be postponed, minimized, or prevented. "Significant regression of advanced lesions is theoretically possible, but difficult to achieve in human beings" (Hurst, p. 1313).

The patient education curriculum should include, at a minimum, the following items: (1) nutrition—dietary modification; (2) physical activity; (3) prescription for cessation of smoking; (4) immediate and long-term plans for management; (5) control of associated diseases,
particularly hypertension and diabetes mellitus; (6) prescription for
the patient's response to new or recurrent symptoms; (7) information
about prescribed medications; (8) counselling regarding possible psy­
chosocial problems (Hurst 1978).

Although patients need education in these areas, there are many
factors which interfere and/or disrupt their learning ability. In her
discussion of the stages of adaptation to illness, Redman (1976) sum­
marized the general characteristics of several other authors. Denial,
developing awareness, acceptance and change are concepts basic to these
models. In reference to the first stage—denial or disbelief—Redman
stated that "teaching that is properly timed, is a nursing skill that
can facilitate adaptation" (p. 44).

Cassem and Hacket (1975) investigated the emotional responses
following a myocardial infarction which were common in stages one and
two. They found that there was a typical pattern of emotional reac­
tions which included anxiety and denial. It has been well documented
that moderate anxiety is beneficial to learning, whereas high levels
of anxiety may be incapacitating. Guzzeta's study (1979) points out
the importance of the nurse's ability to identify the level of anxiety
and realize its effect on patient readiness to learn. "Perhaps just
as importantly, a knowledge of health and illness allows patients to
participate actively in their own care, including the prevention of and
recovery from illness" (p. 35).

A great deal of literature has been devoted to the teaching-
learning process and its effectiveness. Throughout human history people
have learned, usually without consideration of the nature of the process. "Man's power to change himself, that is to learn, is perhaps the most impressive thing about him" (Kos, p. 609).

Specific application of the teaching-learning principles to the health-care setting has been well studied by Redman, Pohl, Streeter, and Winslow. Powell and Winslow (1973) defined learning as a "change in the individual that fills a need and makes him more capable of dealing adequately with his environment" (p. 723).

Redman (1976) proposed that "teaching in health-care situations is a form of interpersonal influence used to change client behavior" (p. 9). She wrote that evidence of change in behavior, which will appear if true learning has occurred, may not be obtained immediately after teaching. She defined teaching as "communication especially structured and sequenced to produce learning" (Redman, p. 9).

Assessment of the patient and his learning needs is vital. Bigge (1976) wrote:

Action, whether participating in teaching or other activities in life, either is linked with theory, or it is blind and purposeless. . . . any purposeful action is governed by theory . . . . Teachers who are well-grounded in scientific psychology . . . have a basis for making decisions which are more likely to lead to effective results . . . (p. 5).

Various methods can be used in teaching, including lecture, discussion, demonstration, and role playing. A variety of teaching aids are available to the nurse and include programmed instruction, video tapes, film-strips, slide-tapes, and closed-circuit television (Schlesinger 1973).
Evaluation is a frequent 'distant cousin,' but an essential part of the teaching process. Evaluation provides an opportunity to determine to what degree the educational objectives have been met, to reinforce the behavior changes of the learner, and to enable the teacher to analyze the adequacy of teaching (Redman 1976).

**Conceptual Framework**

The value of patient education has been substantiated by several authors (Meyers 1964, Lindeman 1972, Rosenberg 1971, and Winslow 1976). It is imperative to understand the principles of the teaching-learning process as a basis for establishing comprehensive rehabilitation programs for the coronary patient. Bigge (1976) outlines 10 different theories in regard to the basic nature of the learning process. The following are the general categories of these theories:

1. Mental discipline theories of the mind substance family
   (including unfoldment and apperception)
2. Stimulus-response (S-R) conditioning theories of the behavioralistic family
3. Cognitive theories of the Gestalt-field family

Twentieth century learning theories fall into the two broad families of S-R conditioning theories and cognitive theories of the Gestalt-field family. Watson and Gutherie are classic supporters of the former theories, whereas, Lewin, Devin, Bigge, and Bruner are proponents of the latter theory (Bigge 1976).
S-R conditioning theories grew out of an increased emphasis on physiologic aspects of psychology. These psychologists were looking for studies that could be measured, described, and reported statistically. Hilgard and Bower (1966) stated that there are certain principles which should be applied when using the S-R theory: (1) the learner should be active; (2) frequency of repetition; (3) reinforcement; (4) provision for practice in a variety of contexts; (5) imitation of models; (6) recognition of importance of drive conditions; and (7) provision for resolution of conflicts and frustrations.

In the eyes of S-R conditioning theorists, or neobehaviorists, "learning is primarily a process within which both verbal and nonverbal behaviors are change . . . learning is more or less a permanent change of behavior that occurs as a result of practice" (Bigge, p. 86). The nature of the learning process for neobehaviorists is central in a study of the relationships of stimuli and responses and what happens between them.

According to the followers of the Gestalt-field theory, learning phenomena are closely related to perception. They define learning in terms of reorganization of the learner's perceptual or psychological world—his field. The word "Gestalt" means an organized pattern. The key word of the Gestalt-field theorists in discussing learning is "insight" (Bigge 1976). They regard learning as a process of developing new insights or modifying old ones. Bigge (1976) summarized May's discussion of the differences of the two theories: "... the trouble with behaviorism is that it leaves out so much behavior" (p. 95).
The cognitive theory of learning developed from the Gestalt-field. Cognitive means knowing. Cognitive theory deals with the problem of how people gain an understanding of themselves and their environment. According to cognitive-field theory, developed by Lewin, learning is a process whereby a person develops new insights or changes old ones. This theory involves reflective learning—learning in which knowledge is applied to the environment of the patient or student (Bigge 1976).

Hilgard and Bower (1966) also described principles which are emphasized in cognitive theory: (1) the problem should be so structured and presented to the learner so that the essential features are open to his inspection; (2) organization of knowledge should proceed from simplified wholes to more complete wholes; (3) learning with understanding is more permanent and more transferrable than rote learning; (4) cognitive feedback confirms correct knowledge and corrects faulty learning; (5) goal setting by the learner is important as motivation for learning; (6) divergent thinking, as well as convergent thinking, is to be encouraged.

Bigge (1976) summarized the difference between the two families very briefly; "S-R conditioning theories interpret learning in terms of changes in strength of hypothetical variables called S-R connections, associations, habit strengths, or behavioral tendencies; Gestalt-field theorists define learning in terms of reorganization of perceptual or cognitive fields or systems" (p. 11).
Numerous sources support the contention that teaching is an integral part of nursing practice. If the basic purpose of nursing is to promote health, then teaching by the nurse is one way to achieve that goal (Pohl 1973). It is supported by others that the nurse, because of her multi-discipline background, is the best person to teach the patient (Winslow 1976, Fralic 1976).

Kos (1969) wrote: "throughout a period of research into the literature related to CHD, the role of the nurse in the long-term care of, and planning with, the cardiac patient loomed larger and larger" (p. 603). Powell and Winslow (1973) emphasized that the learner's needs and interests are the only logical starting point for teaching. In order to be effective, the teacher must have a good understanding of the content, be able to establish a relationship with the learner, and be able to assess learning progress and correct deficiencies (Redman 1971).

Aiken (1970) recommended that the nurse first determine the patient's readiness and motivation to learn as well as his prior knowledge and experience before setting goals for him. Teaching can only be effective if the patient needs and wants information; according to Billie (1977), the individual who denies that he is ill will not admit to a need for knowledge. Storlie (1975) cited other factors such as age, educational level, life-style, state of health, and stress which may influence the patient's ability to learn. Once the individual's learning needs are determined, the nurse can formulate educational objectives for the patient.

The objectives, or goals, of health teaching are the behaviors desired as a result of the learning process. They are
determined by the health team and are based on what the individual's state of health and social situation require and what he is capable of learning (Redman 1976, p. 58).

Use of behavioral objectives promotes effective communication and serves as the basis for planning and evaluating the learning process (Pohl 1973).

Preparation of the content to be taught and teaching materials to be used is the next step. Many authors advocated the use of a planned teaching program (Wenger and Mount 1974, Winslow 1976, Billie 1977). "A structured, carefully developed program assures uniformity of information, variety of teaching methods, and high quality of content" (Ulrich and Kelley 1972, p. 63).

The method of implementing the teaching plan will vary depending on the patient, the content to be taught, and the nurse (Redman 1976). Some content can best be taught on an individual basis. Because significant learning can only take place if instruction is tailored to each learner, it is up to the nurse to individualize teaching and enlist the patient's participation in his recovery (Wolff 1975). Group teaching may be beneficial in some cases to provide an economical use of teaching time, as well as to enhance learning through the participants' sharing of similar problems (Redman 1976). According to Wenger (1975), coronary-prone patients should be taught in a group setting because it enhances learning through reinforcement, decreases anxiety, and supports the individual's self-esteem. Several studies have shown that group teaching facilitates learning (Lindeman 1972, Rosenberg 1971).
Regardless of the method used, there is still a need to follow the steps of the teaching-learning process and use principles of learning in either situation (Zentner and Murray 1975). The nurse must determine which method is best suited for the individual.

