

NURSING INTERVENTION TO PROMOTE PRIMARY AND SECONDARY PREVENTION OF  
CAD IN FIRST DEGREE RELATIVES OF SUDDEN CARDIAC DEATH VICTIMS

by

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## ABSTRACT

This investigation sought to determine if a nursing intervention with first degree relatives (children, siblings, parents, and spouses) of victims of sudden cardiac death would promote change in high risk behaviors for coronary heart disease. The nursing intervention strategy was designed to assess, inform/educate and provide emotional support regarding familial/genetic risk factors, cardiovascular behavioral risk factors, and health beliefs.

The study design was a two group experimental design using repeated measures of health beliefs and health behaviors with random assignment of subjects into groups. The sample consisted of 58 first degree relatives of sudden death victims referred for autopsy by the County Coroner. The outcome measures included changes in health beliefs, health behaviors and whether or not subjects elected screening for blood pressure and serum cholesterol.

Approximately 65%, or 12 of 16 families demonstrated familial aggregation of cardiac diseases. Analysis of covariance was used to determine health behavior, health beliefs, and knowledge differences between groups on health beliefs. There were significant differences between sibling groups on how susceptible they reported their children to be to cardiac disease and how serious they perceived cardiac disease to be. Health habit differences included

significant reductions in the experimental group on alcohol and meat consumption. There were no statistically significant group differences on knowledge, although the experimental group increased in knowledge while the control remained the same. Seventy-six percent of the experimental group did have blood pressure screening compared to 57% in the control. In the experimental group, 27% had serum cholesterol screening compared to 14% of the control group. Qualitative data were collected on the events leading to death for the sudden death victim, risk factors associated with sudden death, and the family member's perceptions of sudden cardiac death.

The nursing intervention made a difference for experimental siblings (the highest risk group) on health beliefs (increased perceived susceptibility and severity) health behaviors (alcohol and meat consumption) and screening for blood pressure and serum cholesterol. Primary preventive intervention holds promise for reduction of cardiovascular mortality.

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## CHAPTER I

### INTRODUCTION

Prevention has been clearly identified as the number one priority for present and future health care systems (Abdellah, 1977; Healthy People, 1979; Preventing disease - Promoting health objectives for the nation, 1979). Nursing has advocated an orientation of primary, secondary, and tertiary prevention, though for decades the nursing process has perpetuated primarily the maintenance and restorative aspects of nursing practice. Nurse theorists have developed conceptual schemes identifying activities and skills that nurses should utilize in assessing, implementing, and evaluating patient care. The best developed conceptualizations are concerned with the restorative aspects of patient care. Certainly, the restorative aspects of patient care constitute a major function of nursing practice, but what about the preventive functions? Has nursing really been accountable for developing and contributing knowledge towards primary preventive care?

Although a substantial amount of investigation has been conducted to determine disease etiologies and treatment modalities, scientific verification for preventing major disease is limited due to lack of basic knowledge about tested approaches modifying individuals behaviors and attitudes. Cigarette smoking has been established as a

causal agent in lung cancer and coronary heart disease, yet more than 50 million Americans, or approximately one-third of the adult population continue to smoke (Smoking and health, 1979). Hypertension can now be alleviated by ongoing medication(s) and/or weight reduction, but individuals must be motivated to take these drugs at prescribed times and lose weight, especially when no overt symptoms are evident. At present, in spite of today's scientific and technologic knowledge level, implementation of successful methods for the specific prevention of most cases of heart disease, cancer, and stroke is lacking (Abdellah, 1977, p. 247).

The obvious potential for prevention of several major chronic diseases has led to many campaigns and actions. Marginal or unsatisfactory results with these campaigns and actions has increased the demand for a sounder theoretical basis for health promotion activities.

There are several general models that may be applied to the design of health promotion programs (Kirscht, 1974; Rosenstock, 1974). Nursing, with its accessibility to not only individuals but families and communities as well, is in a unique position for developing testing and redefining preventive models and strategies of nursing care. Of primary importance in this investigation is the design and preliminary test of a nursing intervention strategy to augment and/or institute health promoting behaviors for primary and secondary prevention of coronary heart disease.

Coronary heart disease is the most common cause of death in both men and women in the United States and many other countries. Of primary importance in the identification of risk factors and subse-

quent modification is recognition that heart attacks have a tendency to recur in certain families. Prevention strategies should be aimed at helping families identify and modify high risk health behaviors. This is especially true when the family members themselves may have a "low" perceived susceptibility of risk and therefore perceive no "need" to consider the costs and benefits of preventive health practice.

Foremost in the establishment of successful programs for prevention of coronary heart disease (CHD) is the informed individual or family. If the individual does not understand what he must do to preserve health, and if he does not recognize when there is need of help, and if he is not prepared to take the appropriate steps to obtain this help, scientific and technologic knowledge will be of little value. It has therefore become increasingly clear that the first line of defense of preventive care is informing individuals, families, or entire communities of the nature and need for preventive health practices.

In early infancy, and later in life in the absence of signs or symptoms, screening programs provide a means to inform the patient of the presence of unsuspected disease. Screening is intended to identify unrecognized disease through the use of procedures and tests that can be economically and rapidly performed. Although screening can be applied to large, asymptomatic populations, it has proven to be most effective when selectively directed at individuals in high risk categories. Selective screening has far greater cost effectiveness and potential rewards than the indiscriminate application of tests



to large groups of people (Lewy, 1980). However, the identification of high risk individuals and families has traditionally been done from visits to their primary care physician. This approach, although successful in applying selective screening, may still miss those individuals and/or families considered at high risk for coronary heart disease (CHD). Therefore, various other strategies or mechanisms need attention, development, and testing as being viable for instituting health promoting practices.

#### General Problem

Motivation and the desire to alter behavior have strongly influenced the accomplishment of screening programs. Knowledge of the most efficacious methods for disseminating preventive intervention strategies among high risk individuals are needed. Enelow and Henderson (1975) have noted the following problems encountered in effectiveness of screening programs:

1. The percentage of individuals eligible for the examination is usually around 50%. Studies have not revealed a systematic bias among those who decline the examination for their reasons; except perhaps motivation.
2. Individuals found to be at risk have not made an effective contact with a physician in about 40-50% of the cases. This percentage rises among younger individuals and blacks.
3. Individuals are reluctant to alter pleasurable lifestyles which include cigarette smoking and the typical high fat American diet.
4. The present medical care system is largely crisis oriented and not skilled in long-term preventive approaches or convinced of the risk-factor concept (Enelow & Henderson, 1974, p. 2).

For these reasons, a better understanding of the mechanisms of motivation, communication, and modification of behavior is needed if effective detection, intervention, and referral programs are to be developed in the area of cardiovascular heart disease (Enelow & Henderson, 1975, p. 2).

Certain questions have been addressed by the investigator to analyze the problem of individuals' initiating and sustaining health promoting behaviors.

1. What populations are considered at high risk? Are these populations being addressed?
2. What motivates people at risk to take appropriate action to seek medical care?
3. What motivates people to adhere to or comply with prescribed medical regimens?

#### Research Problem and Purpose

An analysis of epidemiologic incidence findings for CHD has targeted families with premature sudden death as a high risk population. Sudden cardiac death has been documented as one of the nation's principal health problems, claiming some 300,000 to 400,000 lives each year (Corday, 1977). It has been further estimated that approximately 100,000 of these fatalities occur in persons during the prime of life or less than 65 years of age. Careful planning from the National Institutes of Health have launched several investigations into the problem of sudden cardiac death concerning etiology, pathology, risk factors, diagnosis and therapy (Corday, 1977, p. 813).

Extensive coronary artery disease and heart damage has been purported as causally related to sudden cardiac death (Reichenbach, Moss & Meyer, 1977).

Evidence from the Framingham Study revealed that the same precursors or risk factors occur in persons destined for coronary attacks whether fatal or not. There was no difference in risk factors whether death was sudden or not. Persons who had prior clinical heart disease were at a four-fold increased risk of sudden death. However, the suddenness of coronary fatality among them was no different from those originally free of overt coronary heart disease (Kannel, 1976).

Research has documented that in populations with high rates of coronary heart disease, sudden death occurs frequently. The morphological substrate is atherosclerosis of the coronary arteries, usually severe and widespread. The risk profile of a candidate for sudden death is indistinguishable from that of the individual with clinically manifest coronary heart disease; that is, exhibiting one or more of the risk factors, hypertension, heavy cigarette smoking, obesity, and the electrographic pattern of left ventricular enlargement. The need for primary prevention of atherosclerosis is inevitable, particularly since presently available treatments of the metabolic and electrophysiological precursors of atherosclerosis and sudden death are of unproven effectiveness. Sudden death, the most dramatic expression of CHD, should encourage investigation and investment in attempts to learn how to suppress, delay, or minimize the atherogenic process.

#### Problem Statement

The problem for this investigation is how to intervene with family

members of victims of sudden cardiac death to assess their health beliefs and health behaviors and initiate the change of any high risk behaviors for suppressing, delaying, or minimizing the potential CHD risk. Family members may perceive themselves to be without risk, and need nursing intervention designed to facilitate their consideration of susceptibility to CHD, and costs and benefits of preventive health practices. Specifically, these family members need assistance in the following ways:

1. Knowledge that:
  - a) They are at risk and why and how they are at risk.
  - b) Certain actions can be taken to counteract this risk.
2. Medical assessment and/or screening for determination of their current heart status.
3. Assessment of current risk variables:
  - a) Family history of coronary heart disease.
  - b) Lifestyle analysis and assessment regarding diet, exercise, smoking, and internal/external locus of control.
4. Support to alleviate:
  - a) Emotional distress regarding loss of family member.
  - b) Emotional distress of learning the nature of own risk and susceptibility to coronary heart disease.
5. To change their "health beliefs" in regard to being at risk for coronary heart disease:
  - a) In a primary preventive health context for some.
  - b) In a secondary preventive health context for others with detectable coronary artery disease.

This health care situation has several special features and problems:

1. These family members typically are not identified by health care professionals as "patients."

2. They may not perceive themselves as needing professional help (no symptoms and unrecognized special risk).

3. They are in varying degrees of emotional distress and crisis depending on their relationship to the deceased and the length of time since he/she died.

#### Purpose and Rationale

Operating from the assumption that associations between the primary risk factors (hypertension, hypercholesterolemia, and smoking) predispose and precipitate atherosclerosis, a prevention oriented study for reducing these risk factors is proposed. The purpose of this investigation is to design and preliminarily test a nursing intervention strategy aimed at first degree relatives of sudden coronary death to assess, inform and help institute health promoting behaviors.

The nursing intervention will consist of, and be operationally defined from the following parameters: assessment, information giving, educating, and providing emotional support. Of primary importance is the assessment of the nature and extent of the CHD risk factors of individual family members. Information sharing and educating is necessary to provide the rationale for why the primary risk factors may accelerate the atherogenic process and what health prac-

tices may serve to retard, minimize, or prevent this process. Lastly, the incorporation of appropriate emotional support is necessary because of the possible crisis or bereavement period which may affect these family members.

The inclusion of these essential components or strategies in the nursing intervention are derived from several observations. The first observation, nursings' current lack of empirical investigations testing the effects of nursing intervention in general, and prevention oriented nursing interventions in specific, was made after a comprehensive review of the nursing literature. The cardiovascular medical and epidemiological literature specifies a need for a more comprehensive or "holistic" approach for instituting behavioral changes, particularly in regard to reducing CHD risk behaviors. The last observation, an "empirical" observation, was derived from the investigator's direct patient contact and clinical experience. This comprehensive nursing intervention strategy was further conceptualized as necessary after consideration was made that these families may not see themselves as susceptible and therefore perceive no "need" to consider the costs and benefits of preventive health practices. This would seem to be especially true of those members totally asymptomatic.

The Health Belief Model provides a theoretical structure to account for individual health-illness behaviors and correlates to decision making. This model is discussed in detail in the conceptual framework section.

## CHAPTER II

### LITERATURE REVIEW

Literature reviewed presents appropriate historical and current findings for the aspects of: sudden death, CHD risk factors, cholesterol, blood pressure, and cigarette smoking, familial tendencies, prevention of coronary heart disease, the Health Belief Model, internal and external locus of control and the concept of crisis.

#### Sudden Death

Sudden infarction in a previously healthy subject was first reported in the 1920's in Great Britain and reached epidemic proportions in the two decades following the second World War (Yellowless, 1980). Since more than one-half of all coronary deaths occur outside the hospital and approximately 80% of these are due to sudden death, there has been considerable interest and investigation in factors which predispose this occurrence. According to the Framingham Studies (Kannel, 1976), the incidence of sudden death was distinctly increased in hypertensives, heavy cigarette smokers, the obese, and those with electrocardiogram left ventricular hypertrophy (ECG-LVH). The risk increased with the number of those factors present (Kannel, Doyle & McNamera, 1975).

A prospective study on male employees of the Peoples Gas Company

followed 1,465 men for five and ten year follow-ups. They were classified into three groups based on the initial examination: free of coronary heart disease (CHD), suspect for CHD, and with definite CHD. The risk of sudden death was noted as 9.4 and 6.6 times greater at five years and ten years in the definite CHD group than in the group free of disease. Also, 40-50% of all deaths in the known coronary groups were sudden, versus 20-30% in the group without CHD (Pollock & Schmidt, 1979). An analysis of coronary risk factors (serum cholesterol  $\geq 250$  mg/dl, diastolic blood pressure  $\geq 90$  mm hg, cigarette smoking  $\geq 10$ /day) was examined. "The men with any one, or with a combination of two or more of the three risk factors, even in the absence of major organ system disease, had three times the risk of sudden death at 15 years" (Pollock & Schmidt, 1979, pp. 127-128).

Sudden death in the United States has been documented as almost invariably due to coronary heart disease (Spain, Bradess & Mohr, 1960; Kuller, Cooper & Perper, 1972; Pollock & Schmidt, 1979, pp. 132-137). Evidence of prior myocardial infarction is common. According to some, the frequency of acute myocardial infarction varies from 13% to 47%. In these retrospective studies of sudden death:

- a) up to half of the descendents have had known heart disease, usually ischemic;
- b) the populations are largely male;
- c) risk increases with age;
- d) hypertension and diabetes mellitus are common;
- e) heavy cigarette smoking is frequent.

In the study of Friedman, Manwaring, Doulon, Ortega and Gabe (1973), most of the descendents are said to have exhibited Type A personality traits. Also reported was the finding that a number of the men witnessed to have died instantan-



ously had shortly before engaged in moderate to strenuous exercise (Friedman, et al., 1973).

Conclusions drawn from prospective studies of sudden death yield data strikingly similar to the retrospective observations just summarized. In the 14 years of the Framingham Heart Study, almost 50% or two-thirds of the individuals, dying within one hour of the onset of symptoms outside the hospital, had no prior clinically apparent heart disease (Gordon & Kannel, 1971, p. 1617).

More recently the Albany Study confirmed that sudden and unexpected deaths, observed to occur within one hour of collapse, demonstrated the presence of coronary heart disease in half of the descendants (Kannel et al., 1975, p. 606). The risk profile of the descendants was identical with that of peer groups deemed to be at increased risk of coronary heart disease, or who had survived a myocardial infarction.

#### Risk Factors for Coronary Heart Disease

Generally, those risk factors considered to be of greatest importance for CHD have been age, sex, hypertension, hypercholesterolemia, smoking, diabetes, and positive family history (Kannel, 1976, p. 376; Whyte, 1976; Pollock & Schmidt, 1979, pp. 15-28; Hopkins & Williams, 1979). Currently accepted as the three primary risk factors for the development of premature CHD are hypercholesterolemia, hypertension, and cigarette smoking (Stamler, 1979).

Determination of which factors play significant, causal roles in the pathogenesis of CHD necessitates a multidisciplinary approach.

The complex interaction of agents and synergistic effects points to a multifactorial basis for the disease. Greatest predictive power has been demonstrated with hypertension, hyperlipidemia, and smoking. Patient inactivity, obesity, personality, and stress are considered to be secondary factors in the initiation and/or promotion of CHD.

In the strictest sense, a "risk factor" for CHD should be associated with the disease and be demonstrated to have the ability to help predict the probability of the emergence of CHD following given measured levels of the factor (Williams, 1979, p. 1).

Williams continues to elaborate that in the "strictest" sense, to demonstrate the relationship between a risk factor increasing the incidence or emergence of CHD would require prospective studies in which levels are initially measured and correlated with subsequent CHD incidence and/or mortality. A risk factor may not necessarily be causal, although predictive in light of certain associated environmental factors (pollution, stress, etc.) leading to greater occurrence of CHD. Therefore, for purposes of clarification, risk factor will be considered as meaning no more than a suggested positive or inverse association with initiation, potentiation, and/or promotion of CHD according to already documented research findings.

Arguments based on the apparent synergistic effects among CHD risk factors have been documented (Stamler, 1978; Norum, 1977; Silver-smith, 1973). According to Stamler, the combined presence of two or more of the primary risk factors - hypercholesterolemia, hypertension, and cigarette smoking - constitutes a greater risk than the sum of the individual risks considered separately. Several investigators

have proposed differing quantitative measures for determining the proportion of the total load of a disease that is attributable to, or at least related to any specific risk factor. Miettinen (1974) has strongly advocated the use of the "etiologic fraction" or attributable fraction, and has applied this measure to data published by the National Cooperative Pooling Project to estimate the fraction of CHD cases that could have failed to develop had the risk indicator and/or its associated etiologic factors been absent from the population. Estimates of etiologic fraction were related to different levels of serum cholesterol. The risk of developing CHD in ten years by men aged 30 to 59 years and free of clinical CHD at initial examination increased with increasing cholesterol levels. Among those with initial levels of 300 mg/100 ml or more, the risk was 3.1 times that pertaining to men with a level below 225 and an estimated 67% of CHD in this group is related to their excess cholesterol level (Whyte, 1976, p. 390). Overall it was estimated that 32% of CHD in the men at issue was related to hypercholesterolemia ( $\geq 225$  mg %). According to Whyte (1976, p. 390), Miettinen's estimates of the fractions of CHD attributable to the three major risk factors is 68%. This method gives a composite estimate and no indication of the relative importance of each of the three contributing factors. Whyte (1976, p. 391), using a different method of measurement, analyzed results from the Pooling Project to report and composite attributable contributions of the major risk factors. The proportion of disease attributable to cigarette smoking was reported at 24% for first major event, 14% for sudden death, and 22% for non-

coronary death. Hypertension and hypercholesterolemia were not separated in the results available from the Pooling Project, and were reported in combination as contributing 34% of first coronary event. Overall, the estimated proportion of disease attributable to these factors was reported at 56-70% for CHD and 55% for non-CHD deaths. Whatever the specific "etiologic fraction" is, emphasis for primary prevention should be placed on the interaction of these factors with each other and with other risk factors.

### Cholesterol

The lipid hypothesis maintains that reducing the level of serum cholesterol will lead to a reduction in the incidence of coronary heart disease. The evidence for linking diet to hyperlipidemia as a risk factor is based on the following:

1. CHD is rare among populations with low mean plasma cholesterol levels.
2. CHD at a young age is common in patients with familial hyperlipidemia.
3. There is an approximate linear relationship between plasma cholesterol levels greater than 200 mg/100 ml and the incidence of CHD.
4. Hypertriglyceridemia is probably an independent risk factor.
5. Plasma lipids are mainly derived from foods. Thus, plasma lipid levels can be raised or lowered by changes in eating habits.
6. The hallmark of atherosclerotic plaqueing is the accumulation of cholesterol.
7. The concentration of cholesterol in the arterial wall is in proportion to that in the plasma.
8. Atherosclerosis has been induced in primates where they are fed Western-type diets.

9. Pathological changes in experimental animals regress with a reversion to their natural diet.
10. In man, there is a regression of the cutaneous manifestations of hypercholesterolemia after diet or drug therapy to lower hypercholesterolemia (Lewy, 1980, pp. 14-15).

Controversy, however, exists with the testing of the lipid hypothesis in both secondary and primary prevention trials. Ahrens (1976, pp. 87-93) points out that both secondary and primary prevention trials conducted to test the lipid hypothesis "...lead us to no clear-cut conclusion that the effort was worth the cost...."

The U.S. Coronary Drug Project, considered a classic trial without methodological flaw and meticulously conducted, revealed negative findings. The conclusion was made that serum cholesterol-reducing measures are not likely to be effective in secondary prevention of coronary heart disease (Borhani, 1977, p. 256). The same conclusion was determined for primary prevention studies except, unlike the U.S. Coronary Drug Project, these studies, New York (Rinzler, 1968), Helsinki (Miettinen, Turpeinen & Karvonen, 1972), Chicago (Stamler, Majonnier, Hall, Berkson, Catchings & Moss, 1976) and Los Angeles (Dayton, Pearce, Hashimoto, Dixon & Tomiyasu, 1969) suffered from methodological problems. Included in these problems were inadequate study design and analysis, inadequate numbers, lack of randomization, and invalid statistical procedures. It appears, in summary, that despite a very considerable scientific effort and some tantalizingly suggestive results, the lipid hypothesis has not been adequately tested.

### Blood Pressure

Hypertension is not only a risk factor for CHD, but has its own

set of risk factors. Age, sex, race, obesity, and possibly alcohol consumption have been associated with hypertension (Lewy, 1980, p. 12). It has been estimated that control of obesity among the white population in the United States could reduce the prevalence of hypertension by 50% (Lewy, 1980, p. 13).

According to Whismont (1974), despite the importance of blood pressure control in decreasing the incidence of stroke, it is estimated that only nine percent of all hypertensives under treatment are in good control. Whismont's survey (1974) noted that 42% of hypertensives found did not even know that they were hypertensive. Less than one-third who knew they were hypertensive were being treated.

Clinical trials (Veteran's Administration Cooperative Study Group on Antihypertensive Agents) have provided optimism that primary prevention of major complications of atherosclerosis may be achieved through hypertension control (Borhani, 1977, p. 256). The prevention of stroke has been more conclusive than the prevention of coronary heart disease.

### Cigarette Smoking

Unlike cholesterol and blood pressure where potential efficacy of alteration remains somewhat questionable, cigarette smoking has been definitely demonstrated to increase the risk of coronary heart disease, and abandonment of the habit reduces the risk (Epstein, Ostrander, Johnson, Payne, Hayner, Keller & Francis, 1968; Borhani, 1966; Traett, Cornfield & Kannel, 1967; Reid, 1972). The available evidence indicates that total mortality is about twice as high among cigarette smokers as among non-smokers

(Borhani, 1977, p. 256).

Cigarette smoking has been demonstrated to enhance significantly the effect of other coronary heart disease risk factors. In summarizing the Chicago Coronary Prevention Evaluation Study, Stamler stated, "...these data strongly suggest that continued cigarette smoking is associated with very high risk of premature death for coronary prone men and that other preventive measures are by themselves of limited value...as long as they fail to give up cigarette smoking..." (Borhani, 1977, p. 257).