Evaluation is the final step of the teaching-learning process. This involves a dual process-evaluation of the learner as well as the teacher. Redman (1976) stipulated that the patient should demonstrate the behavior specified by the objectives. Pohl (1973) made reference to the importance of evaluation of the nurse's teaching. This is important if the teacher is to grow and learn through this process also.

Many health professionals recognize the teaching function of the nurse and view this role as a major nursing responsibility in the care of the coronary patient (Zohman and Tobis 1970, Redman 1971, Secor 1971). Nurses have demonstrated their ability to meet the patient's learning needs in a variety of cardiac rehabilitation programs. Naughton (1973) defined cardiac rehabilitation as the process of restoring and maintaining a patient "at his optimal physiological, psychological, vocational, and social status" (p. 337).

The in-hospital teaching program at Grady Memorial Hospital follows the core curriculum recommended by Wenger (1973). Group classes are taught by a variety of health-care personnel including nurses and stress the importance of coronary risk factor modification to prevent further episodes of ischemic heart disease.

The cardiac rehabilitation program at the University of Colorado Medical Center is designed to meet the standards established by
Naughton's definition (Nicolli and Brammel 1976). Basically, the patient is taught all the pertinent aspects of his disease: the nature of CAHD, the facts of the acute clinical event, related anatomy and physiology, hospital care, risk factor modification, medications, warning signals, and long-range health plans and goals.

An evaluation of the cardiac patient education program at UCLA Medical Center revealed that the original 24 patients in the program demonstrated an increase in knowledge about problems surrounding their return to home and work. The failure of these patients to demonstrate a learning effect in the other content areas such as the nature of heart disease, or diet and smoking, led to changes in the teaching program (Rahe and Scalzi 1975).

A follow-up study of 89 patients approximately one year after discharge demonstrated that the Inpatient Cardiac Rehabilitation Program at Georgia Baptist Medical Center in Atlanta was effective in long-term risk factor modification (Johnston, Cantwell, and Fletcher 1976). Rehabilitation programs of this nature have helped patients understand activity progression and life-style adaptation; in addition, nurses have internalized the concept that patient education is an integral part of nursing practice (Fralic 1976).

**Definition of Terms**

The following definitions are used in this study:

Post-myocardial infarction patients - persons who have experienced a myocardial infarction and are currently being evaluated in cardiology clinic 17-35 days post event.
Level of Knowledge - specific information which patients convey about their cardiac disease following testing with the Rahe-Scalzi Questionnaire.
The purpose of this chapter is to provide a literature review of the factors that are considered contributory to the development of coronary atherosclerotic heart disease (CAHD).

Atherosclerosis and CAHD

Atherosclerosis is the major specific type of arteriosclerosis afflicting mankind. Its hallmark is "an accumulation of fatty materials (lipids), cholesterol most prominently, in the walls of medium and large arteries" (Report of Inter-Society Commission 1972).

Atherosclerosis (from the Greek athērē, mash or gruel, and skēlros, hardening) has been known for centuries, and until recently the disease was considered a necessary component of the aging process. Epidemiological studies of the last 40 years however, have revealed wide regional differences in the incidence and prevalence rates of atherosclerosis. The recognition of genetic, environmental, and other factors that can accelerate the atherosclerotic process has made aging an important, but not the only determinant of the pathologic changes (Hurst 1978). All the present evidence indicates that coronary atherosclerosis is a multifactorial disease.

According to Hurst (1978) there are four stages in the progression of atherosclerosis. The atherosclerotic process begins with the
fatty streak, an intimal lesion which can be better visualized with staining. This intimal thickening is composed of increased amounts of cellular and intracellular materials and increased intracellular lipid. Between the second and third decades the fatty streak may become a fibrous plaque, described as a "circumscribed, elevated intimal thickening" (Hurst, p. 1104). From this point, the lesion progresses to an atherosclerotic plaque containing lipid, collagen and mucopolysaccharides. As the lesion progresses, thrombosis, hemorrhage, ulceration and calcification may become evident. This complex atherosclerotic lesion may significantly compromise or totally occlude the lumen of the affected artery. The details concerning which fatty streaks evolve, the time, course, and the mechanism involved remain obscure, although blood lipid infiltration, recurrent surface thrombosis, and intrallesional hemorrhage are all possible candidates (Wenger and Hellerstein 1978).

Hurst (1978) defined coronary atherosclerosis as:

a pathologic condition of the coronary arteries characterized by abnormal lipid and fibrous tissue accumulation in the vessel wall with resulting disruption of the vessel architecture and function and variable reduction of blood flow to the myocardium (p. 1103).

Coronary atherosclerotic heart disease (CAHD) is the leading cause of death in the United States. Almost 700,000 deaths were attributed to myocardial infarction alone. Over four million people living today have a history of heart attack and/or angina pectoris. It is estimated that the cost of cardiovascular disease and disability will surpass 30 billion dollars in the next year (Nicolli and Brammel 1976).
The most important and least well understood processes involved in the genesis of atherosclerotic lesions are operative after the development of fatty streaks in the first decade of life, and before the onset of clinical ischemic symptoms in the third and fourth decades. The presence of symptoms, regardless of the organ system involved, signals far-advanced arterial disease (Wenger and Hellerstein 1978).

Complex atherosclerotic lesions probably arise as a result of multiple causes acting and interacting over long periods of time.

Wenger and Hellerstein (1978) summarize:

It may well be that man, in his adjustment to modern life, has developed a number of bad habits, including smoking cigarettes, eating foods that contain excessive amounts of calories and saturated fats, neglecting physical activity, and participating in a highly stressful emotional environment (p. 15).

Many studies conducted over the past years have demonstrated associations between certain biochemical, physiological, and environmental factors and the development of CAHD. Numerous risk factors have been identified. The following section will explore these findings.

Coronary Risk Factors

Stamler (1966) defined coronary risk factors as "those abnormalities demonstrable in persons free of clinical CAHD and known to be associated with significant increased risk of developing the disease in subsequent years" (p. 230). While information on coronary risk factors has practical implications first and foremost for the primary prevention of clinical CAHD, it is also relevant as well for secondary prevention—that is, in the case of those persons with established clinical CAHD,
in whom the purpose is to prevent recurrent episodes and progression of the disease (Stamler 1966).

Hurst (1978) listed the risk factors for CAHD as follows:

1. Nonmodifiable risk factors
   a. Age
   b. Sex
   c. Familial history of premature CAHD

2. Modifiable risk factors
   a. Major
      (1) Elevated serum lipid levels
      (2) Habitual diet high in total calories, total fats, saturated fats, cholesterol, refined carbohydrates, and salt
      (3) Hypertension
      (4) Cigarette smoking
      (5) Carbohydrate intolerance
      (6) Obesity
   b. Minor
      (1) Oral contraceptives
      (2) Sedentary living
      (3) Personality type
      (4) Psychological tensions
      (5) Others
      (Hurst 1978, p. 1105)

Each of these will be discussed in detail in the following sections.

Age Factor

The development of atherosclerosis and the emergence of detectable coronary lesions are dependent upon time. It has been confirmed that age has a strong and consistent association with atherosclerotic lesions (Hurst 1978). The Framingham study investigated the incidence of CAHD and associated risk factors of 5,109 subjects aged 30-62 years initially free of coronary disease. The findings revealed that men in the 50-59 age range had four times the risk of heart attack as a man
in his thirties (Dawber, Kagan and Kannel 1964). Analysis of the 20 year incidence rate at Framingham revealed that a man 32 years old has a 13 percent chance of developing cardiovascular disease in the next 20 years, and a 52 year old man has a 46 percent chance (Kannel and Gordon 1977).

Sex Factor

Epidemiological studies have revealed a greater incidence of CAHD in men. However, after menopause, in women, there is a rapid narrowing of sex difference. The sex difference appears to be more marked for the white than the black population (Kannel 1976, Cassel 1971).

Though no conclusive evidence is available, many reasons have been presented for a sex difference in the risk for the development of CAHD; a possible protective effect of estrogen, differences in blood lipids and hematocrits, the decreased incidence of cigarette smoking, and a more sheltered mode of life have been proposed (Hurst 1978). With the current trends of increased female employment, increased stress and smoking, these explanations are certain to change and may even supply evidence to support these purported factors.

Familial History of Premature CAHD

CAHD has long been thought to be related to family history. Evidence exists indicating an increased risk of CAHD in close relatives of persons who experience a heart attack early in life, e.g., prior to age 50 (Rosenman 1975, Kannel, Gordon and Castelli 1979).
According to the Report of Inter-Society Commission for Heart Disease (1972) "it is likely that some of this predisposition is mediated by familial resemblances in risk factors, e.g., hypercholesterolemia, hypertension, and diabetes mellitus. Most of the predisposing influences are under both genetic and environmental control; families share not only genes but also living habits such as eating patterns and smoking" (p. 18).

The risk factors of age, sex and family history cannot be modified. However, recently acquired evidence that many factors are amendable to correction should lead to a comprehensive approach in these patients to detect elements that may mediate the genetic expression and to enforce early modifying measures when indicated (Hurst 1978).

Elevated Serum Lipids

The plasma lipids, composed mainly of cholesterol, triglycerides, phospholipid, and free fatty acids, are substances that are insoluble in water, and therefore, are dependent for dispersion and mobility of combination with a carrier protein. These carriers are the lipoproteins. There are four major classes of lipoprotein based on differences in particle density (ultracentrifugation): chylomicra, very low density lipoproteins (VLDL), low density lipoproteins (LDL), and high density lipoproteins (HDL). Each of these four classes contains varying proportions of cholesterol, triglyceride, phospholipid, and protein. The advantages of applying separation techniques to translate the elevation of blood lipids—hyperlipidemia—to a specific hyperlipoproteinemia may
provide useful clues in understanding the underlying metabolic disorder (Hurst 1978).

The classification of disorders of lipid metabolism proposed by Fredrickson and Lees based on the lipoprotein electrophoretic pattern has been widely accepted (Hurst 1978). Type I results from an inability to clear exogenous triglyceride from the plasma, which makes for a tremendous increase in the fasting concentration of chylomicrons. Type I is nearly always a familial disorder thought to be secondary to a genetic deficiency in lipoprotein lipase, which is needed to clear chylomicrons from plasma. Type II is commonly found all over the world at any age. However, it has been subdivided into Type IIa, defined by increased LDL with normal VLDL and Type IIb, defined by increased LDL and increased VLDL. In these types, cholesterol levels are usually high; triglyceride levels are normal.

Type III is relatively uncommon and shows an accumulation of lipoprotein intermediates in the plasma. Both triglyceride and cholesterol levels are very high (350-1000 mg/100 ml). Type IV seems to be a common form of hyperlipoproteinemia. It may be familial or just part of the "American way of life" diet. Type V is a mixed hyperlipidemia where both exogenous chylomicrons and VLDL accumulate in fasting plasma. It is often seen secondary to severe metabolic conditioning such as diabetic acidosis, nephrosis, and alcoholism (Atherosclerosis 1974).

The association of elevated levels of total serum cholesterol and clinical manifestations of CAHD was first recognized by David, Stern and Lesnick (1937) over 40 years ago. In his international study of coronary
heart disease in seven countries, Keys (1970) found the incidence of CAHD was directly related to serum cholesterol levels between cohorts of men from the various countries.

According to Stamler (1966), persons with hypercholesterolemia experience three to four times as many heart attacks as those with low normal serum cholesterol levels. In his initial study in 1958 of male employees of the Peoples Gas Company in Chicago, aged 40-59 years, without definite or suspect CAHD, Stamler discovered the prevalence rate of frank hypercholesterolemia (250 mg/100 ml) was 370 per 1000 men.

The results of the Framingham study questioned the concept of a normal range for laboratory measurement of total cholesterol (Kannel et al. 1979). Relative risk for symptomatic coronary disease was found to correlate to the serum cholesterol value at any level within the range of means. According to Temkin's (1979) interpretation of these data: "The majority of coronary events occurred in individuals with only mild to moderate elevations of serum cholesterol level, thus limiting the value of the measurement as an independent predictor for the individual patient" (p. 615).

However, according to Stamler (1978), "the body of evidence relating serum cholesterol levels to CAHD is as substantial as that relating hypertension and cigarette smoking to atherosclerosis" (p. 128). According to his findings in the Chicago Gas Company and the Framingham study (7,545 men ages 30-59 years who were free of clinically apparent CAHD), there was an exponential relationship between cholesterol level and CAHD, beginning at a serum level of 220 mg/100 ml. Further
supportive evidence was given by the British Civil Servant Study, the Paris Policemen's Study, the Israeli Study, and the Japanese and Hawaiian Studies (Stamler 1978).

The Western Collaborative Group study investigated incidence of CAHD and related coronary risk factors in 3,524 men aged 39-59 years. It was found that subjects who later developed CAHD had significantly higher levels of cholesterol, triglyceride, and beta/alpha lipoprotein, than did the control group without CAHD (Rosenman 1975).

The ability to separate distinct lipoproteins has allowed for additional insight into the risks implied by the total cholesterol measurement. Elevated LDL cholesterol levels strongly correlate to increased cardiac risk at all ages. Levels of VLDL, predominantly triglyceride, have not proven sufficient predictive risk. According to Kannel's latest findings from the Framingham study, triglycerides are not considered to be atherogenic (Kannel et al. 1979).

The role of HDL in the cholesterol-atherogenesis relationship was first documented in 1951 by Barr with the recognition of low alpha lipoprotein (HDL) levels in patients with symptomatic atherosclerosis (Kannel et al. 1979). Prospective population analysis in the Framingham group indicated that HDL cholesterol level at the time of entrance into the study was the single most sensitive individual predictor for the development of coronary disease in patients 49-82 years of age. The lower the level of HDL, the greater the risk (Gordon 1977).
Dietary Factors

Dietary saturated fat and cholesterol are key causative factors of hyperlipidemia. These two components of the diet habitually eaten by a population markedly influence the level of the serum lipids—lipoproteins, and particularly the serum cholesterol. According to Stamler (1978), "the data on this are incontrovertible" (p. 127). Keys' (1970) international study of CAHD revealed that serum cholesterol levels were directly related to the amount of cholesterol and saturated fats in the diet.

Dietary factors are responsible not only for elevated blood lipids but are also related to the risk factors of obesity, diabetes, and hypertension. Stamler (1966) summarized his position:

The contemporary eating habits of the vast majority of adult Americans add up to patterns of nutrient intake excessive in total calories, total fats, saturated fats, cholesterol, sugars, and salt. These ... contribute significantly to the development of ... hypercholesteremia, hypertension, diabetes, and obesity. The practical implications of these findings are obvious (p. 239).

Hypertension

Elevated blood pressure, like an elevated temperature, may be due to a variety of underlying causes. If the elevation is sustained, hypertension due to any cause will shorten life expectancy.

Numerous studies have implicated hypertension (systolic as well as diastolic) as a key coronary risk factor. That hypertension aggravates the atherosclerotic process, particularly in the presence of hyperlipidemia, is supported by impressive clinical and experimental data
(Stamler 1966; Doyle 1963; Keys and Taylor 1963; Dawber et al. 1964; Doyle and Kinch. 1969). The relationship between blood pressure and CAHD is continuous. At each higher step of the blood pressure scale, risk is increased.

During the 1950's and 1960's, a series of longitudinal studies conducted at Framingham, Tecumseh, Albany, Chicago, Los Angeles, and other locations were completed. These studies clearly indicated the association of premature mortality and morbidity from heart disease, cardiovascular disease, and other diseases with increasing systolic and diastolic blood pressure (Remington 1977). The studies by Freis and associates in the Veterans Administration Hospital Study (1967, 1970, 1972) were very important in that they established that combination therapy in selected hypertensive patients produces a reduction in mortality and morbidity. While the observed results were not statistically significant, there was an observed reduction in morbidity and mortality associated with CAHD (17 in the treatment group versus 24 in the control group).

There is a difference in the incidence of hypertension in the white and black populations. The incidence of hypertension is twice as common in black people, and more important, seems to be twice as severe in this population. Hypertension is related to age. In individuals from 10-20 years of age, the incidence is 1.25 percent, at 75-79 years of age the incidence is 42.5 percent, demonstrating that it is a disease that increases as age advances (Eknoyan and McIntosh 1978).
Cardiovascular risk for the hypertensive is often further increased by other characteristics. Among the 7,600 men in the Pooling Project (Veterans Admin. Coop Study 1967, 1970, 1972) only 1216 (16 percent) of the men were without any of the three major risk factors—hypertension, hyperlipidemia, and cigarette smoking at entry into the study. The 10-year mortality rate in these 1216 men was 30 per 1000. When hypertension was present as a sole risk factor, the mortality rate nearly doubled (53 per 1000). When one additional factor—either hyperlipidemia or cigarette smoking—was also present, the death rate tripled (93 per 1000). The proportion dying within 10 years increased to 136 per 1000 for those men who had all three of these major risk factors (Remington 1977).

Cigarette Smoking

The 1964 Surgeon General's report on cigarette smoking established that on the average, cigarette smokers in the U.S. have a 70 percent greater chance of developing CAHD than non-smokers (Report of Inter-Society Commission for Heart Disease 1972).

Data from several studies in the U.S. have extended and strengthened knowledge on the association between smoking and atherosclerotic diseases. The most impressive of these studies was done by Hammond (1966) involving one million men and women who were age 40-84 at the beginning of the study. Data available after three and six years of follow-up showed that for each sex and age group CAHD mortality increased with increasing intensity or amount of cigarette smoking.
The youngest men smoking two or more packs of cigarettes a day were at greatest risk. Several studies confirmed that the younger the age group, the higher the relative risk associated with cigarette smoking (Doyle and Kannel 1970; Chapman and Massey 1964; Keys and Taylor 1963; Stamler 1966). These same studies also demonstrated that the association between cigarette smoking and CAHD risk was independent of such other risk factors as hyperlipidemia and hypertension.