#### Familial Tendencies

At the present time the development of comprehensive measures for quantifying innate susceptibilities to the various risk factors are indicated. A strong family history of premature cardiovascular disease has been documented as ominous (Pollock & Schmidt, 1979, p. 25). Families not only show aggregation to risk factor traits that are genetic, but a tendency to develop disease could well reflect a shared environment. The Framingham Study of 1,256 spouse pairs of single continuous marriages evaluated evidence of aggregation of coronary heart disease risk factors across a span of 14 years. Statistically, significant spouse aggregation was noted at the initial examination for systolic and diastolic blood pressure, cholesterol, uric acid, hemoglobin, phospholipids, blood glucose, vital capacity, and weight (Sackett, Anderson, Milner, Feinleib & Kannel, 1975). The risk factors tended to correlate more strongly among spouse pairs married for progressively longer periods. Here the suggestion of

shared environments was perhaps responsible. However, in spouse pairs present for the entire 14 year period, aggregation of risk factors decreased over time with the exception of weight and vital capacity (Kannel, 1976, p. 384). Spouse pairs dissolved during the 14 years (largely through death) showed divergent risk factor values. These data have been interpreted to mean that spouse concordance of risk factors is determined by marriage of similar people as well as shared environment.

Several studies have presented evidence strongly suggesting that familial factors play an important role in the development of early coronary heart disease (Deutscher, Epstein & Keller, 1969; Russek & Lohman, 1958; Slack & Evans, 1966; Rosenman, Friedman, Straus, Wurm, Jenkins & Messinger, 1964). Support for obtaining parental history has been determined as necessary and predictive in assessing the risk of clinical coronary heart disease (CHD), and has been documented from a wide variety of sources including studies of twins and family aggregations (Goldstein, 1973).

Epidemiologic studies have revealed an increased incidence of clinical CHD among patients with a parental history of CHD (Epstein & Ostrander, 1971; Goldstein, 1973, pp. 53-65; Rosenman et al., 1964, pp. 15-26). Although chance alone can explain impressive clusters for certain diseases, in CHD, familial clustering is too strong to be ascribed primarily to chance (Shanoff, Little, Murphy & Rykert, 1961; Slack & Evans, 1966). The recognition of a positive family history should be understood as a major risk factor, and one which especially concerns family members.



Questions concerning the nature of identifiable risk factors and subsequent modification from various preventive strategies need much investigation and documentation. A report on the Finnish Study in which 6,000 workers in a Finnish wood and paper industry were examined for ischemic and/or angina tendencies provided the basis for studying first degree relatives for CHD. The cases and controls constituted 1,058 surviving first-degree relatives. An increased risk of CHD was fourfold among brothers of the men with CHD, twofold among fathers, and apparently none at all among mothers (Rissanen & Nikila, 1977). In Finland, further investigation revealed that for a man whose brother had just had a heart attack, the probability of CHD appearing before the age of 65 was 65% in eastern Finland, and 52% in the southern region, as compared to 31% and five percent respectively in brothers of healthy controls.

Data concerning familial aggregation have attempted to discriminate environmental from genetic factors. The complexities become enormous when one considers the many intervening physiological, biochemical, behavioral, and cultural variables influenced still further by environmental agents on the sequelae of atherosclerosis. The task of identifying particular genetic influences or variables is formidable. Discouraged by the multifactorial components, investigators have studied single genes and related expressions in hyperlipidemia and cholesterolemia. Many possibilities for genetic control have been postulated as a result of developing knowledge of the cell biology of the arterial wall (Sing & Skolnick, 1979).

Familial hypercholesterol (IIa) has the greatest predictive

power in characterizing genetic disorders leading to early CHD (Williams, 1981, p. 95).

As an autosomal dominant trait, heterozygotes have been estimated to occur once in 500 persons. In adults, serum cholesterol levels range between 300 and 600 mg/dl, and tendinous xanthoma are found in over half of these adults. The risk of CHD by age forty is 15% in males (compared to 0.5% in the normal population) with a 52% risk of CHD by age sixty (compared to 13% in normal population) (Williams, 1981).

According to Williams (1980, p. 95), female heterozygotes are affected to a lesser degree, with cumulative probability of CHD of 20% by age fifty and 32% by age sixty (compared to eight-percent and ten-percent respectively in normals). In school age children, the level of cholesterol is predictive of the level four years later (Williams, 1981, p. 93). Williams refers to this phenomenon as "tracking" in that these cholesterol levels provide some evidence for an inborn control of physiologic processes over time. Only weight demonstrates more consistent tracking than total serum cholesterol among the major CHD risk factors (Williams, 1981, p. 93).

The Framingham Study (1974) demonstrated that abnormal glucose tolerances can be associated with an increased risk for coronary heart disease. Williams (1981, p. 101) reports that this condition (abnormal glucose tolerance) is significantly more common than overt diabetes, and that a glucose intolerance reflected by blood glucose level one hour after a glucose challenge shows much higher correlation between monozygotic than dizygotic twins, with a heritability estimate of approximately 90%. This variable showed a correlation of 0.39 between brothers. In young women with diabetes or glucose

intolerance, demonstration of an increased liability for CHD is revealed (Williams, 1981, p. 101).

In summary, the prevalence of hypertension and hypercholesterolemia is shown to be significantly higher in relatives, both men and women, of men with early CHD. The Tecumseh Study (1969) showed that elevated cholesterol was more common in sons of men who had an early CHD death. Hypertension and glucose intolerance were more common among daughters of women with early CHD. Williams (1981, p. 103) distinguishes that these data suggest sex specific CHD aggregation in families as possibly due to differential responses of men and women to several major risk factors. Familial hypertension and diabetes lead primarily to early CHD in women. Familial hyperlipidemia leads predominately to early CHD in men (Williams, 1981, p. 105).

#### Prevention of Coronary Heart Disease

Atherosclerosis and its cardiovascular sequelae are widely recognized as the leading threat to health and life expectancy. Cardiovascular diseases still account for more deaths (51% of annual national mortality) than all other causes combined (Pollock & Schmidt, 1979, p. xiv). Internationally, heart and vascular diseases account for 40% of all deaths. Due to the ubiquitous prevalence of cardiovascular disease, it seems logical that a preventive approach to these lethal diseases, which may attack without warning and often present with sudden death, can effect a substantial reduction in coronary or stroke mortality.

During the first half of this century, the studies of coronary

heart disease emphasized the pathogenesis, physiology, and clinical features, whereas the second half of the century has emphasized preventive aspects. Since the late 1950's there has been increasing knowledge of the epidemiology of coronary atherosclerosis and related sequelae.

The application of recently devised preventive measures, symptomatic treatments, and evaluation modalities has become widespread due to the increase in collaborative interdisciplinary efforts and public education campaigns. These efforts have exerted a salutary impact on improving the health of Americans (Pollock & Schmidt, 1979, p. xiii).

That an emphasis on prevention was appropriate was not scientifically at issue. However, the controversial issues to some scientists were: a) the adequacy of scientific data relating certain identified risk factors to the development of coronary artery disease; b) the validity of taking the available data regarding risk factors and developing preventive programs for application to individual patients believed to be of high risk; c) the validity of applying current knowledge to the population as a whole; and d) the possible need for more information as to undesirable or hazardous consequences of preventive programs (Multiple Risk Intervention Trial, 1976). As a result of these controversies, two divergent approaches have emerged and are continuing in recent investigative efforts. One approach has been to initiate preventive programs immediately recognizing limitations in the available scientific knowledge but justifying the position that current knowledge is so persuasive and the disease so epidemic

and catastrophic that immediate efforts must begin. The other approach has been to acquire even more convincing information and relate individual risk factors empirically to the development of coronary heart disease and its complications (Multiple Risk Intervention Trial, 1976, p. 825). Both approaches recognize that coronary heart disease is a multifactorial condition.

According to Blackburn, certain directing propositions are increasingly accepted by practitioners and specialists in prevention and public health and are being acted on by the public and elected officials.

1. Individuals, and entire cultures, have vastly different risk for future heart attack and cardiovascular disease.
2. Risk is strongly and consistently related to levels and distributions of the major risk characteristics, both for individuals and for entire populations.
3. Risk characteristics are considered causal because of their strong predictive nature and because of the consistence and congruence of evidence from clinical, experimental-laboratory, and population studies.
4. Risk characteristics are importantly behavioral and sociocultural in origin.
5. Advice to patients and the healthy alike is indicated to change unhealthy behavior and to encourage skills, motivation, and social supports to accomplish the change.
6. Knowledge about risk factors and their safe and palatable modification provides a rational basis for preventive practice and public programs (Blackburn, 1974, pp. 1-36).

These propositions have served as the basis for research for several decades and on several stages of the preventive process. One

of the first large experiments involved risk factor reduction from the Laboratory of Physiological Hygiene, School of Public Health, University of Minnesota. This was the National Diet-Heart (D-H) Study begun in the early 1960's to lower blood lipids by dietary changes.

High risk men from five United States communities were recruited and enrolled in an intensive experimental trial. Experimental diets were designed to be cholesterol-lowering to various degrees, and the control diet was designed as relatively neutral in its serum cholesterol effects. Although the cholesterol levels in the experimental group fell 10-15%, in a six month follow-up after the close of the D-H experimental period, the men on experimental diets had mean cholesterol levels no different from the preintervention values. The D-H investigators concluded that just merely exposure to the experimental diets was insufficient to sustain change in diet habit (National Diet Heart Study Group, 1968). In an attempt to understand the follow-up results it was concluded that a thorough educational process would be essential to stimulate and sustain motivation (National Diet Heart Study Group, 1968, p. 419). Since the D-H study, several other investigations have demonstrated and documented varying amounts of consistent adherence and reduction in risk factor inducing behaviors (Becker & Maiman, 1975; Marston, 1970; Mitchell, 1974).

Several prospective epidemiological studies have demonstrated a linear relationship between the level of the blood pressure and the risk of the coronary heart disease (Cordray & Cordray, 1975; Kannel,

McGee & Gordon, 1976; Multiple Risk Intervention Trial, 1976, p. 825). The Veteran's Administration Cooperative Drug Study where 380 hypertensive men were randomly assigned to a drug treatment group or a placebo group demonstrated that over a five year period the risk of morbidity decreased from 55 to 18% for the treatment group (Lewy, 1980). Cardiovascular events occurred in 35 men of the control group versus nine men of the treatment group. Primary prevention studies for the detection and/or screening of hypertension in children have found as in one survey of 1,795 children that 2.3% of children between ages four and 15 and 1.4% of children between ages 12 and 21 were hypertensive (Lewy, 1980, p. 13).

Much literature on coronary heart disease and smoking has prompted extensive investigations on the impact of smoking as a single predictor of CHD and interactive effects with other known risk factors. A preliminary analysis of an extensive antismoking program in Minnesota demonstrates that the strongest predictor of continued smoking is whether or not cigarettes are still being smoked during the active phase of the antismoking intervention (Pollock & Schmidt, 1979, p. 264). Other predictors include the number of cigarettes smoked at the end of the intake or recruitment period, the amount of business travel, age, and whether or not the spouse smokes (Pollock & Schmidt, 1979, p. 264).

The Framingham Offspring Study provides information that primary prevention may be effective in decreasing CHD mortality (Feinleib, Simon, Kannel, Garrison, McNamara & Castelli, 1975). In comparing the age-specific means of blood pressure, serum cholesterol,

and cigarette smoking between the original cohorts and their offspring, there was a decrease in all three factors among the offspring.

The Oslo investigation which was a randomized trial in healthy men (N = 1,062) has also (Hjermann, Byre, Holme & Leren, 1981) demonstrated a reduction in coronary mortality from primary prevention. Men were admitted to the trial if they had serum cholesterol levels of 290-380 mg/dl, were smokers, and had systolic blood pressures below 150 mmHg. The intervention consisted of education on two risk factors: reduction of serum cholesterol and cessation of smoking. The subjects were advised to reduce saturated fat, slightly increase on polyunsaturated fats, reduce sugar and alcohol, substitute fiber rich bread for white bread, and to stop the practice of smoking. The findings reported were: a) reduction of mean serum cholesterol by 13% in the intervention group; b) decrease in mean tobacco consumption by 45% per person more in the intervention group; and c) 25% quit smoking in the intervention group as compared to 17% in the control group. At the end of the trial the incidence of myocardial infarction (fatal and non-fatal) and sudden death was 47% lower in the intervention group. Cox's proportional hazard model revealed that the reduction in myocardial infarction incidence in the intervention group was correlated with the reduction in total cholesterol (.57) and to a lesser extent with smoking cessation (.18) (Hjermann et al., 1981, p. 1307).

Operating from the premise that cardiovascular risk factors and/or precursors can be measured in asymptomatic individuals and



correlated with a high incidence of premature coronary heart disease (Kannel et al., 1976, p. 46; Dawber, 1975; Gordon, 1973), a nurse designed a program to identify high risk families and encourage practice of preventive measures (Manley & Graber, 1977).

A pilot program instituted in Nashville, Tennessee in the fall of 1975 identified patients with diagnosed CHD either by angiography or acute myocardial infarction. Using these symptomatic patients as index cases, their asymptomatic relatives for the screening program and educational program were sought. Candidates for the screening program included all blood relatives of the index patients, mothers, sisters, children and their descendants. Spouses and other relatives were given an opportunity for screening. The screening program evaluated the following risk factors: hypertension, serum cholesterol, triglycerides, glucose, cigarette smoking, obesity and physical exercise habits (Manley & Graber, 1977, p. 1045).

In the course of the pilot year, more than 1,000 persons attended the classes and 174 persons participated in the screening program. Persons from ten to 60 years of age were included. Excluded in the screening program were those with previously diagnosed coronary heart disease. Participation in the screening program was not required for participation in the educational program and vice versa. Participants in the screening were charged a small fee to cover laboratory costs.

Results are summarized in Table 1: lipid abnormalities of 23% in screened family members; 16% of previous undetected hypertension; 44% of the family members were found to be overweight; 21% were cigarette smokers; and 62% had sedentary activity patterns (Manley & Graber, 1977, p. 1046).

The authors report a successful hospital based program for monitoring families to improve their health habits as instituted using the crisis situation as a stimulus.

Theoretical considerations of motivational needs and coping strategies utilized by people for improving their health habits, factors influencing the adherence to medical regimens, and the holistic view or components of behavioral responses to illness have been extensively conceptualized and investigated (Becker, 1974; Becker & Maiman, 1975; Kasl, 1974; Kegeles, 1963; Mechanic, 1977; Rosenstock, 1974).

In attempting to explicate and understand the determinants of patient compliance behavior, hundreds of investigations have been undertaken ranging in emphasis from medical (Bice & White, 1969) to dimensions which are socioeconomic (Muller, 1965; Roth, 1969), socio-cultural (Jenkins, 1966; Mechanic, 1963; Polgar, 1962; Zola, 1966), social-interactive (Chen & Cobb, 1960; Mabry, 1964; Mechanic & Volkart, 1961), and demographic (Anderson, 1973).

Becker (Table 2) has identified and summarized the occurrence of findings among a multiplicity of demographic variables which were often either not predictive of compliance, (Davis, 1968; Mitchell,

Table 1

Manley and Graber results of Screening in Relatives of Symptomatic Heart Disease Index Cases

	Risk Factors							
	Hypercholesterolemia	Hypertriglyceridemia	Combined hypercholesterolemia and hypertriglyceridemia	Hypertension	Hyperglycemia	Smoking	Overweight	Sedentary
<u>Blood Relatives</u>								
Age 10-45 years (N=81)	3	15	3	5	2	22	29	43
Age 46-60 years (N=27)	1	7	3	10	0	5	12	18
<u>Relatives by Marriage</u>								
Age 10-45 years (N=14)	1	2	0	3	0	6	6	11
Age 46-60 years (N=52)	3	3	1	9	0	4	30	36
<u>Totals</u> (N=174)	3 (5%)	27 (15%)	5 (3%)	27 (16%)	2 (1%)	37 (21%)	77 (44%)	108 (62%)

Note Adapted from Manley & Graber, 1977.

Table 2  
 Summary of Studies Examining Sociodemographic Variables in  
 Haynes/Sackett Annotated Bibliography on Patient  
 Compliance

Variables (Sociodemographic)	Number of Studies		
	Correlation Type		
	+ <sup>a</sup>	-- <sup>b</sup>	- <sup>c</sup>
Age	7	30	0
Sex	3	25	3
Educational status	8	24	0
Social status	4	9	0
Job status	6	12	0
Income	2	11	1
Marital status	6	11	0
Ethnic status and race	7	11	0
Religious preference	0	4	0
Demographic variables	0	1	0
Total	43	138	4

<sup>a</sup>+ = positive correlation; <sup>b</sup>-- = no correlation; <sup>c</sup>- = negative correlation.

Note. Adapted from Lasagna, 1976.

1974), or were mutually contradictory (Marston, 1970; Mitchell, 1974, pp. 75-87).

Becker continues to elaborate that scientific research contrasting high and low rates of acceptance of medical recommendations based on such sociodemographic variables has four major problems: a) even if consistent relationships could be demonstrated between one or more of these factors and patient noncompliance, none of these associations would, by itself, offer sufficient explanation for determining what the content and strategy of the intervention should be; b) the nature of the personal and demographic variables themselves are enduring or immutable, and would render few opportunities for interventions aimed at increasing compliance; c) explanations to account for those persons who possess one or more of the sociodemographic characteristics but who comply with the desired behaviors are not accounted for; and d) these variables do not present a unified conceptual framework regarding differential compliance (Lasagna, 1976, p. 98).

Health action behavior has been analyzed and explained using "value-expectancy" models whereby behavior descriptions and decision-making approaches are discerned under conditions of uncertainty. Behavioral predictions are established from the value of an outcome to an individual or relative costs versus benefits, and from the individual's expectation that a given action will result in that outcome (Becker & Maiman, 1975, p. 11).

Motivation for individuals adhering to certain prescribed medical regimens and "preventive" health recommendations specifies possession of knowledge regarding health practices and/or theory, per-

ception of themselves as potentially vulnerable, and the condition as threatening, are convinced of the efficacy of intervention, and see few difficulties in undertaking the recommended action (Becker & Maiman, 1975, p. 12).

Perhaps most noteworthy of all the theoretical models or frameworks devised to account for individual health-illness behaviors and correlates to decision making is the Health Belief Model. This model will be utilized in this investigation as part of the conceptual framework with certain demographic, socio-psychological and perceived susceptibility considerations as antecedent variables in predicting preventive behavioral changes.

#### The Health Belief Model

The Health Belief Model (HBM) was originally formulated by Hochbaum, Levanthal, Kegeles and Rosenstock extending the use of socio-psychological variables to the explanation of preventive health behavior. Rosenstock states that the HBM is derived from the social-psychological theory of Lewin, Becker, and others who have categorized the model as an "expectancy X value" theory for describing behavior or decision making under conditions of uncertainty (Becker, Drachman, Kirscht, 1974; Lewin, Dembo, Festinger & Sears, 1944; Rosenstock, 1974, pp. 328-335) (Figure 1).

The HBM proposes the following theoretical formulations: a) the individual's psychological "readiness to take action" relative to a particular health condition is determined by both the person's perceived "susceptibility" or vulnerability to the particular condition

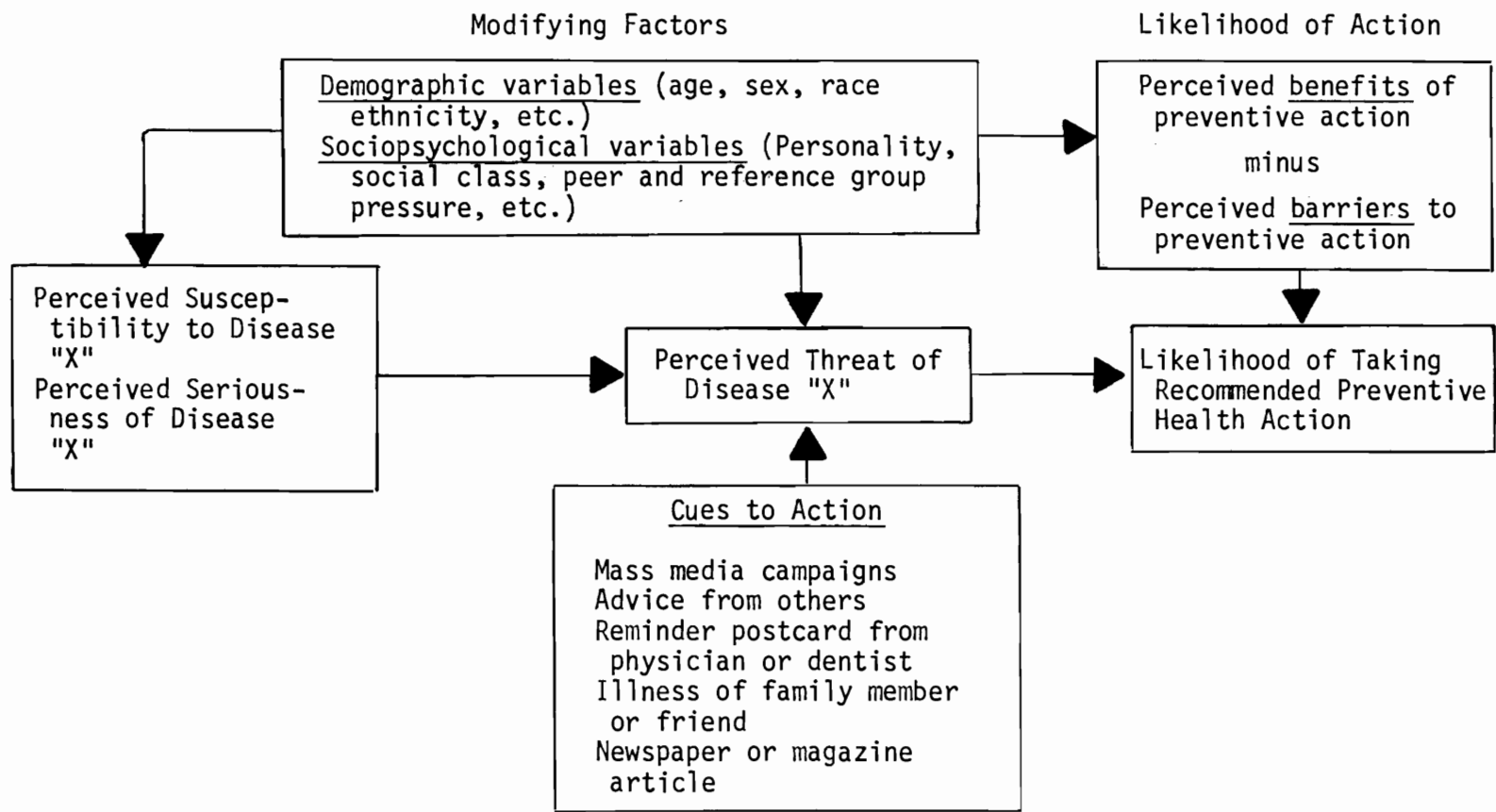


Figure 1. The "Health Belief Model" as Predictor of Preventive Health Behavior. Rosenstock, I.M. Historical origins of the health belief model. *Health Education Monographs*, 1974, 2 (4), 334. Reprinted with permission of Human Sciences Press.

and by his perceptions of the "severity" of the consequences of contracting the condition; and b) the individual's evaluation of the advocated health action in terms of its feasibility and efficaciousness, weighed against his perceptions of psychological and other barriers, or costs, of the proposed action (Maiman & Becker, 1974, pp. 348-349). A stimulus must occur to trigger the appropriate health behavior, "cue to action," which can be either internal (e.g., perception of the bodily states) or external (e.g., interpersonal interactions, mass media communications, personal knowledge of someone affected by the condition) (Maiman & Becker, 1974, p. 349).