The specific mechanisms behind the increased risk of CAHD in smokers has been linked to the two most significant compounds in tobacco smoke: nicotine and carbon monoxide. Nicotine is quickly absorbed from the mouth and lungs and can be found in the brain, adrenal medulla, and sympathetic ganglia a few minutes thereafter. Nicotine is metabolized in the liver, kidneys, and lungs, and excreted via the stomach and kidneys. In small amounts, nicotine stimulates the sympathetic ganglia and the adrenal medulla, and discharges catecholamines into the body. The direct physiological effects on the cardiovascular system are those of an exaggerated sympathetic response manifested by an increase in heart rate, blood pressure, cardiac output, stroke volume, force of contraction, and peripheral vasoconstriction, all of which increase the workload and oxygen demand on the heart. If the coronary vessels are narrowed by disease, the coronary circulation is not capable of increasing the blood flow despite the increased demands on the heart, resulting in local ischemia (Fuh's 1976). In larger concentrations, however, nicotine decreases sympathetic stimulation. So it is not likely that nicotine is the basis for the risk factor in cigarette smoking (Evans
1978). It is also interesting to note, that chronic cigarette smoking tends to be associated with higher serum cholesterol levels, increased platelet stickiness, and agglutination, and in a shorter platelet half-life (Billimoria 1975).

Carbon monoxide is present in cigarette smoke in concentrations of about three to six percent. The concentration of carbon monoxide and tar increases toward the last puff, so that exposure to carbon monoxide is greater close to the filter. Nonsmokers are also affected. There is four to five times as much carbon monoxide in sidestream smoke as in mainstream smoke. These levels are most dangerous in enclosed, inadequately ventilated, smoke-filled rooms and cars, where the level of carbon monoxide can vary between 20 and 80 parts per million (Fuhs 1976).

Once carbon monoxide is in the blood it interferes with oxygen transport. The affinity of hemoglobin for carbon monoxide is about 200 times greater than for oxygen, so that carbon monoxide displaced oxygen from the hemoglobin. In the patient whose heart is already overworked by the effects of nicotine, the decreased oxygen supply is an additional strain (Fuhs 1976). It appears that carbon monoxide increases endothelial permeability and the accumulation of lipids in the arterial wall. In addition, it has been shown to increase platelet stickiness and contribute to thrombus formation (Hurst 1978).

Carbohydrate Intolerance

Clinical diabetes has been recognized for years as a serious risk factor for atherosclerotic disease. This relationship has been
extensively documented in retrospective studies dealing with coronary, as well as cerebrovascular and peripheral vascular disease (Stamler 1967). These investigations have shown that diabetics have atherosclerotic disease more often, more severely, and more prematurely than non-diabetics.

Long-term prospective studies in the U.S. indicate that asymptomatic hyperglycemia—so-called sub-clinical diabetes—may be an independent risk factor for atherosclerotic disease of major coronary, cerebral, and peripheral arteries (Ostrander 1965; Kannel 1966). The mechanism of this relationship of diabetes to risk remains speculative. Diabetes mellitus tends to be associated with higher concentrations of serum cholesterol and especially VLDL. Exposure of arterial tissue to insulin results in proliferation of smooth muscle cells (the major cells involved in atherogenesis), inhibition of lipolysis, and synthesis of cholesterol, phospholipid and triglyceride. The marked variations in serum glucose concentration and the occasionally high levels of catecholamines may influence the endothelial penetration of LDL (Hurst 1978).

It is difficult, however, to isolate diabetes as a single factor, since it is well recognized that obesity, hypertension, and hyperlipidemia are also frequent in patients with impaired glucose tolerance.

Obesity

Studies have found a relationship between obesity and incidence of CAHD. However, because obesity is frequently associated with other risk factors such as hyperlipidemia, hypertension, and diabetes mellitus, some investigators attribute the relationship to this combination of risk
factors (Dawber and Thomas 1970). Insurance studies indicate a risk of dying from CAHD that appears to be related to the degree of overweight.

Latest results from the Framingham group have also shown an increased risk of CAHD in overweight men in the U.S. However, the findings are not entirely "pure." They suggest that the association between overweight and CAHD risk may be largely attributable to the increased proneness of overweight men to hypertension, hyperlipidemia, and diabetes. A strong statement regarding obesity and cardiovascular disease comes from the Framingham group: "We might expect a 20 percent reduction in weight in the obese to result in a 40 percent reduction in chances of CAHD" (Kannel and Bordon 1974).

Sedentary Living

The initial data bearing upon physical inactivity as a CAHD risk factor came from Great Britain (Morris 1953). Within a relatively homogeneous socioeconomic group of British middle-age men, subgroups habitually engaged in greater physical activity exhibited lower CAHD incidence and mortality rates.

Activity levels of longshoremen were correlated with CAHD mortality by Paffenbarger and Hale (1975). Over 3,000 men aged 35-74 years of age at entry were followed for 16 years. Energy output of the men were categorized as high, medium, and low activity levels. Of the 598 deaths that occurred during the follow-up period, 66 were found in the heavy work category, 197 in the moderate class, and 425 in the light
activity group. An 80 percent excess risk of fatal CAHD was incurred in the combined light and moderate groups, as compared with the heavy working longshoremen. The different ages for the mortality cases in each work category were not reported.

Regular exercise affects more than the cardiovascular system. It improves cardiac function, lowers blood pressure, reduces fasting and postprandial hyperlipidemia, decreases blood glucose values, increases fibrinolytic activity, retards platelet aggregation, and results in weight loss if caloric intake remains constant (Fred 1978).

"Disease of the coronary arteries has many causes and exercise has a multifactorial effect because of interaction with other risk factors" (Fred 1978, p. 143). Although physical inactivity in young individuals does not change the level of serum cholesterol very much, in middle-aged, obese, sedentary men, the cholesterol levels tend to fall with increased exercise and sometimes with reduction in body weight.

It has been observed that HDL cholesterol levels are highest in marathon runners and elevated in joggers as compared to sedentary individuals suggesting a potentially beneficial role for physical exercise (Hartung 1978). It is suggested that the higher HDL cholesterol levels noted in trained individuals need not be as a result of physical conditioning per se, but rather associated with dietary and weight control accompanying the individual's lifestyle (Temkin 1979).

According to recent studies, once coronary disease is established, one may improve exercise tolerance, reduce angina, and make these people more productive. "By reducing pressure and anxiety, one may
change the patient psychologically. People with CAHD who exercise live better, but not longer" (Fred, 1978, p. 144).

Personality Type

It has been shown that individuals who have diabetes, a history of cigarette smoking, hypertension, obesity, hyperlipidemia, and/or a family history of CAHD are coronary-prone. However, it is becoming apparent that stress is another major risk factor associated with CAHD (Slay 1976). Seventy-five years ago, Osler described the typical patient with coronary disease as "a keen and ambitious man." Other investigators have found the coronary patient to be an aggressive, ambitious individual with an intense physical and emotional drive, unable to delegate authority or responsibility with ease, possessing no hobbies, and concentrating all his thoughts and energy in the narrow groove of his career (Russek 1973).

In studying reactions to stress, Friedman and Rosenman (1959) became convinced that people can be divided into two personality types. The coronary-prone individual they designated as Type A, the non-coronary prone person is called Type B. They describe the Type A person as one who is aggressive, hard-driving, intensely competitive, obsessively ambitious, and preoccupied with deadlines. Pattern B represents the converse of Pattern A.

Type A individuals have a much higher incidence of CAHD than their more easy-going counterparts who exhibit Type B patterns (Kannel 1976; Jenkins 1975). The explanation for this is still unavailable, but
several studies suggest that stressful emotional states correlate with high levels of circulating catecholamines, increased cholesterol, and hypertension—factors known to be associated with CAHD (Friedman and Rosenman 1958; Williams 1975). It is well known that emotional tension results in compulsive smoking in many persons as a compensation for anxiety (Russek 1973). In several studies, Rahe (1974 and 1975) have shown a positive correlation between life-change events and the incidence of CAHD.

Slay (1976) described stress as anything pleasant or unpleasant that speeds up the intensity of life.

Reactions to stress make it possible to fight disease, run from the burglar, climb out of the burning car, and cope with trying situations. It is when adjustment demands on the body are continued or extreme that the body's adaptive apparatus wears out. It is repeated reactions to continued or extreme stress that appear to cause disease, accident, and death (p. 333).

**Multiple Risk Factors**

Although it has been shown that the presence of one coronary risk factor increases the incidence of CAHD, the presence of multiple risk factors has an additive effect on risk. According to Stamler (1967) CAHD has multiple causes and the risk of developing this condition is increased in the presence of more than one coronary risk factor.

The results of both the Gas Company Study by Stamler and the Framingham study showed the progressive and apparently synergistic effect of the presence of two, three, and four risk factors: hypertension, cigarette smoking, obesity, hyperlipidemia (Hurst 1978). In summary:
"It is quite clear that no single factor per se is responsible for the development of the atherosclerotic lesion, but that a multiplicity of factors contribute at various points and possibly by a variety of interesting mechanisms" (Hurst 1978, p. 1108).

Summary

Coronary atherosclerotic heart disease is the leading cause of death and disability in the United States. Investigators have revealed certain coronary risk factors associated with CAHD. Furthermore, research has demonstrated that modification of risk factors may retard the atherosclerotic process.

As a result of these findings, primary and secondary prevention measures are being advocated in order to slow the loss of life due to CAHD.

It is the obligation of nurses, as professionals, to meet the patient's need and right to information. Successful implementation of the teaching-learning process and principles of learning can aid the patient's comprehension and adaptation to the recommended life-style changes.
CHAPTER 3

METHODOLOGY

This chapter includes a description of the design of the study, the description of the setting and the sample, method of data collection, and the research tool.

Design of the Study

A descriptive design was used to measure post-myocardial infarction patients' knowledge regarding their disease and its management. The study used a questionnaire for data collection. Subjects who agreed to participate were asked to sign an approved consent form prior to administration of the questionnaire. Subjects were also asked to answer questions pertaining to selected personal and sociological factors.

Setting

This study was conducted in the cardiology clinics of a southwestern University teaching hospital and a Community hospital in the same city. Permission for use of the cardiology clinic population of the Community hospital was granted following a presentation by the investigator of the background and methodology of this study to their Human Subjects Review Board. Permission to use the cardiology clinic population of the University hospital was granted after an informal
discussion of the study's purpose and implications for future use with three attending cardiologists.

Sample

A convenience sample was utilized. The sample consisted of 15 subjects who incurred a myocardial infarction and met the following criteria:

1. were recently discharged from the hospital with a diagnosis of myocardial infarction.
2. had an initial follow-up clinic evaluation 17-35 days post-coronary event.
3. were able to read, write and speak English.

Participants were selected from among persons with scheduled clinic appointments in the cardiology clinics of both hospitals.

Method of Data Collection

The investigator contacted the attending cardiologists at the two hospitals to explain the study and to obtain permission for subjects to participate in the study. The investigator attended the scheduled clinics and approached those persons who met the sample criteria and requested their participation in the study. Subjects were then informed of the project's nature and purpose by the investigator prior to their being seen by the physician. Once written consent was obtained, each subject was given a questionnaire to complete. Following the subject's completion of the questionnaire, the investigator
answered any questions pertaining to the subject's coronary disease and its management.

Research Tool

The instrument used in this study was a two-part questionnaire. Part I of the questionnaire, consisting of nine items, asked for the subject's age, sex, ethnic background, marital status, and education. The source of the subject's knowledge about his disease was also elicited from the participant. Part II of the questionnaire, developed by Rahe and Scalzi (1975), consisted of 50 items related to an evaluation of the patient's knowledge in six categories: (a) the nature of cardiac disease, (b) emergency treatment, (c) resumption of physical activity, (d) diet and smoking, (e) psychological factors important in heart disease, and (f) problems encountered when returning to home and to work.

Because of the multiple question format utilized in this tool, multiple-choice and true-false, each item was recoded as either true or false, for clearer statistical analysis. The possible range of scores for the 50 questions then became 0-82 points with the higher score reflecting a higher level of knowledge of heart disease.

The results of Rahe and Scalzi's original study (1975) on a group of 25 patients revealed an increase in the patients' knowledge concerning their return to home and work following administration of the teaching program. Prior to initiation of the teaching program, pre-test scores for these 24 patients revealed a low level (mean
percentage score of 57) of knowledge of heart disease. Following the teaching program, mean percentage scores for all 24 patients for the questionnaire were between 66 and 69 percent.

Since there were no reported measures of reliability or validity for this tool, the questionnaire was reviewed by a cardiologist, a cardiovascular nurse clinician, and three CCU nurses at the two hospitals utilized in this study to establish content validity. The review of literature also supported the importance of the content of this tool.

Protection of Human Rights

Permission to conduct this study was obtained from the Human Subjects Committee of The University of Arizona and also the departments of cardiology at both hospitals used in this study (see Appendix A).
CHAPTER 4

PRESENTATION OF THE DATA

This chapter presents the results of the study. Findings related to the characteristics of the sample and the statistical analysis of the data collected are revealed.

Characteristics of the Sample

The sample consisted of 15 caucasian subjects with a diagnosis of myocardial infarction from one of two outpatient clinic settings of a University teaching hospital and a Community hospital in the same metropolitan area.

Age, Sex, and Marital Status

As shown in Table 1, the reported ages of the 15 subjects ranged from 46 to 69 years with a mean age of 55.8 years. Seven of the subjects were over 55 years of age. Six of the subjects were between the ages of 50-54 years.

Eleven of the subjects were males and four were females. Eleven subjects were currently married and living with their spouse. One subject was separated, two were divorced and one was never married.
Table 1. Subjects' Sex and Marital Status by Age

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>Married</th>
<th>Never</th>
<th>Separated</th>
<th>Divorced</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>M</td>
<td>F</td>
<td>M</td>
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<tr>
<td>45 - 49</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 - 54</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>55 - 59</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 - 64</td>
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<td>65 - 69</td>
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</tr>
<tr>
<td>Totals</td>
<td>1</td>
<td>0</td>
<td>8</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

$\bar{x} = \text{mean age of 55.8 years}$
Number of Myocardial Infarctions

Eleven of the subjects had experienced their first myocardial infarction with this hospitalization. None of the subjects were reported as having more than two myocardial infarctions.

Years of Education

Six subjects were high school graduates and six had some level of college education or its technical equivalent. Two subjects completed their education through the tenth grade and only one subject had completed less than the tenth grade.

Description and Analysis of Data

A 50-item multiple-choice and true-false questionnaire was used to evaluate the subject's knowledge of cardiac disease following his hospitalization for a myocardial infarction. Knowledge categories included the nature of cardiac disease, emergency treatment, resumption of physical activity, diet and smoking, psychological factors important in CHD, and problems encountered when returning to home and work. The questions were designed by Rahe and Scalzi (1975) not only to assess patients' correct knowledge as to the nature and treatment of a myocardial infarction, but also to identify misconceptions patients may have in these areas. There was a total possible score of 82 points.

The raw scores and percent of correct responses are presented in Table 2. None of the subjects scored correctly on all test items. The range of correct scores was from 37 to 69 with a mean raw score of
Table 2. Distribution of Subjects' Raw Scores and Percent of Correct Answers to Knowledge Questionnaire

<table>
<thead>
<tr>
<th>Subject</th>
<th>Raw Score*</th>
<th>Percent of Correct Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>64</td>
<td>78.05</td>
</tr>
<tr>
<td>02</td>
<td>53</td>
<td>64.63</td>
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<tr>
<td>03</td>
<td>69</td>
<td>84.15</td>
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<td>04</td>
<td>57</td>
<td>69.51</td>
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<td>67.07</td>
</tr>
<tr>
<td>06</td>
<td>54</td>
<td>65.85</td>
</tr>
<tr>
<td>07</td>
<td>47</td>
<td>57.32</td>
</tr>
<tr>
<td>08</td>
<td>66</td>
<td>80.49</td>
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<tr>
<td>14</td>
<td>52</td>
<td>63.41</td>
</tr>
<tr>
<td>15</td>
<td>67</td>
<td>81.71</td>
</tr>
</tbody>
</table>

\[ \bar{X} = 57.13 \]

\[ 69.67\% \]

*Highest possible raw score was 82.
57.13 (69.67%). Four subjects had 80 percent or above and only one person scored less than 50 percent correct.

Frequency distributions of the scores and percentage of total number of correct scores given by the subjects according to the six knowledge categories were computed and are presented in Table 3. The scores for the correct answers to the category pertaining to the nature of cardiac disease ranged from 8 to 16 points. The mean score was 11 with 60 percent of the subjects able to answer at least 11 of these questions correctly.

The category discussing emergency treatment of an acute myocardial infarction revealed the highest number of correct responses. The mean score was 10, reflecting that 86.7 percent of the subjects knew the correct responses.

Two subjects scored the maximum 8 points on the physical activity category. The subjects' scores ranged from 2 to 8 points with a mean correct score of 5. The percent of subjects answering at least five questions correctly was 73.3 percent.

Only one subject was able to answer the 12 questions about diet and smoking correctly. A range of 7 to 12 points with a mean correct score of 9.5 was revealed, indicating that only 64 percent of the subjects had an understanding of this information.