Traditional learning-theory models define the term "cue" to mean those things that trigger or initiate the so-called stimulus response sequence and are often themselves demonstrated to contain some motivational value (Maiman & Becker, 1974, p. 349). The "cue to action" employed as necessary for activating the readiness variables presumes cognition as necessary for attitude change. The individual must think about the elements and the relations in question for activating the dissonance required for motivating possible attitude changes. The HBM assumes that motivation is a necessary condition for action, and operationalizes motivation via two dimensions (psychological state of readiness to take specific action and extent to which a particular course of action is believed to be beneficial in reducing the threat). The model's outcome variable "disposition of taking, recommended preventive health action" is related to incentive, expectancy, and motivational variables in a multiplicative fashion (Maiman & Becker, 1974, p. 350).



### Perceived Susceptibility

Several studies have reported positive correlations between an individual's subjective estimate of personal vulnerability and compliance with recommendations to obtain: a) screening for heart disease (Haefner & Kirscht, 1970), b) clinical cancer (Flach, 1960; Kegeles, 1969), c) breast cancer (Fink, Shapiro & Roester, 1972), d) tuberculosis (Haefner & Kirscht, 1970, pp. 478-484; Hochbaum, 1958; Hochbaum, 1956), e) dental problems (Kegeles, 1963, pp. 90-98; Kegeles, 1963; pp. 166-173), and f) immunizations against various illnesses (Levanthal, Hochbaum & Rosenstock, 1960; Ogonwo, 1973; Rosenstock, Derryberry & Carriger, 1959). One retrospective study reported that persons with low susceptibility were more likely to use the dentist preventively. This was interpreted by the investigators to mean that persons who go regularly to the dentist feel that such care maintains their oral health, and thus feel less vulnerable to dental problems (Becker & Maiman, 1975, p. 13). Likewise, another experiment employing fear arousal techniques found no association between susceptibility and college students' obtaining tetanus immunizations.

In examining the relationship between perceived vulnerability and compliance with prescribed regimens (sick role behavior), researchers have utilized the concept of "resusceptibility," since a diagnosis of illness has already been made. Continued penicillin prophylaxis behavior of college students with a history of rheumatic fever was reported by Heinzelmann to be related to subjective estimates of the likelihood of having another attack (Becker & Maiman, 1975, p. 13). Similarly, Elling and others found significant positive associations

between a mother's belief in the possibility of her child getting rheumatic fever again and compliance in both administering penicillin and in clinic attendance (Becker & Maiman, 1975, p. 13).

### Perceived Severity

The Health Belief Model asserts that even when an individual recognizes personal susceptibility, action does not occur unless the belief is held that becoming ill would bring serious organic and/or social repercussions (Becker & Maiman, 1975, p. 14). Several studies of preventive health behavior have demonstrated correlations between relatively higher degrees of belief that acquiring the condition could be serious and compliance with health recommendations for prevention of accidents (Suchman, 1967), seeking dental care (Tash, O'Shea & Cohen, 1969; Kegeles, 1969, pp. 115-124), and care in response to symptoms (Battistella, 1971). Participation in screening programs (Haefner & Kirscht, 1970, pp. 478-484; Becker, 1974, pp. 3-14; Hochbaum, 1958; Kirscht, 1966, pp. 248-252), and obtaining immunizations (Becker & Maiman, 1975, pp. 10-24) have failed to show significant associations between perceived severity and health seeking practices.

Compliance with prescribed medications and perceived severity demonstrates positive and consistent results, and regularly predicts adherence to the regimen (Lasagna, 1976, p. 104).

These findings support the notion of "as soon as people feel better they stop taking their medicine" since the presence of symptoms seems to produce an elevating or "realistic" effect on per-

ceived severity.

### Benefits and Barriers

An individual, even at a high level of readiness (perceives the possibility of contracting the disease, with serious consequences) in all likelihood of compliance, will still be a function of beliefs about "the probable effectiveness of the recommended action in reducing the health threat and about the difficulties (financial, physical, and psychological) which must be encountered or endured if such action is taken" (Becker & Maiman, 1975, p. 16).

In a field experiment to identify factors associated with participation in a cervical cancer screening program, it was demonstrated that women who were compliant were more likely to believe that: (a) early detection could lead to a more favorable prognosis; b) that a physician or a test could detect cervical cancer; and c) such a test/examination could reveal illness before the appearance of clinical symptoms (Lasagna, 1976, p. 105). Prediction of regular administration of the prescribed penicillin was reported by Becker as related to the belief in the medication's efficacy (Becker, 1972, pp. 843-853). Gordis was unable to obtain an association between belief in the power of the drug to prevent another attack and compliance (Gordis, Markowitz & Lilienfield, 1969, pp. 957-968).

Accordingly, several investigators have reported dependable variables as predictors of noncompliance. Among these are safety factors, fear of pain, discomfort, monetary costs (Antonovsky & Kats, 1970; Kegeles, 1963, pp. 166-173; Tash et al., 1969, pp. 514-521), extent

to which new patterns of behavior must be adopted (Collette & Ludwig, 1969; Davis & Eichhorn, 1963; Francis, Korsch & Morris, 1969; Riley, 1966; Weintraub, Au & Lasagna, 1973), duration of proposed medical regimen (Bergman & Werner, 1963), complexity of medical regimens, (Curtis, 1961; Davis, 1966; Francis et al., 1969, pp. 535-540), and side effects (Weintraub & Lasagna, 1973, pp. 481-485).

Rosenstock, in analyzing the major findings of studies on the patterns of use of preventive and detection services, has permitted certain summary generalizations about the association of demographic and perception of symptoms, variables or antecedent variables with the use of services. The demographic variations include females, younger or middle-aged are most apt to use such services, those who are relatively better educated and have higher incomes, and whites generally demonstrating higher acceptance rates than non-whites (Rosenstock, 1974, p. 355).

Certain investigations concerning "perception of symptoms" have attempted to link personal and subcultural variables to an individual's likelihood of perceiving an event as a symptom or to his mode of responding to a symptom. Koos found a social class gradient in terms of the likelihood of interpreting a particular sign as a symptom (Koos, 1954, in Rosenstock, 1974, p. 359). The effects of ethnic values upon the decision to seek medical attention and on the differential interpretation of objectively similar symptoms was investigated by Stoeckle, Zola, and Davidson (cited in Rosenstock, 1974, p. 355). According to Rosenstock, these studies are superior in their ability to explain the relationships between demographic

factors and utilization of services. They also demonstrate that health decision making is a process in which the individual moves through a series of stages or phases. "The findings are of unknown relevance to the situation confronting the person who must decide whether to seek preventive or detection services before the appearance of events that he interprets as symptoms" (Rosenstock, 1974, p. 360).

The studies of Freidson (1961) and Zola (1964) have illustrated some of the stages in which an individual moves through inherent in the health decision making process. For example, individuals who accept their susceptibility to a particular condition and are aware of actions that might be beneficial in reducing their susceptibility may be more prone to learn about and seek out professional diagnosis rather than using the "lay referral system" (Rosenstock, 1974, p. 371).

Rosenstock continues to address the nature of stability and reliability of the health beliefs temporarily as a function of situational changes. Learning that a friend or relative has suffered a serious illness may well raise levels of motivation and readiness to act, or cue to action, and is recommended as a need for future investigation (Rosenstock, 1974, p. 375).

The success of preventive intervention when it is aimed at increasing motivation and subsequent behavioral changes is not only related to subsequent ideas about vulnerability and present health state, the value placed on health and early detection, but also the perceived control felt by an individual over his environment and processes of decision making.

### Internal-External Locus of Control

The constructs of internal and external locus of control were derived out of Rotter's social learning theory. Individuals' beliefs about what they themselves can do to bring about better health are viewed from a perspective of individual differences. These individual difference constructs refer to the "generalized expectancy" as to whether reinforcements are contingent upon the actions of an individual himself (internal locus of control) or upon external factors such as luck, chance, or other people. In general, studies have reported that individuals who hold a belief in external locus of control are less likely to try to control what happens to them than those who hold an internal belief (Joe, 1971; Lefcourt, 1966; Lefcourt, 1972; Rotter, 1966). Several investigators have measured the extent to which individuals hold internal or external locus of control beliefs, but until very recently few have been directly relevant to health care behavior.

Several studies have suggested that internals are more likely to take preventive measures to keep themselves healthy and free of disease or the possibility of accident (Wallston & Wallston, 1978). Non-smokers have been reported as more likely to be internal than smokers, and that males who believed the Surgeon General's report and quit smoking were more internal than those who believed the report but did not quit smoking (Straits & Sechrest, 1963; James, Woodruff & Werner, 1965). Platt found internals able to change smoking behavior to a greater extent than externals, and Williams found

greater cigarette smoking among external ninth-grade subjects (Wallston & Wallston, 1978, p. 108).

Locus of control has been investigated and considered to be a relevant factor concerning weight loss. Manno and Marston found among their control group subjects that internals were more successful in losing weight than externals (Wallston & Wallston, 1978, p. 109). Overweight women were found to be more frequently external locus of control than internal locus of control (Wallston & Wallston, 1978, p. 109). Wallston, however, failed to find significant differences in weight reduction between internals and externals using either the Internal-External Scale or the Health Locus of Control Scale to measure these characteristics (Wallston & Wallston, 1978, p. 110).

Other preventive behaviors have been related to internality: a) greater reported seat belt use, b) immunization against influenza, and c) preventive dental care (Wallston & Wallston, 1978, p. 110).

Sick role behaviors and locus of control have also been studied using measurements of locus of control in analyzing behaviors of myocardial infarction patients while in intensive care. Main effects of locus of control verified that externals spent more days in the coronary care unit and had higher temperatures and lactate dehydrogenase while in the coronary care unit (Wallston & Wallston, 1978, p. 111).

The factors inherent in the Health Belief Model with certain demographic, socio-psychological and perceived susceptibility considerations have been discussed as antecedent variables in predicting

preventive oriented behavioral changes. However, of prime importance in attempting to increase motivational behavioral changes in individuals and/or families is the immediate intervening "situational context" that would influence their "readiness to take action." It is necessary to understand important and relevant concepts from crisis theory when attempting to make these behavioral changes while individuals and families are grieving or experiencing a loss.

### Concept of Crisis

The crisis concept and early conceptualizations of crisis theory came from the work of Lindemann (1944), whose primary interest was in the maintenance of mental health. He studied the surviving friends and relatives of those killed in the Cocoanut Grove nightclub fire in Boston in 1943. His observations lead to a theoretical sequencing of reactions, typical to crisis, from this incident. These were: a) disorganization and tension with disruption to thought and bodily processes; b) preoccupation with, and rumination about, the past; and c) attempts to mobilize resources or to adjust to the situation. Lindemann concluded that the grieving individual had to emancipate himself from the deceased person and to form new relationships to accomplish "successful grief work."

Although much of the work on crisis theory focuses on the individual, Hill (1975) noted that a crisis affecting any family member affects all members, producing shifts in the family equilibrium. Since it is not an isolated event, a crisis that affects one individual also affects the systems of which he is a part. Thus,



crisis itself may be defined as the state of things in a system at a time when a change is impending. The family, as the basic social unit, continually monitors change over the lifetime of its members. While it buffers its members against undesired or abrupt change, the family must prepare for, motivate, and even force change upon its members as an integrated system.

Crisis may be classified as developmental or situational. Erikson (1963) defines developmental crises as periods during the life cycle when change takes place at comparatively rapid rates. Situational crises originate in specific life events which happen at a particular point and which arise unexpectedly or with little warning. Situational crises constitute the type of crisis faced by families experiencing sudden loss of a family member.

Caplan (1964) emphasizes that developmental and situational crisis are transitional periods that present an individual with an opportunity for personal growth and stimulus for action as well as emotional and mental deterioration.

Evidence supporting the transitional nature of the various phases or stages of a crisis has been presented by Caplan (1964) and Rapoport (1962). These authors have emphasized that a crisis is time-limited, usually lasting six to eight weeks. In addition, Lindemann (1944) and Caplan (1964) have supported the notion that during a crisis an individual is particularly amenable to help if the right type of help is given. Operating under this assumption, several investigators have studied the effects of preventive crisis intervention following the life crisis of sudden death in the family (Williams,

Lee & Polak, 1976; Williams & Polak, 1979).

Caplan (1964), who has repeatedly reported that people were very susceptible to the influence of others during crisis states, suggested the development of helping services to aid people "such that a minimal amount of effort would lead to a maximum amount of lasting response" (Williams & Polak, 1979, p. 35). Since then, an increase of various preventive helping services has emerged, such as widow-to-widow caregivers (Silverman, 1970), suicide prevention (Farberon & Schneidman, 1961) and self-help movements (Riessman, 1977).

In spite of the emergence of various programs designed to "prevent," a dearth of controlled research that has tested the efficiency of crisis intervention strategies exist. One explanation for this lies in the operational aspects of discerning population samples in crisis. In attempting to analyze the definitional components of the crisis concept, Bloom (1963) found the only important element to be the precipitating event (Williams & Polak, 1979, p. 35). Furthermore, several investigators have supported the premise that death, particularly sudden, unexpected death, precipitates a crisis state for almost everyone (Williams & Polak, 1979, p. 35).

Intervention for whatever purpose with families that have recently experienced the loss of a family member, particularly unexpected, has comprised certain recognized balancing factors that effect a return to equilibrium. These are perception of the event, available situational supports, and coping mechanisms (Aguilera & Messick, 1978, p. 67). Recognition of these variables has been deemed important and necessary in attempting to help individuals

and/or families with the resolution of a crisis state (Aguilera & Messick, 1978, pp. 70-71). These balancing factors, due to their extreme variability and fluctuations over time have been assessed primarily from interviews. It has been determined that the interviewer needs to specifically collect data regarding the meaning of the event or loss has had for the individual, the degree to which they have available support, and predominant coping mechanisms, e.g., denial, hostility, anger, withdrawal, etc. (King, 1971; Aguilera, 1970; Rappoport, 1965, pp. 22-31).

## CHAPTER III

### CONCEPTUAL FRAMEWORK

#### Selective Intervention Strategy For CHD

The term selective as used here denotes deliberate analysis of populations at risk for intervention. The following model (Figure 2) demonstrates the logic used in determining the population for this investigation. This model includes questions that help to separate the potential genetic and environmental factors inherent in disease distributions in populations. The investigator believes that such questions will help in designing and testing intervention strategies where there is potential of genetic predominance. Interventions aimed at only environmental factors where there is potentially large genetic inheritance will fail to demonstrate accountable and successful preventive approaches.

#### Conceptual Model

The three concepts: genetic factors, personal habits or behaviors, and correlates to decision making have been discussed in detail in the literature review section.

This model (Figure 3) was utilized to evaluate CHD risk as a basis for designing the nursing intervention strategy. More simply, the nursing intervention components of assessing, informing, and

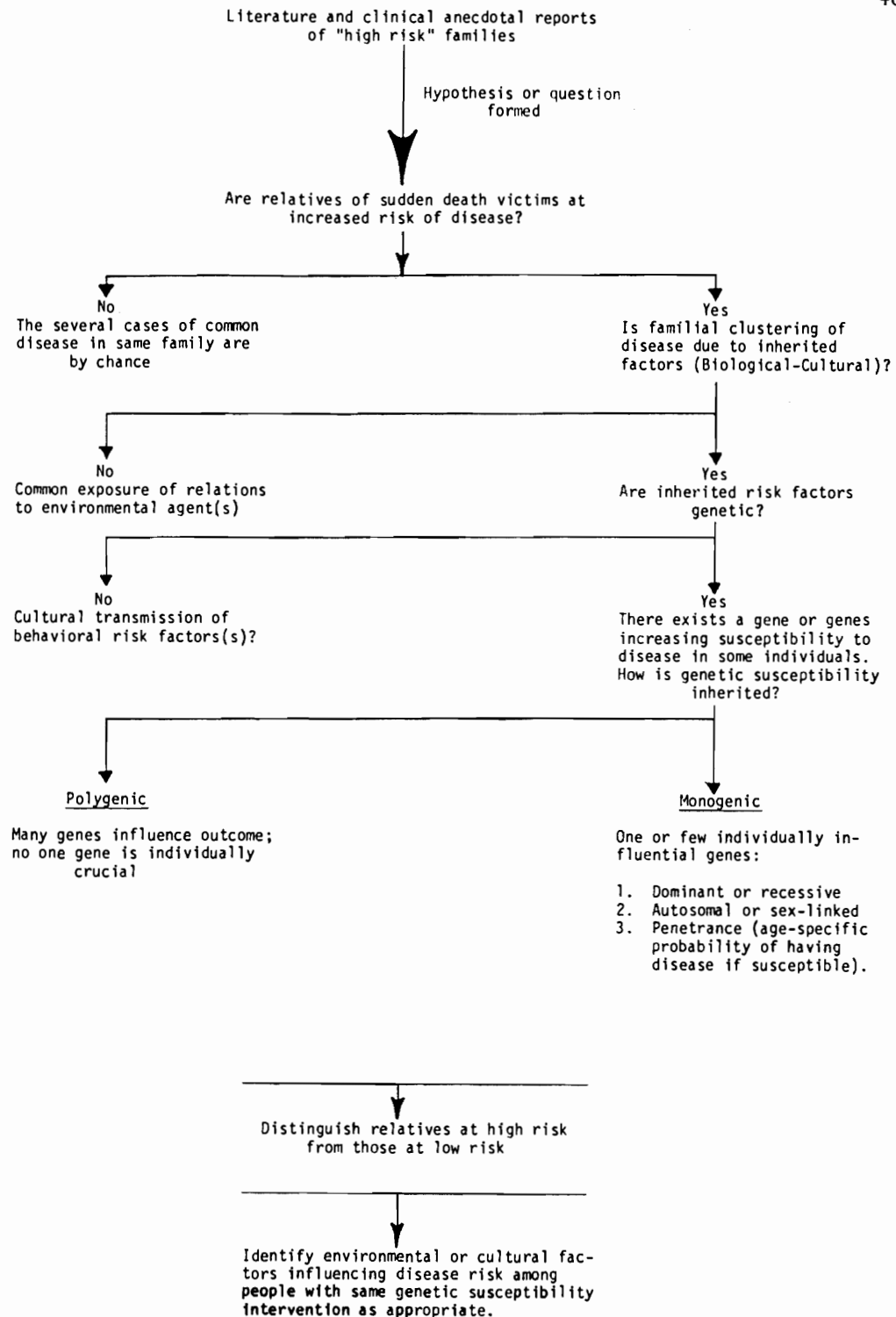


Figure 2. Selection of population for intervention. (Adapted from King, 1981.)

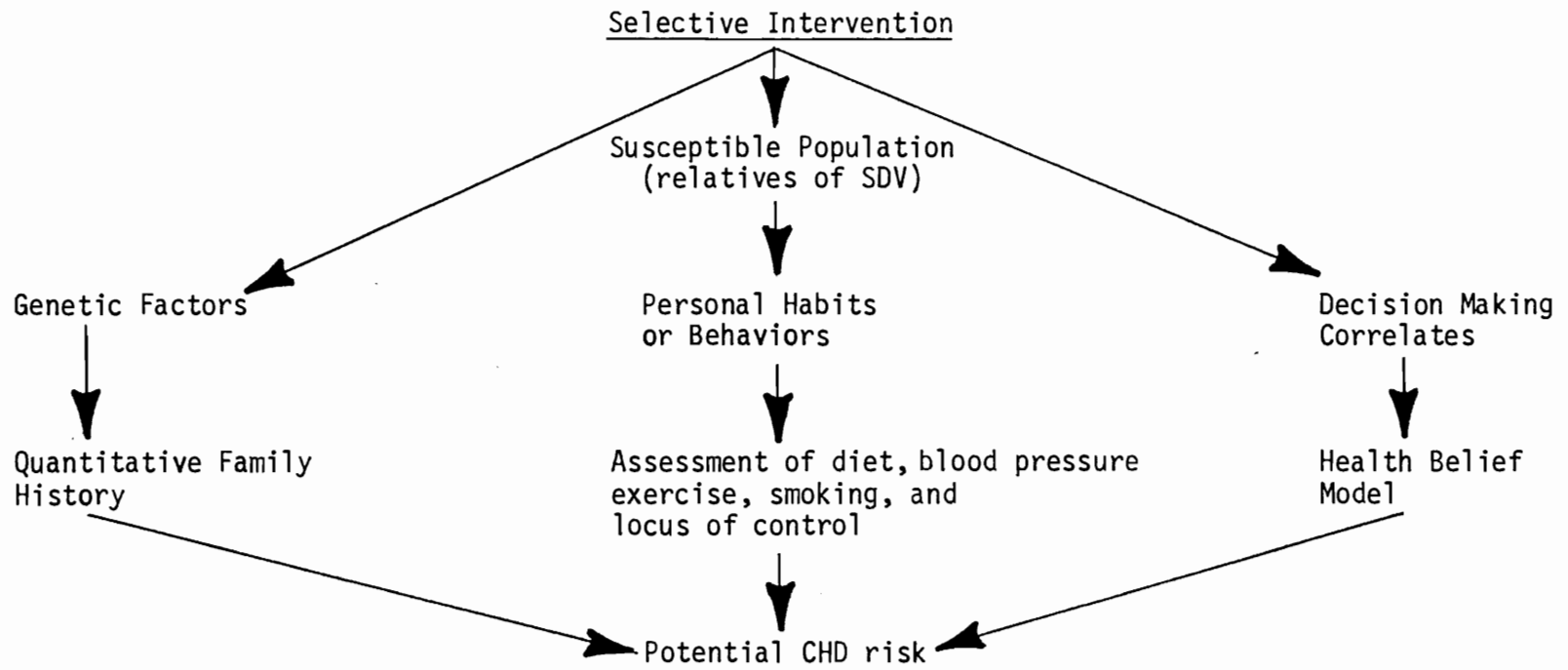


Figure 3. Conceptual Model for Primary and Secondary Prevention.

educating were included to evaluate and intervene with:

1. The genetic factors by quantifying the family history
2. The personal health habits or behaviors (diet, smoking, exercise, blood pressure history, internal and external locus of control)
3. the correlates to decision making by determining if "susceptible" individuals obtain screening for heart disease (health belief model).

The specific concepts addressed here are explicated further in the methods section.