The range of scores for psychological factors important in heart disease were 4 to 12 points. No subject scored correctly on all 13 items. The mean score of correct answers was 8, reflecting that
<table>
<thead>
<tr>
<th>Category</th>
<th>Correct Score</th>
<th>Number of Subjects</th>
<th>Percent of Subjects With Correct Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature of Cardiac</td>
<td>8</td>
<td>2</td>
<td>13.3</td>
</tr>
<tr>
<td>Disease</td>
<td>9</td>
<td>3</td>
<td>20.0</td>
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<tr>
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<td>1</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>3</td>
<td>20.0</td>
<td></td>
</tr>
<tr>
<td>*n = 17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
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<td>6.7</td>
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<td>13.3</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>x = 11</td>
<td>total 15</td>
<td>total 100.0</td>
<td></td>
</tr>
<tr>
<td>Emergency Treatment</td>
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<td>13.3</td>
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<td></td>
<td>9</td>
<td>2</td>
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<td>10</td>
<td>9</td>
<td>60.0</td>
</tr>
<tr>
<td>*n = 13</td>
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<tr>
<td></td>
<td>12</td>
<td>2</td>
<td>13.3</td>
</tr>
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*\(n = \) total possible score for category
only 40 percent of the subjects were able to respond correctly to eight of the 13 questions.

The category of questions relating to the return to home and to work revealed a range of scores from 5 to 17 points. The mean correct score was 13 with only 40 percent of the subjects able to answer these questions correctly.

These data show that the subjects were more knowledgeable about the emergency treatment of a myocardial infarction and the resumption of physical activity following a myocardial infarction than the other knowledge categories.

Frequency distributions of all answers are presented in Table 4 with the correct answers and percentage of those subjects responding correctly to each question. All subjects answered correctly more of the emergency treatment questions than any other category (questions 18-30), but also scored a greater number of lower percentages in this section. Subjects also appeared more knowledgeable in the area of diet and smoking with all 15 subjects aware that too much animal fat in the diet contributes to high blood cholesterol and an elevated cholesterol level signals a proneness to heart attacks (questions 4 and 42).

The section dealing with psychological factors important in heart disease seem to be the most difficult for the subjects tested. Not one of the questions in this category was answered correctly by all of the subjects. Ten of the 15 subjects in this study described this section as "tricky" and "confusing."
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*1 = true, 2 = false
Only one question (69) was answered correctly by all subjects in regards to the return to home and to work situation. The majority of questions were answered correctly by at least 60 percent of the subjects. It is important to note that eight of the subjects regarded their medications as a "crutch" and 10 of the subjects believed that major career alterations were necessary following a myocardial infarction.

Intercorrelations

Intercorrelations between knowledge scores and the number of myocardial infarctions, age, and educational level of the subjects were analyzed by the Pearson product-moment correlation coefficient. The correlation coefficients are presented in Table 5. The findings showed that those patients who had had two myocardial infarctions did not increase the knowledge score, suggesting, that those patients with more hospitalization time and hence, more contact hours with medical-nursing personnel, did not increase their knowledge regarding heart disease.

There was significant negative correlation at the .001 level between years of education and knowledge scores meaning that those individuals with a lower level of education scored higher on the questionnaire. No significant correlation was found between age and knowledge scores.

A Student's t test was performed on the group of subjects from the Community hospital and those from the University hospital to
Table 5. Correlation Coefficients Between Number of Myocardial Infarctions, Age, Years of Education, and Knowledge Scores

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* Significant at the .001 level.

determine any significant differences in the knowledge scores. The resulting t value of 1.87 was not found to be significant at the .05 level.

Item-discrimination Indices

A test of the discriminating power of each test item was computed to determine the extent to which the single item measures whatever the test as a whole measures. Item-discriminating indices are useful in assessing to what extent the questions contribute to dividing the test population into high-scoring and low-scoring groups, in terms of a particular ability which the test as a whole purports to measure (Olson and Turner, 1976). As validity measures were not reported initially by the originators of the tool, it was felt that ID indices might be helpful in assessing the adequacy of the tool. Table 6 presents the item-discrimination indices for each question with the percent of correct responses (a graphic presentation of these data is presented in Appendix D). It is apparent from this table that 16 percent (13 of the 82) of the questions have a negative discrimination
Table 6. Item Discrimination Indices with Percent of Correct Responses by Knowledge Category

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index suggesting that those subjects scoring the lowest on the questionnaire answered those questions correctly. Because a review of the literature by this investigator did not reveal an established and accepted index range, an arbitrary cutoff of 60 was used for the ID index in this study. If a cutoff of 60 is used for the ID index, then 23 percent (19/82) of the questions can be judged adequate in separating the population. It is important to note that only 22 percent (19/82) of the questions have an index range of 20 to 40. This 22 percent combined with those questions with a negative index (16 percent) suggest that 38 percent of the questionnaire does not adequately measure knowledge of heart disease in this population.
CHAPTER 5

DISCUSSION OF FINDINGS

Interpretation of the results of this study and the relationships of the findings to the conceptual framework and the review of literature are presented in this chapter. Discriminant analysis of the test instrument and implications for nursing practice are also addressed. Recommendations for further study are made based upon the interpretations of the findings.

Interpretation of the Results

The mean age of the 15 subjects was 55.8 years with 11 of the subjects being males. These data are consistent with the cardiovascular nature of CAHD (Framingham 1979).

This study utilized a 50-item questionnaire with a total possible score of 82 points. Six knowledge categories were tested: the nature of heart disease, emergency treatment of an acute myocardial infarction, resumption of physical activity, diet and smoking, psychological factors important in heart disease, and problems encountered on the return to home and work situation. Knowledge was operationally defined as the specific information which subjects convey about their disease following hospitalization. The higher the score on the questionnaire, the greater the knowledge about heart disease and its management. The subjects' mean score for the 82 points was 57 (69
percent). The range of scores for the individual knowledge categories revealed a well-informed population with regards to emergency treatment of an acute myocardial infarction (86%) and a slightly less informed population with regards to resumption of physical activity following a myocardial infarction (73%). The lowest scores were found in the categories of psychological factors (40%) and the return to home and to work situation (40%), suggesting that these subjects are less prepared for the rehabilitative phase of a myocardial infarction. Subjects' mean scores for the categories pertaining to the nature of cardiac disease and diet and smoking were 60 and 64 percent, respectively.

Findings in Relation to the Conceptual Framework

The teaching-learning process provided the basis for the framework of this study. Specific application of the teaching-learning principles to the health-care setting has been studied by Redman, Pohl, Streeter, and Winslow. Powell and Winslow (1973) defined learning as a "change in the individual that fills a need and makes him more capable of dealing adequately with his environment" (p. 723). Redman (1976) defined teaching as "communication especially structured and sequenced to produce learning" (p. 9). Numerous sources support the contention that the nurse, because of her multi-discipline background, is the best person to teach the patient (Winslow 1976; Fralic 1976; Pohl 1973). Many factors have been cited which may influence the person's ability to learn, such as age, educational level, life-style, state of health, and stress (Storlie 1975; Billie 1977; Aiken 1970).
Once the individual's learning needs have been determined, the nurse can formulate educational objectives for the patient. Use of behavioral objectives promotes effective communication and serves as the basis for planning and evaluating the learning process. Evaluation provides the opportunity to determine to what degree the educational objectives have been met, to reinforce the behavior changes of the learner, and to enable the teacher to analyze the adequacy of teaching (Redman 1976).

The purpose of this study was to determine the level of knowledge of patients who recently had a myocardial infarction regarding their heart disease. Basic to this study was the assumption of patients' right to knowledge and the responsibility of the health-care institution and its professionals. The findings of this study revealed a total knowledge score of 69 percent with regards to cardiac disease and its many ramifications. Subjects scored highest (86%) in the category of emergency treatment of an acute heart attack and lowest (40%) in the areas of psychological factors important in heart disease and the return to home and to work setting. A possible explanation for this finding is the hospital setting itself. Patients are admitted in acute crisis to the CCU where nurses with advanced skills in the knowledge and care of patients with cardiac disease attempt to allay their anxieties common to this stage of illness. The multitude of foreign objects and procedures is explained to the last detail in an attempt to calm the patient and assure him that all his needs will be met in an effort to prevent further complications during this critical period.
Once the patient is stable, he is transferred to a transition unit for one to three days where he is still monitored. The purpose of this unit is to allow the patient to rest and recoup his defenses. The patient is then transferred to a general medical floor for the remainder of his stay, usually another week. It is during this time when the highest level of receptiveness to learning is reported (Guzzetta 1979). Just prior to discharge from the hospital, patients are given a list of do's and don'ts they are to follow. No correlation was found between higher knowledge scores and more hospitalization time with a second myocardial infarction.

The negative correlation that was found (p = .001) between knowledge scores and the years of education has important implications for health professionals as teachers. It is possible that nurses assume that the more educated the person is, the more knowledge he has about his disease.

Findings in Relation to the Questionnaire

Item-discriminating indices for the knowledge instrument indicated that the tool did not adequately measure subjects' knowledge regarding heart disease. Although only 23 percent of the items revealed an ID index of greater than 60, it is believed by this investigator that minor re-wording changes would alter this low index. Phrases such as "salt is bad for the heart, as a general rule," and "food prepared without salt is flavorless" are misleading.
Personal conferences were held by this investigator with each participant following his completion of the questionnaire. Correct answers and explanations were given at this time. Statements by 10 of the 15 subjects revealed that many of their answers were based on wording discrepancies and at least five of these subjects felt they did not understand the basic material asked. It was not apparent to this investigator that these 15 subjects did understand their disease and its lifestyle implications. Two of the subjects were unaware that they had had a heart attack, but made reference to "something or other went wrong with my heart."

It is interesting that no significant difference was found between the knowledge scores of those subjects from the Community hospital and those subjects from the University hospital. It is known that an established myocardial infarction teaching program existed at the teaching hospital. However, the knowledge scores do not reflect a significant increase in those subjects supposedly taught in this setting. Nevertheless, it would appear from the findings of this study that the study subjects were discharged from the hospital without adequate knowledge of their disease and its management.

Findings in Relation to the Literature Review

The mean age of 55.8 years and the three to one male to female ratio in this study is consistent with the epidemiological studies that have demonstrated the development of atherosclerosis and the emergence
of detectable coronary lesions as dependent upon time with a greater incidence of CAHD in men (Framingham 1979; Hurst 1978).

The risk factors of family history, elevated serum lipids, dietary factors, hypertension, cigarette smoking, carbohydrate intolerance, obesity, and lifestyle patterns were not addressed specifically in this study. However, the questionnaire utilized in this study attempted to address patients' knowledge of the important influence these factors exert in regards to the development of and continued risk for CAHD. Subjects' scores on the individual knowledge categories demonstrate a higher level of knowledge of emergency treatment in an acute myocardial infarction, and the role of diet and smoking in the development of CAHD. This could be attributed to teaching which emphasized this information. However, it is possible that this higher level of knowledge is attributable to the surge of media campaigns in these areas at the present time and not an actual outcome of the teaching programs of the hospitals. The lower scores on the psychological factors important in CAHD and the return to home and to work setting have important implications for the evaluations of existing cardiac rehabilitation programs and for the development of future programs.

Rahe (1972) demonstrated a strong correlation between life-change events and the incidence of CAHD. Stress has been implicated in numerous studies (Slay 1976; Framingham 1979; Friedman and Rosenman 1958) as a major risk factor associated with the development of CAHD. It is imperative that the health-care personnel adequately assess the psychological factors affecting their cardiac patients and equip them
with an understanding of and possible alternative methods for coping with the many stresses they will encounter after discharge.

Findings in Relation to the Information Source

Information was obtained as to the primary source of the participants' knowledge during their hospitalization. Not one of the five subjects from the Community hospital identified the nurse as a source of his information about his disease. Three acknowledged the physician as an information source and two participants stated that no one taught them about their disease while they were hospitalized. Findings from the University setting revealed that six of the 10 subjects identified the nurse as their primary educational source with three subjects identifying the physician and only one person stating that no one taught him about his disease during the hospitalization phase of his illness.

It is important to note that of the six subjects that identified the nurse as responsible for their education, all six subjects identified a specific nurse employed by the teaching hospital. However, the findings from this study did not reveal a higher level of knowledge for these patients. It is possible that the instrument did not test their knowledge regarding what they had been taught.

Concrete conclusions about these findings in relation to the information source cannot be established other than to say, that regardless of the acknowledged source of information, patients' knowledge scores following hospitalization did not reveal an informed study population.
Recommendations

Based on the findings of this study, the following recommendations are made:

1. Revise the instrument and re-test for discriminant power and validity.

2. Conduct studies to measure nurses' knowledge of the teaching-learning process and the principles of cardiac disease and its modification to determine that nurses have the knowledge necessary to teach patients.

3. Plan studies with the revised instrument in various institutions to determine if the findings are consistent.

4. Initiate a cardiac teaching program that incorporates the teaching-learning process and measure the effectiveness of such a program on the modification of cardiac risk factors.
CHAPTER 6

CONCLUSIONS AND SUMMARY

This study was designed to answer the question: "What is the level of knowledge patients have about their cardiac disease following hospitalization for a myocardial infarction?"

Data were collected utilizing the CHD Teaching Evaluation Questionnaire consisting of six knowledge categories. The questionnaire had been utilized at UCLA Medical Center for five years prior to its use in this study. It was also reviewed for content validity by a cardiovascular nurse specialist, three CCU nurses and a cardiologist involved in patient care at the two settings utilized in this study. Demographic data were obtained concerning certain sample characteristics.

The conceptual framework for this study was based on the principles of the teaching-learning process. It is important that the nurse utilize the steps of the teaching-learning process and principles of learning in any teaching endeavor. No teaching endeavor is ever complete without some sort of evaluation to determine the effectiveness of the teaching. This is necessary to reinforce the patient's understanding of what he has been taught, as well as to improve the nurse's teaching ability.
The review of literature focused primarily on those factors thought to be contributory to the development of CAHD. It also focused on the need for education and rehabilitation of the cardiac patient. The purpose and content of such programs, the application of the teaching-learning principles, and the role of the nurse in their implementation were discussed. The literature and the studies cited supported a program of patient education as a vital and effective tool of achieving increased knowledge of the cardiac patient.

The convenience method of sampling was used to select the 15 participants who were tested by this investigator. Any person who met the criteria specified for the study was eligible for inclusion in the study. The 15 subjects were given the questionnaire within 35 days of their coronary event at their initial clinic follow-up. The mean age of the study population was 55.8 years with eleven of the subjects being males. The majority of subjects had experienced their first myocardial infarction with this hospitalization. The mean level of education was reported as 12 years.

The possible range of scores for the CHD Teaching Evaluation Questionnaire was 0 to 82 points with 82 reflecting a higher level of knowledge about cardiac disease. The results of the study revealed a mean score of 57 (69%) for over-all knowledge. Scores for the individual knowledge categories revealed a more informed population with regards to emergency treatment (86%) and the lowest range of scores for psychological factors important in heart disease and the return to home and to work (40%). This data analysis answered the question
regarding patients' level of knowledge following hospitalization for a myocardial infarction.

The data concerning sample characteristics were then analyzed to determine if any relationships existed. Among the variables tested using the Pearson product-moment correlation coefficient, only years of education and knowledge score were found to be statistically significant with a negative correlation at the .001 level. A student's t test was performed on the two groups of subjects to determine if there were any differences in knowledge scores as a function of hospital setting. The resulting t value of 1.87 was not found to be significant at the .05 level.

Item-discrimination indices were computed for the individual questions of each knowledge category. ID indices revealed that the tool did not adequately measure knowledge about heart disease. However, subjective findings of this investigator suggest the low level of knowledge revealed in this study to be indicative of the uniformed population in our health-care settings.

Participants identified a variety of sources responsible for their information about heart disease. Six of the 15 subjects recognized the nurse as a source of information regarding their heart disease.
APPENDIX A

HUMAN SUBJECTS COMMITTEE APPROVAL FORMS
Ms. Julia A. Brandt
7109 E. 28th Street
Tucson, AZ 85710

Dear Ms. Brandt:

We are in receipt of your project entitled, "Patients' Level of Knowledge Following a Myocardial Infarction", which was submitted to the Human Subjects Committee and concur with the opinion of the Departmental Review Committee's examination and recommendation of this minimal risk project. Therefore, approval is granted effective 26 February 1980.

Approval is granted with the understanding that no changes will be made in the procedures followed or the questionnaire used (copies of which we have on file) without the knowledge and approval of the Human Subjects Committee and the Departmental Review Committee. Any physical or psychological harm to any subject must also be reported to each committee.

Sincerely yours,

Milan Novak, M.D., Ph.D.
Chairman
Human Subjects Committee

cc: Ada Sue Hinshaw, Ph.D.
Departmental Review Committee
March 21, 1980

Julia A. Brandt, R.N.
7109 E. 28th
Tucson, Arizona 85710

Dear Ms. Brandt:

We have reviewed your protocol entitled, "Patients' Level of Knowledge Following Myocardial Infarction" which was submitted to the Protocol Review Committee. Approval has been granted after receiving a copy of the revised consent form and statement of agreement on the confidentiality of charts.

Approval is granted with the understanding that no changes will be made in the procedures followed or the consent form used (copies of which we have on file) without the knowledge and approval of the Protocol Review Committee. Any physical or psychological harm to any subject must also be reported to this committee.

Please submit a written report to the Protocol Review Committee by April 30, 1980.

Sincerely yours,

Jose Santiago, M.D., Chairman
Protocol Review Committee

JS/dm
cc: B. Phibbs, M.D.
APPENDIX B

CONSENT FORMS
Subject Consent Form

I am requesting your voluntary participation in the completion of a questionnaire for a study entitled "Level of Knowledge Following Myocardial Infarction." The purpose of this study is to determine what patients who have had a heart attack know about their disease and its management. It is believed that information obtained in this study will be of benefit to the future development and implementation of education programs for patients who have experienced a heart attack. If you decide to participate, please answer all of the questions. About thirty (30) minutes of your time will be required for completion of this questionnaire and will indicate your consent as a willing participant in this study. All data received will be coded to insure confidentiality. You are free to withdraw from the study at any time without incurring ill will. There are no costs or risks to you from participation in this study. You will benefit by having the investigator answer any questions you may have concerning your disease after you have completed the questionnaire.

I thank you for your help in this study. A summary of the results of the study will be provided to you upon request. If you have any questions concerning this study, please do not hesitate to contact me at the number below.