#### Prevention: As Operationalized in Nursing Practice

During the past 20 years, expert groups, public administrators and leaders have repeatedly advised Americans to pursue better lifestyles, i.e., to modify major risk factors for preventive purposes (Stamler, 1979, p. 1582). Nursing has advocated an orientation of not only prevention but a multifactorial basis of prevention for individuals, families and communities. However, in reviewing the literature for empirical investigations concerning nursing's prevention orientation, particularly primary prevention and especially in regard to family and community, a dearth of information is revealed. The expression to "give nursing care" has and still remains to be ubiquitously operationalized to the care of the sick and not in the promotion of the well.

Florence Nightingale conceptualized illness as nature's way of making the body become aware, thus acting to diminish the

factors which interfered with health (Constantino, 1978). She believed that nursing's role was one of helping to minimize or reduce those factors that interfere with health. The first nursing textbook in America (1885) written by Clara Weeks Shaw stressed the maintenance and promotion of health and prevention of disease (Goodnow, 1944; Constantino, 1978, p. 49).

Lillian Wald, through her knowledge of principles of prevention and health promotion, established visiting nursing programs during 1893-1895, maternity home care for mothers and new babies, school nursing in 1902 and the National Organization of Public Health Nursing in 1912 (Kalisch & Kalisch, 1978). The visiting nurses demonstrated and were expected by the American Public Health Association to deliberately plan "...that every family in the land shall have instruction in the laws and practice of health" (Goodnow, 1944, p. 269).

Several contemporary nurse educators have defined nursing as primarily assisting the individual to identify those practices or strategies contributing to health and/or recovery from illness (Constantino, 1978, p. 49; Flynn, 1980, Murray & Zentner, 1979; Sorensen & Luckmann, 1979).

Nursing literature is abundant with the identification of nurses' preventive role in helping people increase their awareness and education of potential deleterious effects from daily living. One preventive perspective of nursing is given by Neuman:

Intervention can begin at any point at which a stressor is either suspected or identified. One would carry out the intervention of primary prevention since a reaction



had not yet occurred, though the degree of risk or hazard was known or present. The "actor" or intervener would perhaps attempt to reduce the possibility of the individual's encounter with the stressor or in some way attempt to strengthen the individual's flexible line of defense to decrease the possibility of a reaction (Riehl & Roy, 1980, p. 124).

Three levels of prevention have been identified: primary, secondary, and tertiary (Caplan, 1974; Neuman, 1974; Shamansky & Clausen, 1980). As more and more health care providers described the levels of prevention, operational definitions of the terms proliferated and conceptual clarity decreased (Shamansky & Clausen, 1980, p. 104). Examination of the following classic definitions from Caplan help to illustrate this confusion and need of clarity:

Primary prevention aims at reducing the incidence of new cases of mental disorder in the population by combating harmful forces which operate in the community and by strengthening the capacity of people to withstand stress.

Secondary prevention aims at reducing the duration of cases of mental disorder which occur in spite of the programs of primary prevention. By shortening the duration of existing cases, the prevalence of mental disorder in the community is reduced.

Tertiary prevention aims at reducing the community rate of residual defect which is sequel to mental disorder. It seeks to ensure that people who have recovered from mental disorder will be hampered as little as possible by their past difficulties in returning to full participation in the occupational and social life of the community (Caplan, 1974, pp. 189-190).

According to Shamansky and Clausen (1980, p. 105), the following "bastardized" definition of Caplan's definitions was found in a recent psychiatric nursing textbook:

Primary prevention acts to reduce the incidence of disease in populations at risk. Secondary prevention aims to reduce the prevalence of disease through early case finding and effective treatment. Tertiary prevention aims to reduce the disability associated with disease through rehabilitation. All levels of prevention refer to populations over a periods of time (Shamansky & Clausen, 1980, p. 105).

This definition does not make clear explicit distinctions between primary, secondary, and tertiary prevention. The definitions are so vague that clinical application becomes very difficult.

Shamansky and Clausen (1980, p. 105), in clarifying the constructs of prevention, reviewed fifteen community public health nursing texts, nine of which did not even mention prevention, and of those that did, examples of each level of prevention were designated as inconsistent in their accuracy. These two authors have perhaps depicted most clearly and comprehensively the three levels of prevention as follows:

Primary prevention is prevention in the true sense of the word; it precedes disease or dysfunction and is applied to a generally healthy population. The targets are those individuals considered physically or emotionally healthy, exhibiting normal or maximum functioning. Primary prevention is not therapeutic; it does not consist of symptom identification and use of therapeutic skills (Shamansky & Clausen, 1980, p. 106).

Primary prevention is conceptualized as promoting optimal health through client education and providing the necessary emotional support information, and attitudinal analysis for decision-making about a given health condition.

At the point that pathology is involved secondary prevention begins. Secondary prevention emphasizes early diagnosis and prompt intervention to halt the pathological process, thereby shortening its dura-

tion and severity and enabling the individual to regain normal function at the earliest possible point. Early diagnosis is illustrated by the use of a comprehensive nursing assessment, which may reveal the need for further medical evaluation (Shamansky & Clausen, 1980, p. 106).

Thus, secondary prevention would incorporate any multiphasic screening procedures, whether it be physiologic and/or psychologic or a combination of both, such as the Denver Developmental Screening Test.

Tertiary prevention comes into play when a defect or disability is fixed, stabilized, or irreversible. Rehabilitation, the goal of tertiary prevention, is more than halting the disease process itself, it is restoring the individual to an optimum level of functioning within the constraints of the disability (Shamansky & Clausen, 1980, p. 106).

Congruent tertiary nursing activities, for example, would stress the importance of education on care of the extremities, exercise, and diet for the diabetic patient. Nursing has a unique opportunity and responsibility in the development of theory and techniques for preventive health care. This is critical with the most prevalent diseases, where early intervention could retard or minimize certain factors inherent in the disease process. The levels of prevention should dictate the specific components or nursing intervention strategy to be tested. These components or nursing activities will change depending upon which level of prevention is being operationalized. For example, a nursing intervention strategy designed for primary prevention might operationalize the components of assessing, educating, informing, and providing emotional support. Secondary prevention might include medical evaluation and screening as part of the

nursing intervention, and tertiary intervention would operationalize concepts of rehabilitation and convalescent care within the intervention strategy. A unified theoretical basis, directed by the levels of prevention should guide nursing research when the aim is to prevent disease, maintain and promote health. The various levels of prevention need clarification as a first step in development of preventive theory.

The understanding of health-illness patterns as they affect masses of people requires data to describe the community and examine the community-wide factors such as knowledge of the people, their health problems, their protective resources, and includes local environment, personal habits, past history, and individual traits.

For this investigation, the pattern of past history (familial aggregation), personal habits or behaviors, and correlates to decision making (Health Belief Model) are the fundamental concepts. The "selective" nursing intervention strategy relates to the primary and secondary prevention levels. Therefore assessing, informing, and/or educating, screening and providing emotional support are the components operationalized.

#### Research Questions and Hypothesis

The development of research questions and the hypothesis was generated from a review of literature concerning the nature of CAD and current preventive practices.

Positive family history for CAD has been determined as an

ominous sign. The literature has documented that in populations with high rates of coronary heart disease, sudden death occurs frequently. The risk profile of a candidate for sudden death is indistinguishable from that of the individual with clinically manifest coronary heart disease. Due to the unproven effectiveness of available treatments of the metabolic and electrophysiological precursors of CAD, the primary prevention of atherosclerosis is inevitably indicated.

The present investigation has evolved from several questions:

1. What is the nature of the variance regarding risk factors in first degree relatives of sudden death victims?
2. Are these family members aware of any susceptibility of risk?
3. What are the current health preventive behaviors exhibited by these families?
4. What is the need for education concerning the nature of risk factors and preventive measures?
5. Can a nursing intervention designed to assess, inform, and evaluate the risk factors and health beliefs make a difference in terms of preventive practices on these family members?
6. Can a nursing intervention strategy motivate these family members to sustain preventive health practices?

The research problem is derived from the need to inform first degree relatives of sudden death victims of their potential susceptibility to risk due to the possibility that these members will have "low" perceived susceptibility and therefore no perceived

"need" to consider the costs and benefits of preventive health practices.

The first and second research questions can then be stated:

1. Will the nursing intervention change the family members' current health beliefs?

2. Given or not given a change in the health belief model, will the nursing intervention result in members taking prescribed actions?

a) Screening: to define the nature of the individual's risk factors

b) Change in health habits: (diet, blood pressure monitorization, activity, decreased smoking, reduction of weight).

Another consideration that must be included in formalizing the nursing intervention strategy is the possibility that these family members may be in a situation of crisis or bereavement, and the information that will be shared with them may be disturbing in its own right. The intervention strategy must employ appropriate emotional support.

The hypothesis can now be formalized:

Experimental subjects will significantly increase when compared to control subjects on:

a) perceived susceptibility

b) parent perceived susceptibility of child

c) parent perceived severity of child

d) general health concern

- e) benefits of preventive action and decrease on barriers to preventive action
- f) knowledge regarding CAD risk factors .

In addition it is hypothesized that experimental subjects when compared to control subjects will demonstrate a greater adherence to preventive actions of:

- a) screening, and
- b) health habit behaviors.

## CHAPTER IV

### RESEARCH DESIGN AND METHODS

The principal objective of this study was to design and experimentally test a nursing intervention strategy to augment and/or institute health-promoting behaviors in first degree relatives of victims of sudden coronary death.

The independent variable, or nursing intervention strategy consisted of: a) assessment of health history, health beliefs and behaviors, b) information and education on the cardiovascular risk factors and health promoting behaviors, and c) the provision of an emotionally supportive interaction style for coping with the exploration and prescription of the proposed health practices. The dependent variables included changes in subjects' health beliefs and health behaviors and whether subjects obtained screening for blood pressure and serum cholesterol.

An interview (3-5 months post-death) was used as the method to intervene with the experimental group. This interview focused on assessment of health history, health behaviors, and health beliefs, informing and educating regarding cardiovascular risk factors, and methods for detecting and reducing these factors. The control group received a mailed questionnaire (3-5 months post-death) which included the health behavior assessment, health beliefs, health history,



and screening information. Two months later the health beliefs and health behaviors questionnaires were mailed as repeated measures on both groups.

### Sample Population

The sample population consisted of first degree relatives of victims of sudden coronary death (index cases) referred to the Medical Examiner's office for autopsy or report of death. Index case assignment to the experimental and control groups was initially determined by a flip of the coin and subsequently by alternation to groups. Selection of the sudden death victims was limited by the following criteria: a) resided within a 50-mile radius of the University Medical Center, b) were 30-55 years of age, and c) verified death as due to coronary artery disease from Medical Examiner or private physician. The first degree relatives included siblings, children and parents of the sudden death victim. Spouses were included due to possible spouse aggregation of certain health behaviors and family compliance to prescribed behavior changes. Families that could not communicate verbally in English were excluded from the study.

### Exclusions

Rationale for exclusion was based on the following considerations:

Age. Death due to coronary artery disease is considered premature in approximately 30-55 year old people. The study questions pertained to the goal of retarding coronary artery disease in high

risk families. Since premature death is the most dramatic expression of atherosclerosis, these families logically seemed to be at greater risk and needing immediate intervention.

Non-English speaking. To test whether or not the nursing intervention changed the individual's/family's health beliefs (perceived susceptibility and cost/benefit analysis), knowledge regarding the risk factors and prescribed health promoting behaviors was dependent on understanding the interactive process. Therefore, without an interpreter, all non-English speaking families were excluded.

#### Sample Size

According to the Annual Report from the Office of the Medical Examiner of Utah unexpected sudden cardiac deaths comprised 411 of a total of 558 unexpected deaths in Utah, for 1979. Approximately 200 cases were due to coronary death. The Medical Examiner further estimated that 100 of those deaths could be considered premature under the age of 50, and close to 50% of those cases resided in Salt Lake County. An approximation, therefore, of 25-50 victims of sudden coronary death was proposed as the projected index cases.

A total of 35 potential index cases were listed as coronary occlusion deaths. Six of those cases were deleted because they did not have autopsies and cause of death was confounded by other problems (alcoholism, drug use, and diabetes). Others deleted included: relatives of four families who could not be located or contacted, two families refused to participate (in both cases, the index cases were female and participation was refused by their

husbands), two index cases did not have relatives residing within the 50 mile radius of the University, one index case had only one relative living within the Salt Lake region and he was residing in the Salt Lake County Jail, and one other case was not included because she was an adopted daughter and did not know previous family history. Therefore, the total sample consisted of 19 index cases and 62 first degree relatives.

#### Experimental Group

The intervention took place within the subject's home (See protocol, Appendix B). There were three components of the intervention: a) nurse assisted assessment of health history, health beliefs and behaviors; b) informing and/or educating on the cardiovascular risk factors and health promoting behaviors, and c) providing emotional support. The provision of emotional support was conceptualized as the process of facilitating the content components of assessing and informing. The emotional support component provided by the interviewer, although not directly measured, provided some account of the potential interviewer effects between the experimental and control groups.

Health history assessment. Health assessment included a complete family health history and appraisal of specific cardiovascular risk. The Multidisciplinary High Risk Coronary Consultation Clinic, a free clinic for "high risk" coronary patients and their families, previously developed and evaluated tools for assessment. A comprehensive family history, pedigree analysis,

dietary assessment, and personal questionnaire including locus of control was utilized. A multidisciplinary team composed of a cardiologist, epidemiologist, exercise specialist cardiologist, behavioral psychologist, registered nurse specialist in chronic disease, and health educator developed and evaluated these tools. The tools were designed for obtaining information that could readily define (the following) family history (See Appendix C).

Family history score. The usual procedure of family history recording is not quantitative and does not lend itself to an exact prediction of risk as would be the case for serum cholesterol levels, blood pressure, or smoking. A quantitative estimate of familial risk as part of the health history assessment was used to identify which CAD cases are likely familial since family history data are usually available for patients and relatives (Chamberlain, Williams, Goth, Ingersoll, Weinberg, Hunt & Hopkins, 1981). For each relative who had had a heart attack, age at diagnosis, age at death, and current age were obtained. Family history scores were calculated from this information as shown below,

$$FHS = \left( \frac{|O - E| - \frac{1}{2}}{\sqrt{E}} \right) \left( \frac{|O - E|}{O - E} \right)$$

when O = observed and E = expected.

The first term in the parentheses is analogous to a standard statistical procedure testing for differences between a sample rate and a population rate (Fleiss, 1973). The second term in the parentheses maintains the sign of the difference.

This method approximates the number of disease events expected in a given family tree by multiplying age/sex specific person-years of experience in the family times the respective rates calculated from the general population. For these data, population disease rates were obtained from analyzed self-report family tree questionnaires from 730 families of high school students in Texas. The incidence rates reported by the family tree data when compared to rates from the Framingham Heart Study demonstrated significant similarities (Figures 4 and 5). The observed number of heart attacks in the family was then compared to the number of expected events as indicated by the formula. The resultant family history score (FHS) is a quantitative index of the degree of disease aggregation in that family tree.

A positive family history score indicated more disease events were observed than expected among the first degree relatives and a negative score indicated fewer than expected events were observed. If family structure is not associated with the disease the expected value is 0. When a family history score (FHS) is calculated for relatives of different degrees (i.e., first and second degree combined) then degree specific scores are weighted according to the number of genes shared in common with the index case. First degree relatives ( $FHS_1 - 1^\circ$ ) are given twice the weighting of second degree relatives ( $FHS_2 - 2^\circ$ ) in deriving the total score ( $FHS_1 + 2$ ) (Chamberlain et al., 1981).

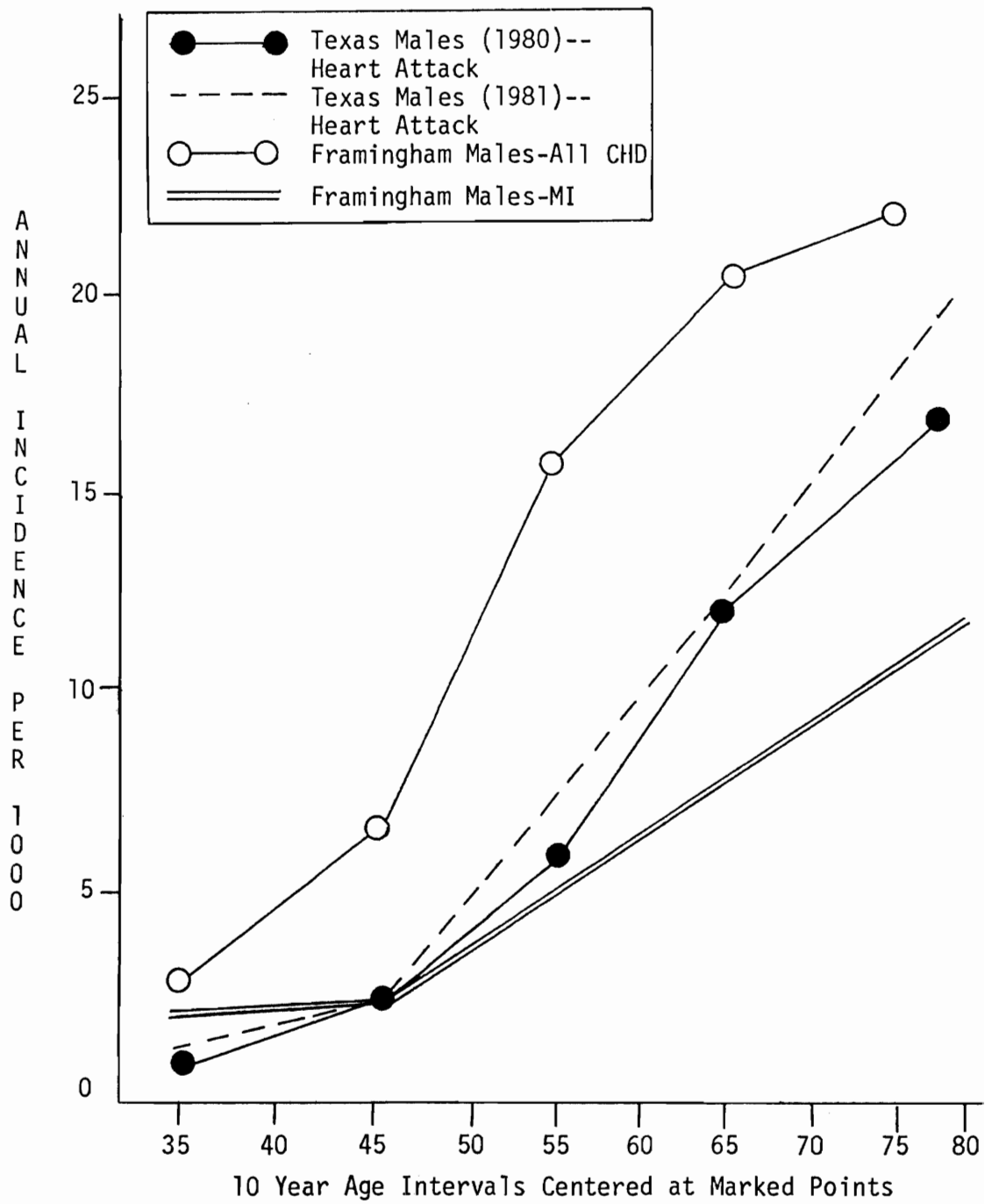


Figure 4. Comparison of Texas and Framingham Incidence Rates for MI. (Adapted from Chamberlain, 1981.)

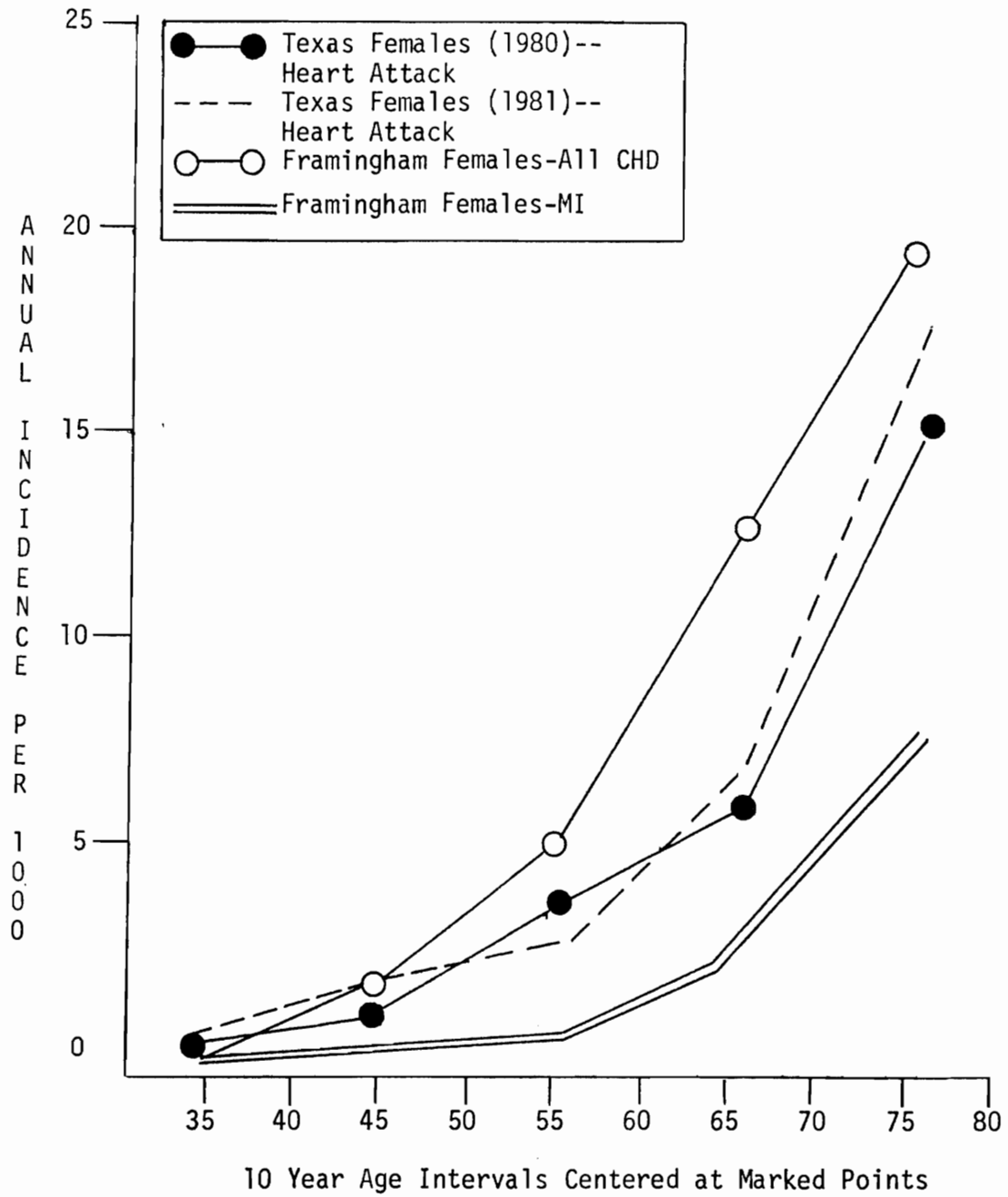


Figure 5. Comparison of Texas and Framingham Incidence Rates for MI. (Adapted from Chamberlain, 1981.)

$$FHS_1 + 2 \frac{FHS_1 + \frac{1}{2}FHS_2}{1 + \frac{1}{2}}$$

The family histories in the experimental group were collected in a personal interview and from questionnaires in the control group. The investigator attempted to make clear the different types of heart diseases (rheumatic, etc.) as causes of death. Explanations of heart attacks were provided often with diagrams. Two families did not complete the family history during the interview due to extensive family records elsewhere and these were mailed. The family history score (FHS) results in this analysis also included separate calculations for maternal and paternal relatives for each family.