Julia A. Brandt, R.N.
Graduate Student
University of Arizona
College of Nursing

298-5738
Home Phone
Subject Consent Form
for
Kino Community Hospital

I am requesting your voluntary participation in the completion of a questionnaire for a study entitled "Level of Knowledge Following Myocardial Infarction." The purpose of this study is to determine what patients who have had a heart attack know about their disease and its management. It is believed that information obtained in this study will be of benefit to the future development and implementation of education programs for patients who have experienced a heart attack. If you decide to participate, please answer all of the questions. About thirty (30) minutes of your time will be required to complete this questionnaire. All data received will be coded to insure confidentiality. You are free to withdraw from the study at any time without affecting your medical care or your relationship with your physician. Should you decide to withdraw from the study after you have completed the questionnaire, all information received will be destroyed. There are no costs or risks to you from your participation in this study. You will benefit by having the investigator answer any questions you may have concerning your disease after you have completed the questionnaire.

This consent form will be filed in an area designated by the Human Subjects Committee with access restricted to the principal investigator or authorized representatives of the particular department.

I thank you for your help in this study. A summary of the results of the study will be provided to you upon request. If you have any questions concerning this study, please do not hesitate to contact me at the number below.

A copy of this consent form is available to you upon request.

Julia A. Brandt, R.N.
Graduate Student
The University of Arizona
College of Nursing

298-5738
Home Phone

Subject Signature

Witness signature
APPENDIX C

A CORONARY HEART DISEASE QUESTIONNAIRE

Date: __________________________
Client: #: ______________________
# MI: ___________________________
Setting #: ______________________

Part I: Personal Data

The following questions seek to obtain some general personal information. Please fill in the blank(s) or place a check (√) beside the appropriate response for the following questions:

1. How old were you on your last birthday: _____ years

2. Sex: _____ Male  _____ Female

3. Ethnic or Cultural Group: _____ 1. Indian
   _____ 2. Mex-Amer.
   _____ 3. White
   _____ 4. Black
   _____ 5. Other

4. Marital Status: _____ 1. Married, living with spouse
   _____ 2. Separated
   _____ 3. Divorced
   _____ 4. Widowed
   _____ 5. Never married

5. What is the highest grade of school that you completed:

   None 0
   Elementary 1 2 3 4 5 6 7 8
   High School 1 2 3 4
   College 1 2 3 4 5+
   Professional or Graduate
   Technical 1 2
   Other (specify) __________________
6. What is the name of your place of permanent residence:

________________________________________________________

7. From what source did you learn the most information about your disease:


8. Were you given any reading material (pamphlets) about your disease when you were in the hospital?

   ___ Yes  ___ No

9. Were you given any reading material (pamphlets) about your disease when you were discharged from the hospital?

   ___ Yes  ___ No

Part II: CHD Teaching Evaluation Form

A. Nature of your disease

Circle the small letters for all statements you feel to be true (there may be more than one correct answer):

1. The damage in a heart attack is due to:
   a. Too much fat in the blood.  2
   b. Too little blood to the heart muscle.  1
   c. Too little blood into the heart chambers.  2
   d. No heart damage; only damage is a clot in a blood vessel.  2

2. The pain involved in a heart attack is from:
   a. Heart irritability.  2
   b. Too little oxygen to the heart muscle.  1
   c. Too little blood to the heart chambers.  2

3. The damage to the heart muscle from a heart attack is:
   a. Similar to a deep cut.  2
   b. Similar to a muscle sprain.  2
   c. Similar to a bruise  1
4. The healing of the heart following a heart attack is:
   a. Never complete, leaving a "soft spot." 2
   b. Totally complete, leaving no trace of damage. 2
   c. Leaves a scar. 1

5. The chances of a new heart attack:
   a. Decrease markedly over your first few days in the hospital. 1
   b. Can be influenced by things you learn to do in the hospital. 1
   c. Are always increased if you continue to feel chest pain. 2
   d. Are reduced by a clam, quiet atmosphere. 1

B. Emergency treatment
Circle all statements you feel to be true (there may be more than one correct answer).

1. The heart monitor attached to you in the CCU is used to:
   a. Keep outside electrical currents away. 2
   b. To detect any changes in heart action. 1
   c. To help your heart to recover. 2

2. The reason for nasal oxygen in the CCU is:
   a. To reduce chest pain. 1
   b. To keep you from smoking. 2
   c. To reduce the work of your lungs. 2
   d. To give your heart more oxygen. 1

3. Repeated blood tests are to:
   a. Measure the fat in your blood. 1
   b. Measure enzymes in your blood—reflecting heart muscle damage. 1
   c. To assess the effects of medication. 1

4. You are transferred from the CCU:
   a. Because your condition improves. 1
   b. When someone else needs your bed. 2
   c. According to a set schedule. 2

C. Physical activity
Mark "T" for true; "F" for false:

1. T_____F______ After a heart attack one should stay at bedrest for two to three weeks. 2
Correct Answers *

2. T F After a heart attack a patient will very likely not return to his previous level of physical activity. 2

3. T F After a heart attack one's sex life has to be greatly reduced (in future years). 2

4. T F If one gradually increases his physical activity over the six months or so following a heart attack, he can obtain and may even surpass his previous degree of physical fitness. 1

5. T F Probably too much physical activity causes heart attacks. 2

6. T F After the amount of rest one gets in the hospital following a heart attack, one really feels "rarin' to go" his first few days at home. 2

7. T F It is important for the healing process of the heart to gradually increase physical activity. 1

8. T F One can begin a physical fitness program in the hospital. 1

D. Diet and smoking
Mark "T" for true; "F" for false:

1. T F It was my last meal that led to my heart attack. 2

2. T F Even an occasional cocktail is bad for your heart. 2

3. T F Too much animal fat in your diet contributes to high blood cholesterol. 1

4. T F High blood cholesterol signals a proneness to heart attack. 1

5. T F As a rule, salt is bad for your heart. 2
6. T____F____ Patients who develop heart attacks tend to be overweight.  
7. T____F____ Losing weight is relatively easy.  
8. T____F____ I won't be able to eat rich foods again.  
9. T____F____ Food prepared without salt is flavorless.  
10. T____F____ If you have been a long-time smoker, quitting now won't be of much help.  
11. T____F____ Smoking has definite psychological and physical side effects.  
12. T____F____ Smoking tends to keep your body weight down.  

E. Psychological factors  
In general, persons who develop a heart attack: (Mark "T" for true; "F" for false).

1. T____F____ Work several hours "overtime" and/or take their work home with them.  
2. T____F____ Frequently look back upon their accomplishments with a high degree of personal satisfaction.  
3. T____F____ Tend to have jobs at the "top of the ladder."  
4. T____F____ Don't take time to relax.  
5. T____F____ Are hard-driving, competitive persons.  
6. T____F____ Take on high degrees of responsibility.  
7. T____F____ Have well-defined goals.  
8. T____F____ Take their work, and life in general, very intensely.  
9. T____F____ Frequently hold more than one job.  
10. T____F____ Are flexible people who can easily delegate work and learn new routines.
11. T_____F______ Tend to rush themselves and fight time deadlines. 1

12. T_____F______ Are persons who have made their "own way" in life. 1

13. T_____F______ May have family problems. 1

F. Return to home and work
Circle the small letters for all statements you feel to be true (there may be more than one correct answer):

1. The first 2 to 3 days after hospital discharge are:
   a. Difficult for all family members. 1
   b. Surprisingly joyous and trouble-free. 2

2. Children at home (if any) will:
   a. Be on their best behavior over the first few weeks. 1
   b. See you in a different way when you are home and not going to work. 1
   c. Along with your spouse, tend to be overprotective of you. 1

3. Your spouse:
   a. Should always be in the house with you during your first 2 to 3 months at home. 2
   b. Should understand your illness and what you're supposed to do to avoid a future heart attack. 1
   c. Had to cope with many stresses during your hospitalization. 1

4. About medications:
   a. You should not become dependent on them as a "crutch." 2
   b. It may help to carry nitroglycerine tablets in your pocket. 1
   c. Once you leave the hospital, the medications you are given are not apt to be changed in the future by your doctor. 2

5. About physical activity:
   a. You must rest for the first month or more before starting walks outdoors, etc. 2
   b. You can begin a graduated physical activity program within the first few days after you arrive home. 1
5. c. The walking you normally do at work can suffice for future physical exercise requirements.  
6. If chest pain should re-occur after hospital discharge, you should:
   a. Call your doctor immediately.  
   b. Immediately return to the hospital.  
   c. Try a nitroglycerine tablet (under your tongue).  
7. When you are ready to return to work:
   a. If you don't change to a different kind of work, it will be very difficult to alter any previous work stresses.  
   b. Most employers don't understand about heart attacks and won't allow persons to gradually readjust to their work.
APPENDIX D

ITEM-DISCRIMINATION INDICES FOR QUESTIONS
ON KNOWLEDGE QUESTIONNAIRE
Discriminating Power

Question Number

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-100 -80 -60 -40 -20 0 +20 +40 +60 +80 +100
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