#### Education and Emotional Support

According to Travelbee (1979), the purpose of nursing "is to assist an individual, family or community to prevent or cope with the experience of illness and suffering and, if necessary to find meaning in these experiences." This purpose is largely achieved by the establishment of a human-to-human relationship.

The nurse establishes this relationship principally in two ways: a) utilization of a disciplined intellectual approach to problem analysis and resolution, and b) the therapeutic use of self (Travelbee, 1979, p. 17). Both abilities are inseparable and of equal importance, although the major emphasis inherent in these abilities differs. The disciplined intellectual approach, a logical method of problem solution, draws upon and uses concepts and principles from the natural, physical, biological, medical,



nursing and behavioral sciences. This approach focuses more on the theoretical or content aspects of nursing practice and less on process (Travelbee, 1979, p. 18). The therapeutic use of self is a combination of the cognitive and affective, emphasizing process more than content.

This proposal has emphasized thus far only the "content" or analysis of the problem; explication of the process or therapeutic use of self is also necessary.

The term "therapeutic" is defined as "having healing or curative powers; gradually or methodically ameliorative" (The American Heritage Dictionary, 1979, p. 1335). When a nurse uses self therapeutically, she deliberately makes use of her intuitions, perceptions, and knowledge in order to effect a change in the patient/client. Travelbee considers any change as therapeutic when it alleviates an individual's distress and increases personal awareness.

By "therapeutic use of self" is meant the ability to use one's personality consciously and in full awareness in an attempt to establish relatedness and to structure nursing intervention. To use oneself therapeutically requires self insight, self understanding, and understanding of the dynamics of human behavior, ability to interpret one's own behavior as well as the behavior of others, and the ability to intervene effectively in nursing situations. To use oneself therapeutically also implies that the nurse possesses a profound understanding of the human condition. Such a nurse will have explored and can discuss her/his beliefs about illness, suffering, and death and the meanings these beliefs have for her/him (Travelbee, 1979, p. 19).

Kindness has often been employed as that characteristic of "therapeutic use of self." Although important, it will not compensate for ignorance or lack of knowledge and understanding of scien-

tific concepts and principles, or in their application. Kindness, perhaps the most ubiquitous concept within the realm of caring, is not sufficient in and of itself to meet a person's needs.

In summary, the ability to use one's self therapeutically is not the antithesis of the disciplined intellectual approach but represents a synthesis of these two abilities (Travelbee, 1979, p. 20). These abilities purposely guided the nursing intervention component.

Information was given to family members regarding the nature of coronary heart disease including: familial aggregation, appropriate research documenting "risk" behaviors, and current medically accepted methods for retarding, minimizing, and/or ameliorating each of the primary risk factors. Questions were encouraged and answered at this time. Encouragement for further screening and compliance to prescribed behavioral changes was also given at this time.

Through anticipatory guidance (a strategy of therapeutic interaction) the family members were provided information which enabled them to formulate accurate expectations regarding risk behavior and coronary artery disease. The beneficial effects of information provision were proposed to minimize any undefined threats or vague understanding regarding coronary artery disease.

These family members were bereaved and apprehensive over the loss of their loved one. The investigator attempted to create a warm and empathetic relationship with these subjects. These family members exhibited much stress concerning "why their relative

died." They continually asked questions and seemed to want someone to listen and talk to that was knowledgeable about sudden cardiac death.

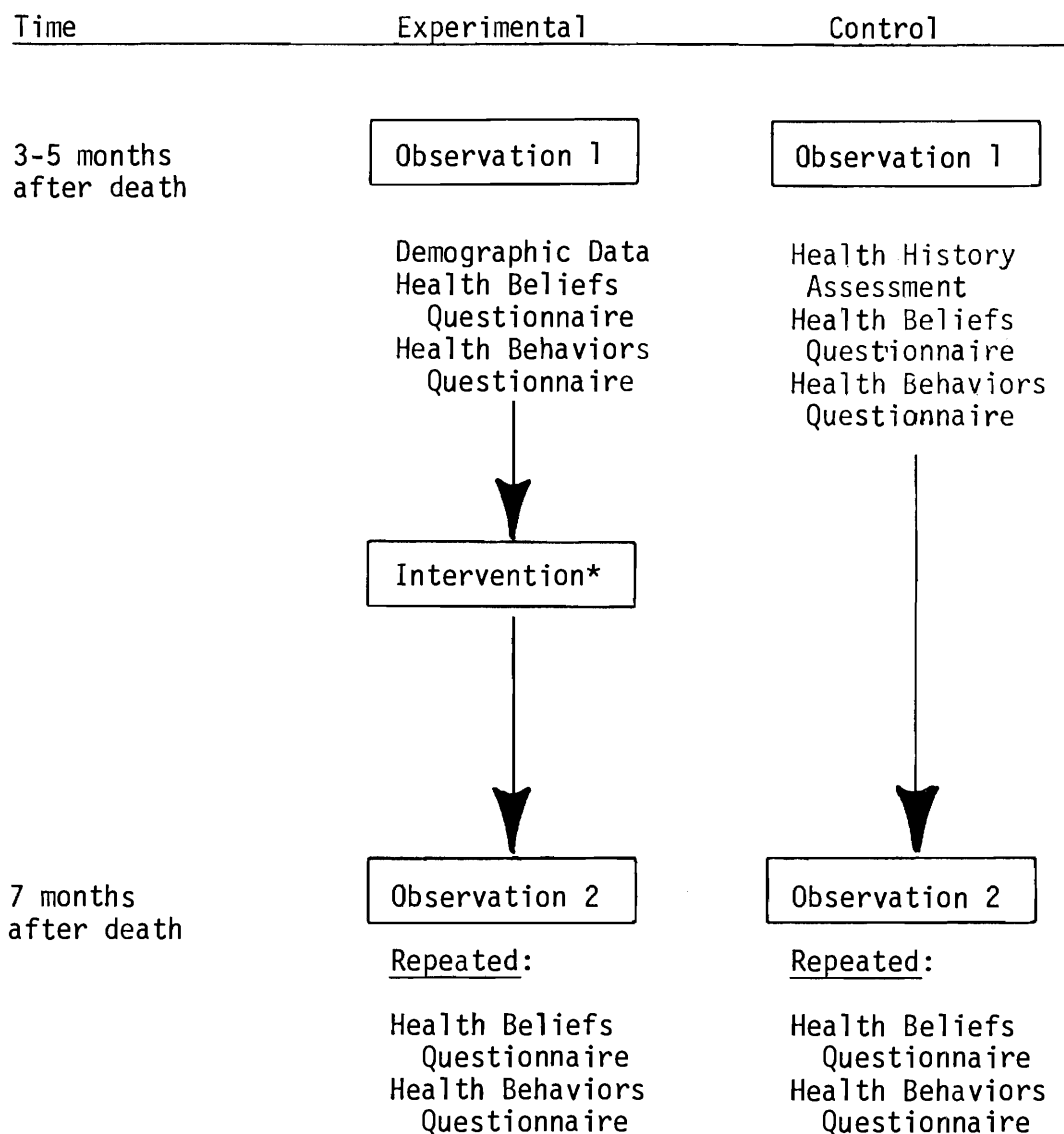
Probing questions were asked to ascertain the subject's response or situational context to the sudden death. The interview focused on: a) the perception of the event, b) available situational supports, and c) coping mechanisms. Detailed notes were kept of subjects' responses. This was necessary to help them ascertain if the "loss" in any way provided the "cue to action" for any health seeking behavioral changes.

Two months following the nursing intervention, families were sent the Health Belief Questionnaire and Health Behaviors Questionnaire (repeated measures). Figure 6 summarizes the measures and data collection periods for this study.

#### Control Group

The control group did not have any personal contact (interview). This group was sent the repeated measures questionnaires, Health Belief Questionnaire, and Health Behaviors Questionnaire. Attached to the Health Behaviors Questionnaire was a guide for completing a personal and family health history and information regarding screening for blood pressure and serum cholesterol at the Old Veteran's Administration Hospital Screening Clinic. The control group was asked to contact the investigator for screening appointments.

Several months post-death, the repeated measures, Health



\*Intervention consists of assessment of health history, information and education regarding cardiovascular risk factors and health promoting behaviors, the need for screening and emotional support.

Figure 6. Design of Study and Summary of Measures

Beliefs and Health Behaviors Questionnaires were mailed to the control subjects (Figure 6).

Dependent Variable - Changes in  
in Health Belief Model Construct  
Validity

Many studies using the theoretical perspective of the Health Belief Model have used different questions intended to measure the presence and magnitude of the same health beliefs. The model, until recently, did not have empirical verification of convergent validity. A multitrait-multimethod design has been employed to assess the construct validity of the Health Belief Model. The data were obtained from a non-representative sample of 85 graduate students at the University of Michigan's School of Public Health. The respondents' perceptions included the traits of: health interest, locus of control, susceptibility to influenza, benefits produced by a flu shot, and the costs or barriers associated with getting a flu shot. Each trait was measured by three methods: a fixed-alternative multiple choice scale, a seven-point Likert scale, and a vignette. The results indicate that a substantial amount of convergent validity using the Likert or multiple choice questionnaire items can be obtained with the Health Belief Model variables. Perceptions of severity and susceptibility are substantially but not entirely independent. Perceived benefits and barriers demonstrate a negative relationship suggesting that these two variables represent opposite ends of a single continuum and not separate health beliefs (Cummings, Jette & Rosenstock, 1978).

Based on the results and recommendations of the Cummings et al. study (1978), a written questionnaire to measure six constructs or traits of the Health Belief Model (HBM) was incorporated into the interview process. The constructs consist of respondents' self-report perceptions of:

1. HI: Interest in health matters (general health concern)
2. SEV: Severity or seriousness of certain health conditions
3. SUS: Susceptibility to certain health conditions
4. BENE: The benefits provided by altering dietary habits, reduction of smoking, exercise and adhering to blood pressure control prescriptions
5. BAR: The barrier/costs to the provisions under BENE. Each construct was measured using the seven-point Likert scale. For example: "Many times I feel that I have little control over my health" That is, where would you place yourself on this scale? (Circle number)

Strongly agree			Strongly disagree			
1	2	3	4	5	6	7

#### Changes in Health Behaviors

Freston (1980) has constructed a tool for assessing self-reported cardiovascular risk behaviors. Content validity has been

researched and documented rigorously from numerous other tools. Each question has theoretical and/or pragmatic documentation from cardiovascular literature. This tool was used to assess the health behavior changes (See Appendix).

#### Obtained Screening

Whether or not subjects obtained screening for blood pressure and serum cholesterol comprised another outcome measure. Experimental subjects were encouraged to seek screening from their private physicians or the Old Veteran's Administration Hospital Screening Clinic. Control subjects were mailed information on screening.

#### Antecedent Variables

Demographic information was collected as part of the health history assessment. Included in these data were age, sex, education, occupation, ethnicity and religious preference.

#### Intervening Variable

To assess the response to sudden death and subsequent "situational context" of the family members, information was gathered by interview on the following: a) the perception of the event, b) available situational supports, and c) mechanisms.

## CHAPTER V

### RESULTS OF ANALYSES

#### Demographic Characteristics

In order to compare demographic differences between the experimental and control groups the following variables were included: age of family members by relationship to the index case, sex, race, marital status, years of education, occupation and religion (Table 3). Comparisons between groups were done by chi square analysis and t-tests groups. There were no significant differences on these variables.

#### Family History Score

A central descriptive characteristic for this study is the extent to which families are at risk due to certain environmental agents or genetic predispositions. To determine if certain families experienced an aggregation of cardiac disease events an index of familial aggregation was calculated from family histories.

Table 4 illustrates the family history score in the final right hand column. The score was calculated with the index case included or "in" and excluded or "out." The scores are ranked according to the greater positive to the greater negative. Families are identified as experimental (E) and control (C). The higher the score the greater familial aggregation is related to heart



Table 3  
Demographic Characteristics of the Experimental and  
Control Groups

	Experimental	Control
<u>Spouses</u>		
$\frac{n}{x}$ Age	7 39	5 48
<u>Siblings</u>		
$\frac{n}{x}$ Age	13 38	7 46
<u>Parents</u>		
$\frac{n}{x}$ Age	4 65	5 76
<u>Child</u>		
$\frac{n}{x}$ Age	11 17	6 23
<u>Sex</u>		
Males	12	9
Females	23	14
<u>Race</u>		
White	32	23
Spanish American	3	--
<u>Marital Status</u>		
Married	15	12
Single	8	3
Widowed	8	6
Divorced	1	2

Table 3 Continued

	Experimental	Control
<u>Years of Education</u>		
$\bar{x}$	17.3	12.5
<u>Occupation</u>		
Semiskilled	9	4
Skilled	4	5
Secretarial/Clerical	2	5
Professional	3	1
Unemployed	12	7
<u>Religion</u>		
Catholic	7	1
LDS	18	11
Protestant	15	3
Other	3	5

Table 4  
Family History Score

Family History in Relatives of Young CHD Sudden Death Victims														
Family	No. Rel.		Index Case Age	Age at CHD Death or Dx in Relatives							Total FHS Index			
	Male	Female		Paternal		Sibs	Maternal		In	Out				
				Male	Female		Male	Female						
1E	5	2	32	F							3.9	1.2		
2C	3	4	52							MGF 50	M 52	MA 45	3.1	1.8
3C	9	5	52		PGF 83			B 44	B 52	MU 44	MU 65	MU 65	2.3	1.6
4E	12	11	40	F 68	PGF 73	PU 37	PU 40	PA 66		MGF 45	MU 61	MU 63	2.0	1.0
5E	3	2	50	F 64									1.6	0.4
6E	6	4	53	F 58						MGF 69		MGM 30(?)	1.5	0.4
7C	4	8	37	F 65				PGM 62				MU 47	1.7	0.5
8E	11	7	47	F 67	PU 67	PU 72		PGM 66					0.9	0.7

Table 4 Continued

Family History in Relatives of Young CHD Sudden Death Victims											
Family	No. Rel.		Index Case Age	Age at CHD Death or Dx in Relatives						Total FHS Index	
	Male	Female		Paternal		Sibs	Maternal		In	Out	
				Male	Female		Male	Female			
9E	11	5	54	F 67	PGF 61			MGM 82	0.8	0	
10C	4	7	49						1.2	-0.2	
11E	9	4	53		PGF 86			MGM 84	0.8	0	
12C	5	9	53	F 81	PU 89	PGM 72		MU 64	0.5	0.3	
13E	6	8	38			PA 76			0.2	0	
14C	3	1	44						0.1	0	
15C	8	1	55						0	-0.6	
16E	$\frac{9}{6}$	5	44					MGF 82 MU 90	-0.2	-0.6	
1-7	23.4		$\frac{45.1}{48.0}$	±8.6							
10-16				±6.2							

Note. 1° relatives: F = father; M = mother; B = brother; 2° relatives: PGF = Paternal grandfather; PU = paternal uncle; PA = paternal aunt; MGF = Maternal grandmother

attacks (disease events). As shown in Table 4, seven of 16 families or 44% had strong positive family history scores (3.9 to 1.7 index included) indicating more disease events were observed than expected among the first and second degree relatives. With the index excluded, four of these seven families still indicated positive family history scores (1.2 to 1.0) while the remaining three families decrease to borderline scores (0.5 to 0.4). Four families or 25% had borderline or moderately positive scores (0.9 to 0.8 index included). With the exclusion of index cases these family scores decrease (0.7 to 0). Four families or 25% had negative scores (0.5 to -.02) indicating fewer than expected events were observed. These negative scores changed little with the exclusion of the index case (0 to -0.6). One family had a score of 0 indicating familial aggregation is not associated with the disease. The larger scores (scores greater than 1) reflect premature or unusually early heart attacks occurring in first and second degree paternal male relatives.

The observation of more family history scores in a strong positive direction than in a strong negative direction is expected not only because of the population but also due to the nature of the data used for the calculation of family history scores. It is difficult to obtain a large score in the negative direction unless the number of individuals in the family is relatively large. Most of these sixteen family histories were small based on fifteen relatives or less.

### Health Beliefs

A 2 (experimental/control) by 4 (spouse, sibling, child, parent) analysis of covariance (covarying age and pre-intervention scores) was used as the primary analysis. The experimental and control subjects were compared on the following health belief concepts: general health concern, self-perceived susceptibility, parent perceived susceptibility of child, parent-perceived severity of child, benefits to preventive action, and barriers to preventive action. Specifically the belief of susceptibility was hypothesized to increase in the experimental group after intervention. The results for each concept will be described separately.

#### General Health Concern

Table 5 shows the mean differences between the pre- and post-treatment general health concern scores for the experimental and control groups according to family relationship. A negative change indicates a decrease while a positive change indicates an increase in general health concern of the family members. Family members in both groups showed mean decreases in general health concern scores with the control group showing the largest mean decrease. Table 6 shows the results of the ANCOVA. The ANCOVA indicated there were no significant differences between the experimental and control or between family relationship groups in the change score. There also was no significant interaction between the treatment condition and family relationship. Age was not correlated with changes in general health concern scores but

Table 5

Differences in General Health Concern Pre- to Posttest by Family Relationship

	Experimental					Control				
	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD
Spouse	6	10.00	9.00	-.33	2.34	4	12.60	15.50	-3.00	.82
Sib	13	8.00	7.31	.69	3.99	7	7.29	8.86	-1.57	2.57
Parent	4	10.30	13.00	-2.75	4.50	5	8.00	10.00	-2.00	8.12
Child	11	9.10	10.00	-.91	5.15	6	8.00	9.00	-1.00	1.67
Total	34	9.00	9.15	-.41	4.21	22	8.78	10.36	-1.77	3.96

Table 6

ANCOVA Results for General Health Concern  
Covarying Age and Pretest Scores

Source of Variation	df	f	p
<u>Covariates</u>			
Age	1	.88	.353
Pretest scores	1	18.40	.000
<u>Main Effects</u>			
Exp./Control	1	1.32	.257
Family Relationships	3	1.50	.226
<u>2 Way Interactions</u>			
Exp./Control vs Family Relationship	3	1.656	.190

treatment scores were correlated with post-treatment scores ( $r = .49, p < .001$ ).

### Self Perceived Susceptibility

Mean difference scores on self-perceived susceptibility for the treatment and family relationship groups are reported in Table 7. Table 8 shows results of the ANCOVA. There were no significant differences for either the treatment or family relationship variables. The significant two-way interaction is shown in Figure 7. The interaction is due to differential change scores appearing primarily with the children. Children in the experimental group showed a mean decrease while children in the control group showed a large score increase for self-perceived susceptibility. Age was not correlated with changes in susceptibility but pre-scores were correlated with post-scores ( $r = .52, p < .001$ ).

The general self-perceived susceptibility was scored by taking the mean of susceptibility on six health condition items: anemia, pneumonia, asthma, rheumatic fever, heart trouble and hardening of the arteries. Self-perceived susceptibility for cardiovascular health was analyzed separately (Tables 9 and 10). The greatest differences between groups occurred in the children group (Figure 8). The control children scores increased while the experimental children scores decreased (Table 9). As can be seen in Table 10 there were no significant main effects but a significant interaction between experimental and control groups and



Table 7  
Differences in Self-Perceived Susceptibility Pre- to Posttest  
by Family Relationship

	Experimental					Control				
	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD
Spouse	7	25.14	24.00	1.14	4.0	4	29.80	28.25	1.50	5.80
Sib	13	21.62	20.31	1.37	7.3	7	21.34	24.71	-3.29	4.96
Parent	3	25.00	29.33	-6.00	10.5	4	11.25	15.00	-3.75	8.42
Child	11	19.82	27.10	-7.27	12.7	6	29.83	18.83	11.00	12.21
Total	34	21.14	24.06	-2.15	9.8	21	23.77	21.86	1.62	10.05

Table 8  
ANCOVA Results for Self-Perceived Susceptibility Covarying  
Age and Pretest Scores

Source of Variation	df	f	p
<u>Covariates</u>			
Age	1	.55	.462
Pretest scores	1	21.53	.001
<u>Main Effects</u>			
Exp./Control	1	.60	.442
Family Relationship	3	.52	.673
<u>2 Way Interactions</u>			
Exp./Control vs. Family Relationship	3	4.59	.005

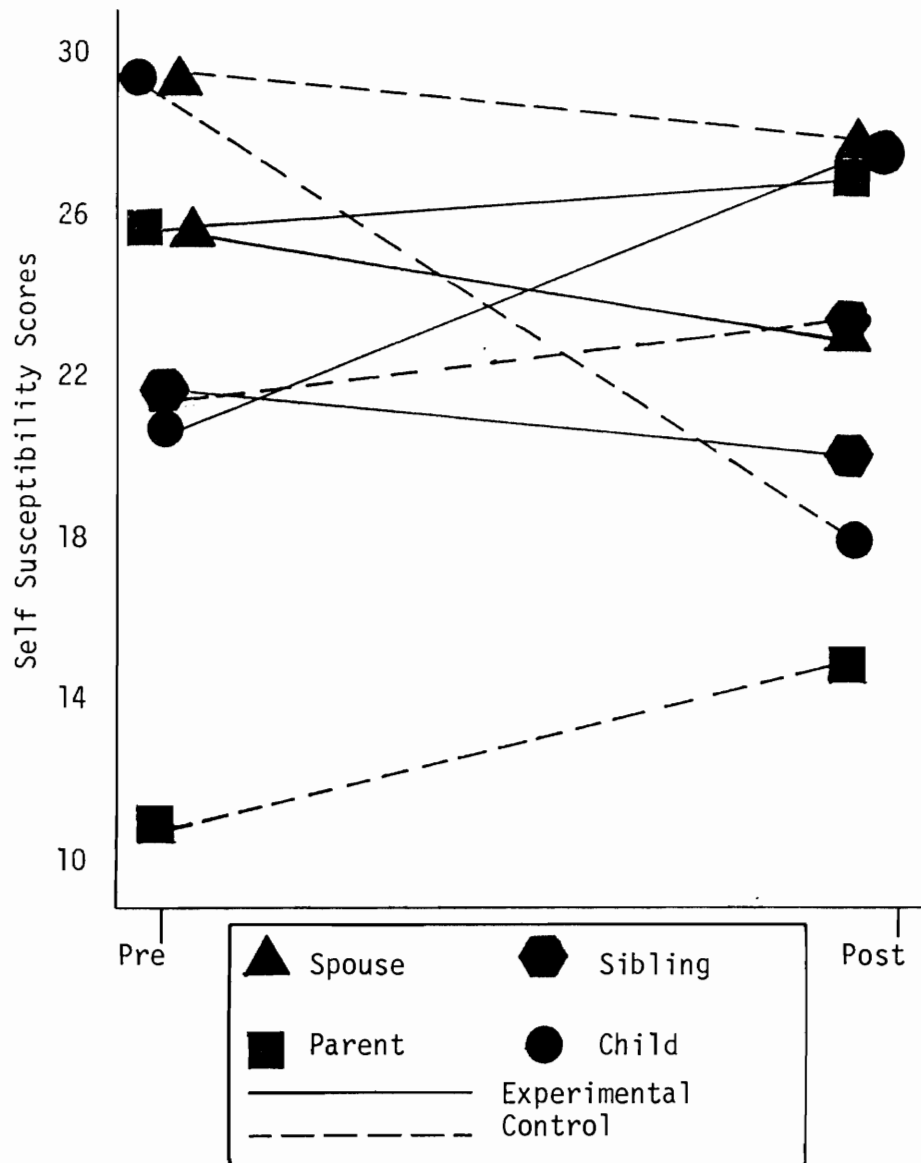


Figure 7. Two Way Interaction Experimental/Control vs. Family Relationship Self-Perceived Susceptibility

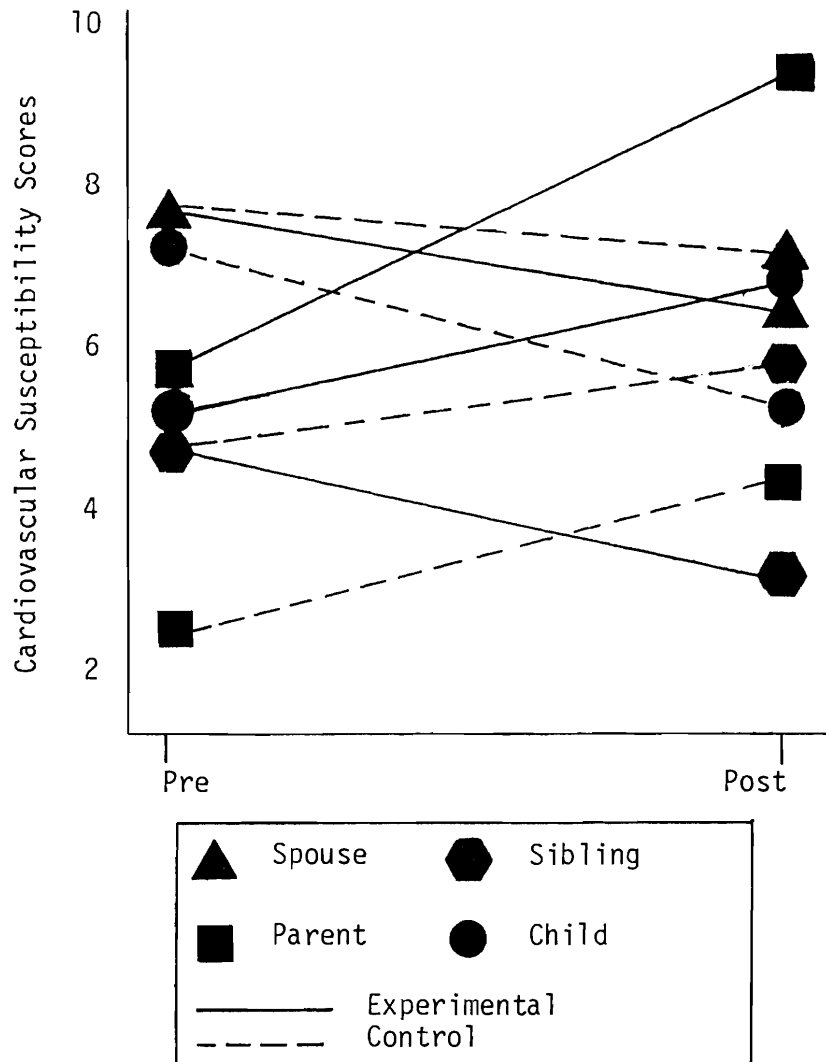


Figure 8. Two Way Interaction Experimental/Control vs. Family Relationship Self-Perceived Susceptibility to Cardiovascular Health

Table 9

Differences in Self-Perceived Susceptibility for Cardiovascular  
Health Pre- to Posttest by Family Relationship

	Experimental					Control				
	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD
Spouse	7	7.29	6.00	1.29	1.98	4	7.20	7.00	.00	1.63
Sibling	13	4.85	4.00	.85	1.28	7	4.43	5.71	-1.29	1.25
Parent	3	5.50	8.67	-2.67	3.06	4	3.40	4.50	-.75	6.70
Child	11	5.65	6.00	-.36	3.78	6	6.67	4.50	2.17	4.02
Total	34	5.66	5.47	.24	2.73	21	5.40	5.38	.02	2.73

Table 10

ANCOVA Results for Self-Perceived Susceptibility for Cardiovascular  
Health Covarying Age and Pretest Scores

Source of Variation	df	f	p
<u>Covariates</u>			
Age	1	.33	.571
Susceptibility pretest	1	24.35	.001
<u>Main Effects</u>			
Exp./Control	1	.29	.591
Family Relationship	3	1.32	.278
<u>2 Way Interaction</u>			
Exp./Control vs. Family Relationship	3	2.83	.049

family relationship was demonstrated (Figure 8). Overall, both groups increased susceptibility regarding cardiovascular health with the experimental group slightly more than the control.

#### Parent Perceived Susceptibility of Child

Parent perceived susceptibility of the child was limited to those patients with children younger than 18 years of age. Due to the combination of the missing data and small cell sizes ANCOVA will not be reported. Only five children of the sudden death victims had children of their own under 18 years of age (two experimental, three control).

#### Parent Perceived Severity for Children

Parents were asked how worried they would be if any of their children had: anemia, asthma, rheumatic fever, pneumonia, heart trouble or hardening of the arteries. Age correlated with changes in parent perceived severity scores ( $r = .48$ ;  $p = .001$ ) while pre-scores did not correlate with postscores. In general the experimental group increased in their perceived severity scores while the control group decreased. Siblings demonstrated the greatest change between groups; the experimental siblings increased while the controls decreased (Table 11). There were no main effects for differences between experimental and control groups and family relationship. There were no significant interactions (Table 12).

The experimental group overall increased on scores of parent

Table 11  
Differences in Parent Perceived Severity for Children Pre-  
to Posttest by Family Relationship

	Experimental					Control				
	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD
Spouse	6	15.33	12.33	3.00	4.65	3	16.50	10.33	4.33	7.51
Sibling	12	9.50	6.92	2.58	5.50	5	11.00	13.40	-2.40	3.91
Parent	2	10.00	15.50	-5.50	17.68	2	10.50	24.00	-9.00	38.18
Child	2	6.00	7.60	.00	.00	3	6.00	6.00	.00	.00
Total	22	10.61	9.04	1.72	6.48	13	11.31	12.62	-1.31	12.44

Table 12  
ANCOVA Results for Parent Perceived Severity for Children  
Covarying Age and Pretest Scores

Sources of Variation	df	f	p
<u>Covariates</u>			
Age	1	11.25	.003
Severity pretest	1	.00	.980
<u>Main Effects</u>	4	.35	.844
Exp./Control	1	.51	.481
Family Relationship	3	.26	.857
<u>2 Way Interactions</u>	3	1.28	.302

perceived severity of child for cardiovascular health while the control group decreased (Table 13). In the experimental group the largest increase was in the siblings group. The largest decrease in the control was the parent group. There were no significant main effects or interactions (Table 14). The age of the parents was correlated with changes in parents' perceived severity of child for cardiovascular health ( $r = .48$ ;  $p < .001$ ).

#### Benefits to Preventive Action

Questions to delineate benefits of preventive action included: a) How much do you think doctors can cure the above mentioned six health conditions? These were not addressed as separate or cardiac versus non-cardiac conditions, b) Do you think special diets could reduce any of these conditions? and c) Do you think there are any modifications in the way you live that could help to prevent any of these conditions?

The experimental group decreased on their scores regarding benefits of preventive actions while the control increased (Table 15). Age was not correlated with changes in benefits; prescores were correlated with postscores ( $r = .44$ ,  $p < .001$ ) (Table 16). There were no significant main effects or interaction effects. Siblings in the experimental group were the only family group that increased on benefits while spouse and siblings of the control group both increased. Parent and child groups of both the experimental and control groups decreased on benefit of preventive action.

Table 13  
Differences in Parent Perceived Severity for Children for Cardiovascular  
Health Pre- to Posttest by Family Relationship

	Experimental					Control				
	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD
Spouse	7	3.14	3.00	.14	.38	3	4.00	2.00	2.00	1.10
Sibling	12	3.25	2.25	1.00	2.67	5	2.80	3.60	-.80	12.72
Parent	2	3.00	5.00	-2.00	5.66	2	3.50	8.00	-3.00	.00
Child	2	2.00	2.00	.00	4.31	3	2.00	2.00	.00	.00
Total	23	3.04	2.62	.39	2.41	13	3.12	3.86	-.31	3.46

Table 14  
ANCOVA Results for Parent Perceived Severity for Children for  
Cardiovascular Health Covarying Age and Pretest Scores

Sources of Variation	df	f	p
<u>Covariates</u>			
Age	1	16.99	.000
Cardiac severity pretest	1	3.17	.087
<u>Main Effects</u>	4	.37	.827
Exp./Control	1	.01	.965
Family Relationship	3	.45	.722
<u>2 Way Interactions</u>			
Exp./Control vs Family Relationship	3	1.29	.300



Table 15  
Differences in Benefits of Preventive Action by Pre- to  
Posttest by Family Relationship

	Experimental					Control				
	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD
Spouse	7	9.14	10.86	-1.71	3.50	3	12.00	10.33	2.00	2.00
Sibling	13	9.85	9.62	.23	3.51	7	10.29	8.86	1.43	2.57
Parent	4	11.00	11.50	-.50	3.41	3	12.00	13.00	-1.10	1.00
Child	8	9.64	11.13	-2.00	4.10	6	8.33	9.17	-.83	1.60
Total	32	9.77	10.50	-.84	3.61	19	10.45	9.84	.42	2.27

Table 16  
ANCOVA Results for Benefits of Preventive Action  
Covarying Age and Pretest Scores

Sources of Variation	df	f	p
<u>Covariates</u>			
Age	1	.01	.905
Benefits Pretest	1	10.41	.002
<u>Main Effects</u>			
Exp./Control	1	1.33	.256
Family Relationship	3	1.62	.200
<u>2 Way Interactions</u>			
Exp./Control vs. Family Relationship	3	.48	.70

### Barriers to Preventive Action

Barriers to preventive action was assessed by two questions: a) How difficult will it be for you to change diet?, and b) Do you think changing your diet could cause health problems? Neither age or prescores were correlated with changes in barriers. Overall, the experimental group scores decreased slightly on barriers while the control group scores increased slightly (Table 17). There were no significant main effects or interaction effects (Table 18).

Table 19 shows the direction of change for all the health beliefs by experimental/control groups and family relationship. The siblings groups consistently demonstrates a change in the desired direction of increase for all the health beliefs. The control siblings demonstrate almost consistently a change in the opposite direction or decrease. Parents in both the experimental and control groups demonstrate a consistent decrease while experimental children reveal a pattern of decrease. Self-perceived susceptibility increased in the experimental spouse and sibling group.

As can be seen in Table 19 siblings consistently changed in the desired direction except for barriers of preventive action and for the most part opposite to that of the control group. T-tests between sibling experimental and control groups revealed differences on the following health beliefs: parent perceived severity of child ( $t = 2.11$ ;  $p < .05$ ), parent perceived severity of child for cardiovascular health ( $t = 1.97$ ;  $p < .06$ ) and parent perceived susceptibility of child ( $t = 3.7$ ;  $p < .003$ ).

Table 17  
Differences in Barriers of Preventive Action Pre- to Posttest  
by Family Relationship

	Experimental				Control					
	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD
Spouse	7	9.71	11.29	-1.57	3.64	3	10.60	12.00	2.00	3.61
Sibling	11	11.08	10.42	1.81	3.28	7	11.29	11.29	.00	1.73
Parent	3	12.00	11.75	.00	2.00	2	11.67	12.50	-1.17	3.48
Child	8	11.00	11.62	-.75	1.99	6	12.33	11.00	1.33	2.66
Total	29	10.85	11.10	-.14	1.77	16	11.48	11.44	.13	2.60

Table 18  
ANCOVA Results of Barriers to Preventive Action Covarying  
Age and Pretest Scores

Sources of Variation	df	f	p
<u>Covariates</u>			
Age	1	.22	.642
Barriers pretest	1	.01	.922
<u>Main Effects</u>			
Exp./Control	1	.03	.894
Family Relationship	3	.72	.549
<u>2 Way Interactions</u>			
Exp./Control vs. Family Relationship	2	.60	.553

Table 19  
 Summary Table of Direction of Change of Health Beliefs  
 by Family Relationship

	Spouse	Sibling	Parent	Child
<u>General Health Concern</u>	↓	↑	↓	↓
Experimental	↓	↓	↓	↓
Control				
<u>Self Perceived Susceptibility</u>				
Experimental	↑	↑	↓	↓
Control	↑	↓	↓*	↑*
<u>Self Perceived Cardiovascular Susceptibility</u>				
Experimental	↑	↑	↓	↓
Control	0	↓	↓	↑
<u>Parent Perceived Severity of Child</u>				
Experimental	↑	↑	↓	0
Control	↑	↓	↓	0
<u>Parent Perceived Cardiovascular Severity</u>				
Experimental	↑	↑	↓	0
Control	↑	↓	↓	0
<u>Benefits</u>				
Experimental	↓	↑	↓	↓
Control	↑	↑	↓	↓
<u>Barriers</u>				
Experimental	↓	↑	0	↓
Control	↓	0	↓	↑

Note. \* = Dramatic; 0 = no change

### Health Habits

The experimental and control groups were compared on health habits in order to determine if the intervention could decrease risk behaviors. The following items were compared: weight loss, salt at meals, frequency of eggs and meat, frequency of ham, bacon and hot dogs, frequency of butter, smoking now, drink alcohol now, belong to physical fitness program. ANCOVA was used for this comparison. The results indicated a near significant difference in health habits for amount of ham and alcohol consumption. The experimental group reported less consumption of ham, bacon, hot dogs, ( $f = 3.49$ ;  $p = .07$ ) and alcohol ( $f = 4.15$ ;  $p = .05$ ). No other significant main effects or interactions existed between the groups. An interesting finding for smoking now was found in the control group. Four subjects or 20% of those who smoked quit smoking (siblings). Two subjects or six percent of those who smoked quit in the experimental group (spouses). The groups did not differ significantly on participation in physical fitness programs. Nine subjects or 26% of the experimental group belonged to a physical fitness program. Five subjects or 25% of the control group participated in a physical fitness program. There was no pre- to posttest change in participation in physical fitness program.

### Basic Knowledge of Cardiac Disease

Fourteen questions were assessed to determine changes in knowledge about heart disease (Appendix C). Overall, members in the

experimental group showed an increase in knowledge scores (Table 20).

Table 21 shows the results of the ANCOVA. There was no change in the control group. On the pretest the control group had higher knowledge scores. However, the ANCOVA indicated there was no significant difference between the experimental and control or between family relationship groups in changes on the knowledge test. There also was no significant interaction between the treatment condition and family relationship. Age was not correlated with changes in education but pre-treatment scores were correlated with posttreatment scores ( $r = .48$ ;  $p = .001$ ).

#### Internal-External Locus of Control

The health belief model includes psychological variables that may predict subjects' motivation for preventive action. Internal-external locus of control has been used in several studies (See Review of Literature) to predict preventive outcome. In this study, there were no differences between experimental and control groups on internal-external locus of control ( $\bar{X} = 12.59$ ) indicating a direction of external locus of control rather than internal.

#### Screening

Subjects were asked whether they obtained blood pressure and serum cholesterol measurements post intervention. Table 22 shows the percentages of people screened by group.

Comparisons of mean proportions between groups revealed that 76% of the experimental group did have blood pressures screened

Table 20  
Differences in Knowledge Pre- to Posttest  
by Family Relationship

	Experimental				Control					
	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD	n	$\bar{x}_1$	$\bar{x}_2$	$\bar{x}$ Diff	SD
Spouse	5	11.20	12.67	1.20	1.30	1	13.50	10.00	1.00	.00
Sibling	9	7.50	9.00	.89	3.33	6	9.50	10.14	.17	2.04
Child	8	8.44	9.50	.75	2.91	5	10.80	11.00	-.40	2.97
Total	22	8.67	9.67	.58	2.84	12	10.00	10.41	.00	2.30

Table 21  
ANCOVA Results for Knowledge Covarying Age  
and Pretest Scores

Sources of Variation	df	f	p
<u>Covariates</u>			
Age	1	1.89	.180
Knowledge pretest	1	12.72	.001
<u>Main Effects</u>	4	1.64	.191
Exp./Control	1	.84	.368
Family Relationships	3	2.18	.114
<u>2 Way Interactions</u>			
Exp./Control vs. Family Relationship	2	.01	.990

Table 22  
 Screening Results of Blood Pressure and Serum Cholesterol  
 by Experimental and Control Groups

	Blood Pressure Taken				Serum Cholesterol			
	Yes		No		Yes		No	
	N	%	N	%	N	%	%	%
Experimental	25	(76)	8	(24)	9	(29)	22	(71)
Control	12	(57)	9	(43)	3	(14)	18	(86)
	p = .123				p = .161			

Note. ( ) = row proportion



compared to 57% of the control group ( $p = .123$ ). In the experimental group 29% had serum cholesterol screening compared to 14% of the control group ( $p = .161$ ).

T-tests between groups of high family history scores and low family history scores revealed differences on screening for cholesterol ( $t = 2.08$ ;  $p = .04$ ). Those with high family scores or more disease events observed than expected, had screening for serum cholesterol levels.

#### Additional Findings

To provide some clinical insight and understanding regarding the sudden cardiac death syndrome certain risk factor characteristics of the index case or sudden death victim and qualitative data of the families are reported.

#### Index Cases--Associated Risk Factors

Although it was not the purpose of this study to investigate the risk factors of the sudden death victims, certain important trends emerged from questionnaire and interview discussion data (Table 23). Dietary data of the sudden death victims proved difficult to systematically and validly obtain and thus were not collected.

Since there was opportunity to discuss the index cases in detail with the experimental first degree relatives much more information was obtained from this group. It is interesting to note that fourteen of the nineteen cases were smokers for a mean of

Table 23  
Relative Reported Characteristics of the Sudden  
Death Victims

Sex		Mean Age	Smokers (N=19)	Years Smoked		Hypertension	Diabetes Mellitus
F	M			Range	Mean		
2	17	41	88%	13-36	24	40%	17%

twenty-four years. Smoking was the most consistent risk factor found for these cases. As expected, a large incidence of hypertension was also present.

#### Events Leading to Death

Six or approximately half of the experimental cases had seen a physician with symptoms within two weeks prior to death. Diagnoses reported by spouses ranged from "arthritis of the elbow," "G.I. upset," "high blood pressure," "muscle flu" to "perfectly healthy." Only one subject was asked to remain for further observation. This subject had undergone what the spouse referred to as a "complete cardiovascular workup."

One spouse revealed the following information:

A year ago Thanksgiving--had complaints of stomach upset--this lasted 2-3 days, he did not have it checked out. No other symptoms until two weeks before death--went to private physician at a local hospital E.R.--This M.D. asked him to run around the block (unattended) and have an EKG when he got back--and he did--the doctor stated he didn't know why he was having chest pain--wife stated, "I thought he was familiar with the family history"--but he checked out his lung function--lungs ok--told him he would look over his records--and call him in two weeks with his impression.

This particular subject had the highest family history score for premature familial disease.

Out of clinical interest the investigator would like to share other accounts concerning the problem events leading to sudden death as reported by family members. These five interviews were chosen to illustrate the range of problems and certain consistent risk factors among the index cases as reported by family members.

The family of a 42 year old revealed the following information:

His wife left him several years ago and he never quite got over it. I think I was his only real confidante (father) because his ex-wife didn't like his daughters seeing him--He had a history of high blood pressure and took propanolol for control--After his death, I found him at home, I noticed all of his medications were untouched-- I think if he could have resumed a normal female relationship it would have helped with his blood pressure control. I'm sure there were things he couldn't share with me that he could have shared with a woman -- My younger son thought -- he had chest pain occasionally.

The next interview was with a 34 year old spouse whose husband was 36 when he died,

--was 60-70 pounds overweight most of the time but would go on diets intermittently where he would drop 60 pounds-- He drank but not heavy--he smoked but had given this up six months before his death--he loved meat--at it every night--after January when his father died (six months prior to his death)--of severe peripheral vascular disease and had a leg amputated--Jim compulsively started dieting--stopped smoking--stopped drinking--experienced some stress associated with his work--but felt that it wasn't excessive--We had gone to Flaming Gorge for four days with friends and had a great time--came back Sunday--that morning 1:00 a.m.--awoke with chest pain went back to bed and awoke again with chest pain so I took him to the Hospital about 4:00 a.m. An ECG, lab work, and everything was done--all were negative so they sent him home with Catapres 2 pills and told him to stay in bed--I went to work reluctantly and my husband did not want me to stay home. I called--at 9:00 a.m., he was grumpy, but seemed okay and I called again at 4:00 p.m. and every ten minutes after that, but no answer. I got in my car and went to the Boulevard and knew he was dead. I even told my son to stay in the car while I went into the house--he was in bed--dead. I wrote the coroner for a copy of his autopsy report and they charged me \$17.00--how crass.

The next interview was with a Spanish American family:

My husband and I made love that morning--he went into the bathroom--he was complaining of the cats--he set them out and then his chest pain started. He had gone into the Hospital a week before with chest pain and was told he had arthritis of his elbow--on autopsy they thought he had had a heart attack earlier--Well, the paramedics

came and he died in the hospital--We were very angry with the hospital staff and especially with the paramedics--could he have died because there was air in his I.V. line?

The next interview included a 36 year old spouse and her two sons 17 and 14 years old:

I expected Dad's death--he was a smoker, a beer drinker and didn't like doctors. When I gave--a birthday party this past Spring, I had a feeling that it would be his last one. He would start to look pale and paler--but hated to admit he had heart trouble--but he took his blood pressure medication every day. He had high blood pressure diagnosed when he was 28 years old. The night he died our son had pneumonia--I took care of both of them--my husband worked very hard that day and I had company over for a late supper. When we went to bed he complained of a stomach ache. I asked him if he had any chest pain or pain down in left arm. He was very defensive and denied any pain. I was very worried--I sat up with my son at about 12:30 a.m. I woke up in the chair in the living room and went back to our bedroom and my husband was dead.

The next interview was a 49 year old spouse:

My husband had been a smoker for 30 years, had borderline diabetes, borderline hypertension, and ate lots of fats. He came home with chest and arm pain. He went to see his doctor and he told him it was muscle flu--nothing else. He seemed to get worse over a week but did not return to the hospital. He was very short of breath and thought he had pneumonia--he died shortly later at home. It was kind of interesting that--and two of his cousins around sixty years old died within a couple of months of each other from heart attacks. They were from Finland. It was his fault; if he hadn't eaten so much sugar, coffee, meat and eggs, exercised and taken his blood pressure pills--it was all his fault--he didn't like doctors. He was also under a lot of stress with his job--He was a comptroller for a couple of businesses that were having a hard time financially and he was to make them work.

These interviews indicate the presence of symptomatic cardiovascular disease and the presence of consistent risk factors (smoking, hypertension, high stress) among the index cases. One additional finding was a slight tendency for index cases to reside

in a particular geographic location (West Valley). Whether this is a sampling error or indicates systematic variation in genetic-environmental differences would require further investigation. Another interesting finding, although data were not obtained from all cases, was the strenuousness of activity just prior to death. Five index cases had just completed some form of challenging activity: a) water skiing, b) lifting heavy crates for 8 hours, c) jogging a couple of miles, d) competing in a motorcycle race, and e) sexual intercourse. It was not until mid-point in the data collection procedures that this information was recognized as something that might have been included systematically on the questionnaires for further evaluation of the index cases.

#### First Degree Relatives

The interviews usually took between two and one-half to three and one-half hours to complete. The length of the interview depended upon whether there were children present when interviewing the spouse, and when interviewing the siblings and parents, how many were present. This arrangement of groupings: spouse and children and parents and siblings was not always possible. When large groups met together (three families) it was difficult to elicit information on: a) the perception of the sudden death event, b) available situational supports, and c) coping mechanisms. This information was intended to help ascertain if the "loss" in any way provided the motivation of "cue to action" for any health seeking behavioral changes.

In general the experimental families easily communicated their feelings regarding the sudden loss. The investigator did not feel like an intruder and in only two cases did there seem to be apathetic responses. It was somewhat surprising how easily families talked about the event and how seemingly interested they were in learning about heart disease. However, there was a predominance of anger projected towards the hospital nurses and staff, paramedics and physicians, concerning the loss of their family member. This was especially true of those family members where index cases had seen a physician just prior to death. The irony of this finding is the fact that these family members still chose screening from private physicians rather than the study's recommended Veteran's Screening Clinic.

In only a few cases did it dramatically appear that certain family members were having difficulty coping. One fourteen year old son had been vomiting at school on and off for a couple of months. Another son (12) had insomnia for a couple of months due to nightmares. An older mother, soon after the index cases' death, was hospitalized for chest pain. A spouse five months after her husband's death, died of an acute myocardial infarction. One spouse was so angry that she made an appointment with the hospital administrator and members of the emergency room staff and threatened to sue the hospital (this same subject is the mother of the young boy who had been vomiting at school).

In summary, three to five months post-death seemed to be a non-threatening time to interview the family members. The two

families that refused to participate were both refused by young working husbands who lost their wives and had younger children at home. One husband asked me to send the questionnaires to his office and he would look them over and call me if he would participate. I never heard from him. The majority of families responded favorably and enthusiastically to the letter of introduction. This method of introducing the study seemed to be a very effective modality and enabled the subjects preparation time before they were called to commit for participation.

Additional information regarding Pearson Product Moment correlation coefficients and outcome measures are included in Appendix A.



## CHAPTER VI

### DISCUSSION

Evaluation of the nursing intervention strategy for high risk coronary subjects needs discussion from several approaches. The first approach will focus on the actual results of the study; the second approach will concentrate on certain emergent trends or implications for clinical practice. The final approach will include limitations of the study and suggestions for further research.

#### Characteristics of the Sample

##### Demographic

The total sample consisted of 58 subjects, 35 experimental and 23 control. There were 21 males and 37 females. The largest family relationship group was the siblings (n=20). Ninety-five percent of the population was Caucasian and 58% were Mormon.

##### Family History Score

With the inclusion of the index case in the family history score calculations, 44% of the population demonstrated that familial aggregation was related to heart attacks. This percentage however seems to be clinically if not statistically conservative. With reference to Table 4, four families with moderate scores

(0.9 - 0.8) still had several heart attacks in the family with a range of 47-53 years old as the age of death for the index case. Therefore, the 44% probably reflects a percentage less than actual and indicates an overly conservative estimation using this method of family history score analysis.

Excluding the index case from family history score calculations resulted in notable changes in four families' history scores. One family revealed a decrease of 1.6 to 0.4 indicating a questionable relationship between familial aggregation and heart attacks. However, in the remaining three other families, a prevalence of two to four heart attacks still existed with a mean age for heart attacks of 55 years old. Therefore, analyses using the family history score should calculate both scores (index in and out) for discerning the index cases' potential contribution to the overall family score.

The observation of more family history scores in a strong positive direction than in a strong negative direction is generally expected not only because of the population but also due to the nature of the data used for the calculation of family history scores. It is difficult to obtain a large score in the negative direction unless the number of individuals in the family is relatively large. Most of these sixteen family histories were small based on fifteen relatives or less.

There is general agreement concerning the increased risk for coronary heart disease in families with a prevalence of young heart attack victims. Coronary heart disease prevention among relatives

of greatest risk presents as a priority need. It would be useful to incorporate methods in clinical practice and research for discerning those individuals at greatest risk. Recording of family histories has been a standard part of patient evaluation. However, the utility of family history recording has not been demonstrated both clinically or for research purposes until recently (See Family History Score section of Methods chapter). The family history score has been shown to potentially identify those specific individuals or families suspicious for premature heart disease. However, the necessary method for calculating the family history score presents notable challenges to the history taker. All first and second degree relatives should be included with current health status and cardiovascular related conditions enumerated. Information should be collected for both males and females and particular emphasis on ages of onset of disease or death specified. If specific ages are not known, the evaluator should try to obtain some estimation of age. Appendix B illustrates information needed for useful family histories.

### Health Beliefs

#### General Health Concern

The hypothesis was not supported for general health concern. There was no significant difference between the experimental and control groups on general health concern. The control group decreased more on general health concern than the experimental

group, however, it would be difficult to defend the meaning of this difference. Interestingly, the experimental sibling group was the only family group that increased their general overall health concern. Therefore, it is possible that the intervention was selective and did help change the brothers and sisters beliefs regarding their own health or vulnerabilities of getting sick.

#### Self-Perceived Susceptibility

There were no significant differences between the experimental and control groups on self-perceived susceptibility. The children of the sudden death victim in the control group revealed the greatest change in susceptibility. These children increased their "susceptibilities" or vulnerabilities to the health conditions: anemia, pneumonia, asthma, rheumatic fever, heart trouble, and hardening of the arteries. However, when the cardiovascular variables, heart trouble and hardening of the arteries were analyzed separately, these children did not perceive themselves as vulnerable to these as to the general health conditions. These children may have experienced problems with non-cardiac conditions during the study creating this large increase in their perceived susceptibility scores. Also it is plausible that because the control children did not have anyone to discuss health issues with directly and merely received information on screening for cardiovascular risk factors, this made them more aware of their susceptibilities. The children in the experimental group may have

experienced the intervention as alleviating their vulnerabilities since steps for promoting health and reassurances for reducing risk were emphasized.

#### Self-Perceived Susceptibility for Cardiovascular Health

There were no significant differences between the experimental and control groups on cardiovascular perceived susceptibility. Overall, both groups increased on their susceptibility scores for cardiovascular health. Again, consistent with the changes in self-perceived susceptibility for all health conditions, there were differential changes in family groups between the experimental and control groups. More simply, the spouses and siblings increased their perceived vulnerability in cardiovascular health in the experimental group, while the children in the control group increased their perceived vulnerabilities in cardiovascular health. Interaction with the spouses occurred frequently concerning: the events leading up to the death of their husband or wife (index case), answering many questions regarding autopsy findings, answering questions regarding their children's risk, measures that could be taken to decrease their children's risk and discussion on their own (spouse's) personal risk to heart disease. These parameters of discussion probably contributed to the spouse's increased awareness of risk for heart disease. The spouse's increased awareness of personal susceptibilities to heart disease could also partially account for the cessation of smoking in this group. Reasons for the differences between experimental and control children groups

have already been discussed (See Self-Perceived Susceptibility). The significant interaction between family relationship group and experimental and control group was due to the differences in the child group. Again it is conjectured that because the control children did not receive reassurances regarding their own cardiovascular risk and methods to reduce this risk that they felt more susceptible than the experimental children to cardiovascular health.

The relatively large decrease in the experimental parent group (parents of the sudden death victim) on cardiovascular susceptibility is not surprising in light of the information shared with them during the intervention. It was emphasized how atherosclerosis generally occurs over time due to the cumulative effects of patterns of eating, smoking, control of blood pressure, activity, etc. Exceptions to this included families where a genetic transmission creating premature risk or early onset of disease was acknowledged. These family members probably felt as if the damage was already "done," they had "escaped" the "vulnerable" time, and there was no need to be feeling any more "susceptible" at their age.

When health beliefs were correlated with other demographic and outcome variables, two relationships existed with self-perceived susceptibility. There was a tendency for those with more formal education to report higher self-perceived susceptibility to health conditions. It can be argued that people with more formal education are more aware of potential risks or threats to their health and experience an increase in susceptibility when

compared to those who may not be as aware or knowledgeable. The second relationship was with dietary intake. Those subjects feeling more susceptible to disease also had a tendency for increased egg consumption preintervention to postintervention. Since subjects with an increase in perceived susceptibility decreased their meat consumption, especially ham, perhaps these subjects increased another protein source, or egg consumption.

#### Parent Perceived Susceptibility for Children

There was no significant overall difference between experimental and control groups on how worried they would be if their children had: anemia, asthma, rheumatic fever, pneumonia, heart trouble, or hardening of the arteries. However, there was a significant difference between experimental and control siblings on how worried they would be if their children had any of the six conditions. There was also a significant difference in this group when the cardiovascular conditions (heart trouble and hardening of the arteries) were analyzed separately. Once again, the intervention seemed to selectively make a difference in the desired direction for siblings.

The relationship between age and differences in severity scores indicated that younger parents had more of a tendency for increasing their scores from preintervention to postintervention than older parents. Perhaps this was due to the fact that younger parents have children at home and feel more responsible for their health or that if younger they can still have impact

on their child's health. In addition, a relationship existed between the age of the sudden death victim and parents perceptions of the seriousness of chronic disease for their children. The younger the age at death of the sudden death victim the more "serious" parents perceived their own children's vulnerabilities. Thus it appears that psychological readiness for parents to be amenable or even help change risk beliefs/behaviors in their children may be a function of how early or young a family member has died of heart disease.

Becker and Maiman (1978, p. 14) have reported that prescribed action will not be completed unless the belief is held that becoming ill would bring serious or social repercussions. A tendency existed that parents who perceived the cardiovascular conditions as "serious" for their children were more likely to obtain blood pressure screening. Thus there was consistency between this belief and increased compliance with health recommendations.

#### Benefits of Preventive Action

There was no significant difference between the experimental and control groups on benefits of preventive action. However, brothers and sisters of the sudden death victim held the belief that certain dietary changes and lifestyle modifications could reduce their personal disease risk.

The decrease in the experimental group and increase in the control group on benefits of preventive action is puzzling. Becker and Maiman (1975, p. 16) have indicated that individuals even at



high levels of readiness will not comply with prescribed actions unless they hold the belief that the actions will have "beneficial" effects. This seems inconsistent in this study with regard to screening where there was more compliance from the experimental group than the control group on blood pressure and serum cholesterol screening. Also inconsistent with other reported studies (Rosenstock, 1974, p. 355) is the fact that women perceive more "beneficial" effects of screening and are subsequently more compliant for screening. Yet, in this study, more males elected to have screening (p.122).

The intervention may have contributed to this difference between the experimental and control groups. Information concerning both the ease and difficulty of lifestyle modifications and realistic goal setting were discussed. It is possible that discussion regarding "accurate expectations" had an inadvertent paradoxical effect on the experimental subjects, causing them to perceive a decrease in benefits to preventive action.

#### Barriers of Preventive Action

There were no significant differences between groups on barriers of preventive action. Overall, experimental subjects reported fewer potential barriers than control subjects. This difference is so slight that any clinical interpretation would be meaningless. However, it was interesting that the experimental siblings reported an increase in perceived barriers of preventive action. This could mean that since the brothers of the sudden

death victims felt more vulnerable to heart disease and were more compliant to health behavior changes that they were actually experiencing certain "barriers" or difficulties compared to other family members who were not changing personal health habits.

Sex was related to perceptions of barriers, as men reported more barriers to changing dietary habits than women. No other previous studies were found for a comparison of this specific finding for sex. However, reports indicating potential barriers to prescribed regimens have included: a) monetary costs, b) extent to which new patterns of behavior must be adopted, c) duration of proposed change, and d) potential side effects (An & Lasagna, 1973).

Subjects (n=4) who had experienced angina reported more difficulty in changing dietary habits. It is not clear why a recommendation for decreasing sodium and cholesterol would be perceived as threatening to subjects with angina type pain.

Two patterns of change occurred in health beliefs: a) The brothers and sisters of the sudden death victim in the experimental group consistently demonstrated a change in the desired (increase) direction except for barriers. The siblings in the control group demonstrated almost consistently a change in the undesired (decrease) direction. Significant differences existed in the sibling groups on how serious they perceived both cardiovascular and general disease to be in their children, and how vulnerable they believed their children to be to all disease conditions. The intervention seemed to selectively make a difference for sib-

lings on health beliefs. b) Parents of the sudden death victim demonstrated a consistent change of a decrease in health belief variables.

The pattern of change in the parent group is somewhat perplexing. One would think that after the sudden or unexpected death of a son/daughter that parents would feel more worried about their remaining children and acknowledge the "seriousness" of cardiovascular disease. Yet seven months after the death of their children, they reported less worry regarding their other children. Although these differences were based on very small numbers (N=7) and consequently represent cautious interpretation, the pattern of a decrease on all of the health beliefs is consistent. Perhaps the experimental parents felt guilty in that they, the parents, had contributed to their child's early death. Consequently, perhaps these parents were defensively denying the seriousness of cardiovascular conditions in their remaining children.

#### Health Habits

The health habits that were compared between groups included: weight loss, salt at meals, eggs how often, meat how often, ham, bacon, hot dogs how often, butter how often, current smoker, drink alcohol now, and belong to physical fitness program. An extensive questionnaire was obtained on types of exercise the subjects engaged in, how often, and duration. The statistical analysis proved too cumbersome, expensive and difficult for determining if the

experimental group increased exercise activity (quality, quantity) more than the control group. Therefore, this analysis was not performed.

The only habits that differed significantly between groups were ham and alcohol consumption. The experimental group reported less ham consumption than the control group. Ham, hot dogs and bacon were emphasized in the intervention as meats consisting of not only fats but sodium as well as sodium containing preservatives. These foods were talked about as "processed" foods containing chemical preservatives. Therefore the reduction in this food item was consistent with the information component of the nursing intervention.

Alcohol consumption was not stressed as much as some of the other health habits known to directly increase cardiac risk. The investigator was often asked what effects alcohol had on health. The usual effects of hepatic-neurologic toxicity were discussed and the controversial nature of alcohol and cardiac disease. Therefore it was a surprise to find this difference between groups. Perhaps the explanation of liver effects was enough to produce significant differences, particularly since no other variables significantly correlated with alcohol consumption.

Smoking has consistently been one of the more difficult risk habits to change (Enelow & Henderson, 1975, p. 147). The dissemination of information regarding the effects of smoking has profoundly changed public attitudes in recent years, but a corresponding change in public behavior has not occurred. Thus these

data are consistent with previous findings. A situation of sudden loss and planned intervention to explicate the risk involved in smoking does not significantly motivate smokers to quit.

However, four subjects or 20% of those who smoked in the control group quit smoking. These family members were brothers of the sudden death victim and considered at greater familial risk than other family members. In the experimental group, two subjects or 6% of those who smoked quit. These were both spouses. Study participation (whether intervention or questionnaire alone) could have conceivably contributed to subjects' cessation of smoking.

Subjects who smoked were less compliant with blood pressure screening. Further exploration with smokers and compliance to blood pressure screening is clinically indicated especially since smoking has such deleterious blood pressure control consequences.

### Knowledge

The experimental group revealed a small increase in knowledge from pretest to posttest. Experimental subjects were initially less knowledgeable than control subjects: ( $\bar{X} = 8.67$ ) as compared to the control group ( $\bar{X} = 10.00$ ). Questions regarding food categories, i.e., which foods were carbohydrates, fats and proteins and what is a hypertensive blood pressure were consistently answered incorrectly by both groups. The investigator was surprised that subjects taking blood pressure lowering medications were not knowledgeable about what constituted a hypertensive blood pressure. Neither were these individuals knowledgeable of what

their own blood pressure readings were after seeing a physician.

Generally subjects knew the hazards of smoking and cholesterol as risk factors for heart disease. However, subjects had difficulty choosing foods high in cholesterol.

#### Internal-External Locus of Control

There were no differences between groups on locus of control. However, internals in the experimental group were significantly more likely than externals to obtain screening for blood pressure. When groups were combined, internals were significantly more inclined to obtain blood pressure screening than externals. This finding is consistent with several studies suggesting that internals are more likely to take preventive measures to maintain themselves healthy and free of disease (Wallston & Wallston, 1978).

#### Screening

Although a statistical significance was not produced between groups on screening outcome measures the existence of a clinical significance can be argued from comparisons of group percentages. Compliance to blood pressure screening occurred in 76% of the experimental group compared to 57% of the control group. Serum cholesterol measurements were obtained on 29% of the experimental group as compared to 14% of the control group. Manley and Graber (1977, p. 1045) reported out of 1,000 persons attending the hospital based education program only 174 persons or 17% complied with recommendations for blood pressure and serum cholesterol screening. In this study both the experimental and control groups

demonstrated considerably higher percentages of people electing to be screened. The sibling group (the greatest risk group) was more compliant to screening than other family groups. This finding further supports the intervention's selection bias. Because siblings constituted the larger family relationship group and were conceived as the highest risk group the intervention was directed toward, and subsequently had the greatest impact on this group.

Certain relationships between outcome and demographic variables and screening have been mentioned throughout the text. In summary, the younger the sudden death victims' age the more likely blood pressure screening was obtained. Subjects who decreased their meat consumptions were more likely to obtain blood pressure screening. There was a slight tendency for smokers to be noncompliant for blood pressure screening; and subjects who obtained serum cholesterol screening also obtained blood pressure screening. Families with higher family history scores as compared to those with lower family history scores were more likely to obtain screening. Finally, for parents there was a near significant relationship between concern about cardiovascular disease in their children and obtaining blood pressure screening. All of these relationships except those including smoking indicate consistency between perceived vulnerabilities and obtaining screening and other preventive behaviors associated with screening. Also inconsistent with previous reports was the fact that males were more compliant than females to screening. Males perceived their risk to heart disease to be greater than females and demonstrated commensurate

behavioral changes or compliance to recommended actions.

A powerful motivator for screening was the age at death of the sudden death victim. Perhaps family members who have experienced the death of a family member at a very young and unexpected age experience their own vulnerabilities and want to believe that screening can detect and hopefully prevent disease events for themselves.

Family members who obtained screening were more likely to receive screening from their own private physicians rather than the study's recommended screening clinic. Six subjects elected to be screened at the study's recommended screening clinic. Due to the accessibility and lack of familiarity of this screening clinic a potential "barrier" to screening may have existed for other subjects. However, the investigator encouraged evaluation and follow-up care with subjects' physicians. Many subjects expressed a need to identify a community physician who could provide continual evaluation. Apparently the anger and hostility that was expressed by some families toward medical personnel after the index cases' death subsided or did not interfere with their preferences for screening.

### Implications and Significance for Clinical Practice

#### Intervention Strategy

The components of assessing, informing/educating and providing emotional support seemed to produce the most significant effects in the sibling group. The fact that significant interactions



existed primarily with the health beliefs and family relationship is further support that interventions must be designed to attend to unique generational differences within families. Validation of the need to differentially construct intervention strategies for parents, siblings, children and spouses is an important finding. With regard to research, testing of compliance to prescribed preventive measures needs to incorporate methodologies and statistical analyses for discerning generational effects and differences. It is possible that intervention strategies could include several nurses, each with their own generational expertise to "reach" an entire family. This would enable "group interactions" selectively employing the components of assessment, informing/educating, and emotional support to more precisely fit the unique aspects or individual differences within families.

The nursing professional transcends every generational level from neonate to centarian in everyday practice. Strategic dissemination of preventive "type" information can occur as a routine part of nursing practice. For example, the coronary care nurse is initially concerned with acute care aspects of the myocardial infarction patient; yet opportunity does exist to "alert" family members of their potential susceptibilities and suggestions for screening. High risk families for cardiovascular disease could be at least identified by the coronary care nurse and referred to public health nurses for additional care needs. The conception of risk and primary prevention unfortunately does not occur within acute care settings. Obviously, one may approach health education

by directly disseminating knowledge to masses of individuals but those at greatest risk may well be lost. A complementary route which should be considered for the diffusion of information is by way of the practicing nurse. The practicing nurse can begin the initial implementation and act as a primary change agent. The information and education concerning primary prevention needs to become an "integral" part of nursing practice. The problem of dissemination of information and selective intervention is a problem of internalization and socialization. Traditionally, nursing education has adapted and integrated acute and restorative care concepts of nursing. These concepts have focused on the extension and assistance of aspects of curing and healing rather than the anticipation, forestalling, readiness for, satisfy in advance concepts of prevention. Therefore, the socialization and integration of preventive practice has not been well established in nursing practice. More bluntly, the dissemination and integration of preventive concepts in nursing education have suffered from curricular sclerosis. Solutions to this problem might include curricular emphasis on: a) assessing a person's past, current and future living patterns, including analyses on family history, behavioral patterns, and beliefs; b) educating students on risk factor analyses emphasizing competing and synergistic risk habits by generations (different age groups); c) emphasis on educational and screening needs; d) emphasizing appropriate selective intervention strategies in regard to primary, secondary and tertiary prevention. Perhaps a new process of thinking or conceptualizing patient need is

necessary for the accomplishment and integration of preventive health care in everyday nursing practice.

Successful strategies will need to be "selective" regarding the manner in which assessments, information and support are conceptualized, operationalized and evaluated. Specific information or findings from this study useful for designing selective interventions include using family histories for discerning familial disease. Family history taking is a skill that both physicians and nurses learn as a part of their educations. It is a method or clinical tool that can be easily undertaken with the proper education. Those families determined at greater genetic or familial risk could benefit from early interventions designed to reduce their concomitant modifiable behavioral risk. Greater benefits from preventive measures will probably be gained when applied to younger individuals as suggested by Table 24 (Williams, 1981, p. 109).

Serum cholesterol level in children is associated with increased CHD rates in their adult relatives (Schrott, Bucher, Clark & Laner, 1979, p. 619). These observations justify serious consideration for modification of risk factors in children. Initial attempts to modify CHD factors in children will be most appropriate in families deemed at very high risk. Large numbers of youth at high risk for CHD can readily be found from health history analyses where there are attempts to define early coronary events in parents and grandparents. Hypertension, hyperglycemia, and hypercholesterolemia can all be treated with dietary and drug modifications. While total prevention of atherosclerosis may not occur

Table 24  
 Potential Benefits of Lowering Serum Cholesterol 18 Percent  
 for 20 Years in Men\*

Presence of Other Risk Factors  Smoking, Hypertension, LVH, Glucose Intolerance	% of New Coronary Heart Disease (CHD) Cases Preventable		
	Age at Start		
	35	45	55
Low	40%	24%	13%
High	30%	14%	6%

\*Based on Framingham, Massachusetts data lowering serum cholesterol 310 to 260 or 260 to 210. Adapted from Williams, 1981.

a clinical objective of delaying the atherosclerotic manifestations may well be feasible.

Interventions could be directed toward brothers of the sudden death victim. To intervene successfully with the brothers of the sudden death victim has potentially the greatest impact in eventual reduction of cardiovascular mortality. If the "seriousness" for coronary artery disease could be perceived in this group, which also is the group with young children who could benefit early from preventive strategies, then perhaps the greater yield from preventive strategies might be demonstrated. Priority interventions need to occur with family members who have experienced younger sudden death victims. The age of death may serve as the most powerful motivator for changing health beliefs/behaviors. The significance of age at death can help the clinician in two ways: a) age can become a biological marker for selecting those families that seem to be at more genetic risk therefore needing preferential assessment of behavioral and/or modifiable risks, and b) families who have experienced young cardiac deaths may be more motivated to reduce high risk behaviors. Thus age would provide a "cue" for timing the intervention for maximizing reduction of risk behaviors. This study has demonstrated the need for educating individuals on what may appear to be "obvious" and "known" information regarding cardiovascular risk factors. Questions regarding food categories and what is a hypertensive blood pressure were troublesome areas. Subjects had trouble choosing foods high in cholesterol and differentiating a protein source from a carbohy-

drate source. More education on hypertension and dietary management is indicated. This is indicated not only for individuals with symptomatic heart disease as a primary preventive strategy but for those who have heart disease as a secondary preventive emphasis. In fact, individuals taking prescribed medications for blood pressure control need much more selective information regarding the definition of hypertension, associated risk factors for hypertension, signs and symptoms potentially threatening to their disease state, and some form of record keeping procedure for blood pressure recording. Family members seem to want to continue with familial medical facilities. Therefore encouragement for continual evaluation with a consistent practitioner could be emphasized. As long as people seem to be obtaining proper preventive evaluation this should be encouraged rather than creating a new system of evaluation or screening. Familiarization regarding resources that promote primary prevention is indicated for the practitioner. Lastly, titrating the intervention on two or more risk factors at a time is indicated. For example, progress in one area, decrease in meat consumption, can lead to deterioration in another, an increase in egg consumption. One possible solution to the problem of having to help individuals to change multiple risk factors would be to set priorities and alter each risk factor step by step.

The design and implementation of preventive nursing interventions is no small feat and requires rigorous study and theoretical explication, operation and evaluation. As more and more consumers become aware of their potential health risk, demands will

be made for innovative modalities for identifying and curtailing risk. Thus nursing has the potential of being on "the cutting edge" for meeting these demands as well as developing a strong and accountable approach to health promotion.

The construction of successful preventive approaches can provide a concrete measure of high-quality nursing care. Operationalizing activities for preventive nursing practice should begin with the levels of prevention: primary, secondary and tertiary. Emphasis on demographic patterns, physical and behavioral characteristics, family history and response to previous prevention trials can aid in developing and evaluating nursing prevention strategies.

The conceptual framework in this study (pp. 47-48) was developed over time from continual interaction with the data. It seemed clear that populations susceptible to heart disease were those with certain familial/genetic risks, pertinent habits or behaviors, and certain cognitive processes involved in making decisions regarding health care. As a first step this model provided conceptualization of risk based on a variety of factors not just secular or non-holistic orientations. This framework needs much more testing for discernment of its potential predictive capabilities. This framework provided a "starting place" for conceptualizing ingredients and areas of emphasis for designing and implementing the nursing intervention strategy.

### Limitations

Studies to promote behavioral changes require longitudinal

analyses and frequent interaction with the health care provider. For the investigator this takes time, money, patience, and coping strategies commensurate to promoting health. More simply, because prevention strategies must address the entire person, methodologies to evaluate or test these strategies are complex and comprehensive. This study required 19 months for data collection and still had a sample size of 58 subjects. Had another investigator been involved it is conceivable that the sample size could have doubled. Therefore the most important limitation of this study was the sample size.

The sample size was limited due to several factors: a) the sampling criteria; selecting primarily those index cases known to die of CAD as verified from autopsy and selecting those subjects within a 50 mile radius of the university, b) time required for the intervention per subject, c) and one person to do the intervention and maintain the logistics of a potentially complicated study. All of these factors limited subject intake.

Another important limitation was the lack of various tools already tested for their utility in promotion of behavioral change type studies. This was particularly significant in trying to discern or measure the effects of the intervening variable, crisis. When this study began there were no such tools that could help determine the impact of the crisis state on the outcome measures. The state of the crisis could very well have been a motivating factor for the behavioral changes seen. Also it was difficult to get a measurable "handle" on the family members' perception of the



sudden death, their available situation supports and coping mechanisms. The operational aspects of discerning the impact or state of crisis presents a notable problem for testing intervention strategies directed at families in crisis.

A tool to measure specific changes in level of activity and increases in exercise was also a problem. The Freston tool included a section on activity, however it proved too cumbersome and expensive to analyze and was potentially not sensitive enough to quantify activity level. This problem constituted another limitation of the study. As more and more health promotional studies are being undertaken more valid indicators of behavioral change will emerge.

The method of obtaining family history scores potentially contributed to information loss from the control group. Since the control subjects did not have a nurse assisted family history assessment, information was either lost or seemed questionable, and subsequently was deleted.

Further insight into the risk analysis of the sudden death victim can provide useful clinical information for designing interventions. Part of the usefulness of this information is the discernment of any sex specific differences regarding risk analyses and subsequent intervention emphases. Information concerning the sudden death victim was not a priority analysis. The lack of information on women as sudden death victims was a limitation.

Since the control group received screening information, location of the study's screening clinic and what specific diagnostic

procedures were obtained, this group did not control for screening because they were informed about screening and what constituted screening for cardiovascular risk.

#### Recommendations for Future Research

Preventive oriented investigations can benefit from a host of different disciplines. Investigators attempting to test preventive protocols need to share ideas, methods, and analyses with other scientists and clinicians. A major recommendation for future research is to collaborate with as many other individuals as appropriate for designing testable intervention strategies. Data of quantitative and qualitative nature needs analysis. Too much clinically useful vital information is lost without attention to more phenomenological data. Modalities for attaining these kinds of data must be incorporated into the design of these studies.

Extension of this study as well as other preventive oriented studies should include similar conceptual frameworks. To only look at behavioral changes without assessing cognitive appraisal concepts or familial risk is too narrow. Therefore a comprehensive knowledge base needs development including several parameters of the "total person" to assure risk reduction. If these parameters are always different in major studies, encouragement for many problems of a methodological and interpretive nature will persist. For example, the health belief model (HBM) constructs have been operationalized differently by various investigators attempting to measure these beliefs. Little work has been done to examine the

predictive value of combinations of two more beliefs and the joint influence of all HBM dimensions on behavior has had little evaluation. Finally, the model has rarely been tested in the area of conditions requiring long-term personal health actions.

Some additional areas of concern or recommendations include:

1. Specific studies to determine the exact nature or operational definition of what type and method of information dissemination is needed for children, adolescents, young adults, middle age, and geriatric subjects that would increase health promotional compliance. Questionnaires to specifically look at what subjects know about cardiovascular inheritance or familial risk, diagnostic procedures for evaluating risk, and whether or not each specific cardiovascular risk factor can be minimized from clinician evaluation could help more precisely distinguish the effects of intervention of knowledge.
2. Study designs that would control for crisis states to determine the impact of crisis on outcome measures.
3. Streamlining the family history assessment form for increasing subject compliance.
4. Incorporating a control group for screening where subjects are not mailed information at all on screening. Perhaps this would be difficult for human subjects approval but the provisions could be made to see that these families received necessary information once the study was finished.

5. Studying the effects of "value" orientations as compared to "risk" orientations. For example, it is currently not known what the effects of value have on adoption of health promoting behaviors. Runners may not be running because of the potential decrease in "risks" to disease but because they "value" trim figures or the psychological euphorias created while running.

Probably at the completion of every study the recommendation is made for more researchers, more money, and more sensitive tools. These types of studies mimic epidemiological approaches requiring substantial budgets and personnel. If several researchers could collaborate to discuss the development of preventive strategies and theory development perhaps resources could be shared as well as knowledge. Comprehensive approaches to health care requires comprehensive models, methods, and evaluations. Recognition of the complexity of this type of research is essential for addressing the health promotional needs of individuals in our society.

APPENDIX A

ADDITIONAL INFORMATION PEARSON CORRELATIONS

Table 25

Additional Information Pearson Correlation with Certain Health Belief and  
Health Behaviors Outcome Measures

Variable	Self-Perceived Susceptibility	Barriers to Prescribed Action	Parent Perceived Severity	Ham Consump- tion	Smoking Now
Years of education	-.27*			-.49*	
Egg consumption	-.27°				
Ham consumption	.38*				
<u>Age</u>					
Age of sudden death victim			.72*		
Screening for serum cholesterol			.33°		
Screening for blood pressure					.30*
Sex		.37*			
Angina		.40 p = .006			

\*p < .05; \*\* p < .001; °p = .06.

Table 26  
 Additional Information Pearson Correlation Coefficients with  
 Screening Outcome Measures

Variable	Blood Pressure	Serum Cholesterol
Age of sudden death victim	.80*	
Decreased meat consumption	.29*	
Smokers	.30*	
Blood pressure screening		.38*
High family history score	2.08*	
Parent perceived serverity of children		.33°

\*p < .05

\*\*p < .001

°p = .06

APPENDIX B

PROTOCOLS



Experimental Group

1. Index cases will be randomized from an assessment sheet kept by the County Coroner's office.
2. Letters will be sent to the next of kin (as reported on the death certificate) 3 to 5 months post death. This letter will identify the investigator and purpose of the study.
3. One week following the letter, a phone call will be made by the investigator. Information will be obtained, at this time, of the names and phone numbers of the other first degree relatives. An appointment will be made with the next of kin for health history assessment and information. Provision to be done by the investigator.
4. Letters and phone calls will then be instituted for the first degree relatives.
5. Consent forms for participation in the study will be taken to the first meeting in the subject's home. Children under 18 years of age will require parental signature on the consent form. It will be encouraged that the families should meet as two groups with the investigator.
  - a) spouses and children
  - b) siblings and parents
6. The Health Beliefs Questionnaire and the Health Behavior Questionnaire will be given to the family members for completion before the intervention begins. Children under the age of 12 will not be asked to complete the questionnaires.

7. Nurse assisted health histories will be taken for family members. Mothers will be asked to assist with health histories for children between 12 and 18 years of age. This will include a self-report of assessment of risk factors and pedigree analysis.

8. Education concerning the risk factors will begin upon completion of the health history. Education will include: reports concerning familial aggregation of coronary risk factors and coronary heart disease, appropriate research documenting risk behaviors, and current medically accepted methods for retarding minimizing and/or ameliorating each of the primary risk factors. Questions will be encouraged and answered at this time. Encouragement for further screening (B/P, Serum cholesterol) to be provided for \$10.00 a family or free for individuals at the old Veterans Administration Hospital will be stressed also at this time. Members will be given a telephone number for scheduling for screening appointments or encouraged to make appointments during the home visit (1 - 1½ hours).

9. A phone number to reach the investigator will be given to the family members. They will be told that in the event of any questions and/or concerns, to please call.

10. A secretary at the College of Nursing will receive phone calls from the family members for appointments on Monday, Wednesday and/or Friday. Other times for appointments can be arranged. The secretary will be instructed to ask members to fast for 10-12 hours before their clinic appointment.

11. The investigator and/or research assistant will check with the secretary daily for appointments.

#### Screening Clinic

12. Consent forms for height, weight, blood pressure, and blood drawing for cholesterol will be presented.

13. Once the consent form is signed the following measurements will be taken and recorded on the Screening Clinic Report:

- a) height
- b) weight
- c) blood pressure
- d) serum cholesterol

14. The subject's identity number, age, phone number and address will be recorded on the Screening Clinic Report.

15. The research assistant will obtain height and weight.

16. The Investigator will obtain blood pressure and serum cholesterol. Blood pressure will be recording using the Infra-sonde Automatic Blood Pressure Recorder, Model SR-2.

17. At the completion of the screening procedure, subjects will be told that they will be notified of laboratory results by the research assistant or Investigator.

18. Subjects will be referred to private physicians for:

- a) blood pressure greater than 90 mmHg diastolic
- b) cholesterol level greater than 304 mg/dl which is University Medical Center standard criteria.

19. If subjects do not have private physicians they will be

told to contact the County Medical Association for names of physicians for referral.

20. Collection of \$10.00 for screening fee will be obtained. A receipt will be given to the subject.

21. A two-month follow-up Health Behaviors Questionnaire will be mailed to family members with self-addressed and stamped envelopes.

#### Control Group

1. Index cases will be randomized from an assessment sheet kept by the County Coroner's Office.

2. Letters will be sent to the next of kin (as reported on the death certificate). This letter will identify the investigator and purpose of the study.

3. One week following the letter, a phone call will be made by the Investigator. Information will be obtained of the names and phone numbers of the other first degree relatives. The investigator will inform the subjects personally of the purpose of the study. If the subject is willing, they will be told that a consent form and two questionnaires will be mailed to them. A research assistant will pick them up.

4. Letters and phone calls will be instituted for the first degree relatives.

5. Consent forms, Health Beliefs Questionnaire, Health Behaviors Questionnaire and Health History Assessment forms will be sent. On the Health Behaviors Questionnaire will be attached infor-

mation for screening for blood pressure and serum cholesterol at the Old Veterans Administration Hospital. The investigator's phone number will be attached for any concerns and/or questions.

6. A secretary at the College of Nursing will receive phone calls from family members for appointments on Monday, Wednesday and/or Friday. Other times for appointments can be arranged. The secretary will be instructed to ask members to fast for 10-12 hours before their clinic appointments.

7. The investigator and/or research assistant will check with the secretary daily for appointments.

#### Screening Clinic

8. Consent forms for height, weight, blood pressure, and blood drawing for cholesterol will be presented.

9. Once the consent form is signed, the following measurements will be taken and recorded on the Screening Clinic Report:

- a) height
- b) weight
- c) blood pressure
- d) serum cholesterol

10. The subject's identity number, age, phone number, and address will be recorded on the Screening Clinic Report.

11. For Measurement Procedures, please see Experimental Protocol.

12. At the completion of the screening procedure, subjects will be told that they will be notified of laboratory results by

the research assistant or investigator.

13. Subjects will be referred to their private physicians for:

- a) blood pressure greater than 90 mmHg diastolic
- b) cholesterol level greater than 304 mg/dl which is University of Utah Medical Center standard criteria.

14. If subjects do not have a private physician, they will be told to contact the County Medical Association for names of physicians for referral.

15. Collection of \$10.00 for screening fee will be obtained. A receipt will be given to subject.

16. Seven months following the sudden death and/or initial contact from the Investigator (a two month follow-up), the Health Behaviors Questionnaire and Health Beliefs Questionnaire will be mailed to family members. A research assistant will pick up completed questionnaires.

APPENDIX C  
QUESTIONNAIRES

Health History/Behavior FormFamily Number Subject Number 

This survey asks questions about aspects of behavior that have been found helpful in determining health status.

Identifying Information  
(All Kept Confidential)

1. Name \_\_\_\_\_  
(please print) Last name      First      Middle      Maiden

2. Date of Birth \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
   month      day      year

Please circle the number of the correct choice or fill in the blank:

- |           |                     |                                      |
|-----------|---------------------|--------------------------------------|
| 3. Sex:   | 4. Race:            | 5. What is your religion? (optional) |
| 1) female | 1) white            | 1) Catholic                          |
| 2) male   | 2) black            | 2) L.D.S. (Mormon)                   |
|           | 3) oriental         | 3) Jewish                            |
|           | 4) American Indian  | 4) Protestant                        |
|           | 5) Spanish American | 5) Other                             |
|           | 6) Other            |                                      |

6. Age now \_\_\_\_\_

7. Marital status:

- 1) married
- 2) single
- 3) widowed
- 4) divorced
- 5) separated

8. Total years of formal education \_\_\_\_\_  
(12 = high school graduate; 16 = college graduate)



9. What has been your main occupation? \_\_\_\_\_

(please be specific)

### Personal Health History

10. Have you ever been told by a doctor that you have any of the following conditions or diseases?

Condition	Yes	No	Age at Onset	Treatment		Kind
				Yes	No	
Coronary or heart disease (heart attack).						
High blood pressure						
Stroke						
Chest pain Attributed to your heart (diagnosed by physician). "angina pectoris"						
Diabetes						

### Family Health History

Please answer these questions as best you can in relation to your natural/biological parents. If you are uncertain of ages, please estimate.

11. Are you a twin?  No  Yes  identical  not identical

12. Are you adopted?  Yes  No Raised by foster family?

Yes  No

13. Complete Family history. Please give us the medical history of the following family members (person who died of sudden death, your father, mother, grandparents, brothers, sisters, aunts, uncles, children and half brothers or sisters). Even if family members have died, please indicate if they had high blood pressure, suffered a stroke and/or heart attack, diabetes, cancer, and smoked. Try to the best of your ability to give us ages affected under each of these categories (Age affected = approximate age diagnosed).

Family Members	First Name	Status Living(L) Dead(D)	Sex	Age Now or Age Died	Cause of death	High Blood Pressure (Age Aff)	(Age Aff) Strokes(S) Heart Attacks (H.A.)	Diabetes Mellitus (Age Aff)	Cancer (Age Aff)	Smoker (Years smoked)
Sudden death victim										
Father	1.									
Mother	2.									
Father's grand-father	3.									
Father's grand-mother	4.									
Mother's grand-father	5.									
Mother's grand-mother	6.									
Brothers & Sisters (if more than 5, please continue on back)	7. 8. 9. 10. 11.									
Aunts and Uncles	31. 32. (please designate paternal=P maternal=M)									
Children	71. 72. 73. 74. 75.									
Half brothers and sisters	91. 92. 93. 94.									

14. Does obesity tend to run in your family?

yes  no

15. How many in your family lived beyond 80 years of age?

\_\_\_\_\_

16. How would you rate your weight?

- very slender                       somewhat overweight  
 slender                                       moderately overweight  
 average                                       very overweight

17. Do you add salt to food as you are eating a meal?

- every meal     most meals     some meals  
 rarely or never

18. On the average, how many times per day do you eat (a meal?)

- one     two     three     four     five

19. On the average, how many times a week do you eat breakfast?

- never     1-2 times/week     3-4 times/week  
 5-6 times/week     every day

20. Listed below are a variety of foods eaten by most people. While it is difficult to remember exactly what one eats, think about an average amount at an average meal, in an average week.

Which of the following foods do you eat or drink?	What types would you usually eat or drink? (mark one)	How much? (approximate the portion per meal)	How many times per day, week or month					
			How often (circle one)			Times per (mark one)		
Eggs <input type="checkbox"/> yes <input type="checkbox"/> no	Whole egg ( )    Yolk only ( )    White only ( )	1eg ( )    2eg ( )    3eg ( )	1	2	3	dy	wk	mo
Meat (beef, pork, lamb) <input type="checkbox"/> yes <input type="checkbox"/> no	Lean ( )    Med. Fat ( )    Fatty ( )	sm 2 oz ( )    med 4 oz ( )    lrg 6 oz ( )	1	2	3	dy	wk	mo
Fish & Poultry <input type="checkbox"/> yes <input type="checkbox"/> no	Skin Removed ( )    Skin left on ( )	sm 2 oz ( )    med 4 oz ( )    lrg 6 oz ( )	1	2	3	dy	wk	mo
Pretzels, chips, nuts <input type="checkbox"/> yes <input type="checkbox"/> no	Salted ( )    Unsalted ( )	sm 1/2 c ( )    med 1/2 c ( )    lrg 1 c ( )	1	2	3	dy	wk	mo
Ham, bacon, hot dogs, lunch meat <input type="checkbox"/> yes <input type="checkbox"/> no	Processed ( )    Not Processed ( )	sm 2 oz ( )    med 4 oz ( )    lrg 6 oz ( )	1	2	3	dy	wk	mo
Milk <input type="checkbox"/> yes <input type="checkbox"/> no	whole ( )    2% ( )    skim ( )	sm 4 oz ( )    med 8 oz ( )    lrg 12 oz ( )	1	2	3	dy	wk	mo
Butter, Margarine <input type="checkbox"/> yes <input type="checkbox"/> no	low salt ( )    regular ( )	sm 1/2 tsp ( )    med 1 tsp ( )    lrg 1 tbs ( )	1	2	3	dy	wk	mo

21. On a typical work day, how much time do you spend on the following?

	-30 min.	$\frac{1}{2}$ to 1 hr.	1-2 hrs.	3-4 hrs.	more than 4 hrs
sitting					
walking					
lifting or carrying heavy things					

22. On a typical day, how many flights of stairs do you climb?

less than 1 flight       1-2 flights  
 3-5 flights       6-8 flights  
 9-12 flights       more than 11 flights

23. Do you participate in a regular physical fitness program?

Yes       No

24. If "yes" for how many months have you been doing a physical fitness/exercise program?

less than 3 months       3-6 months  
 7-12 months       13-24 months  
 more than 24 months

25. Do you smoke cigarettes now?  yes  no

If your answer is no, please skip to question 32.

26. How old were you when you started to smoke cigarettes on a regular basis? (at least one cigarette per week)

years

27. On an average, how many cigarettes a day do you smoke?

\_\_\_ less than 1

\_\_\_ 1-9

\_\_\_ 10-19

\_\_\_ 20-39

\_\_\_ 40 or more

28. For how many total years have you smoked cigarettes?

\_\_\_ years

29. How much of a cigarette do you usually smoke?

\_\_\_ entire cigarette

\_\_\_ 3/4 of the cigarette

\_\_\_ 1/2 of the cigarette

\_\_\_ less than 1/2 of the cigarette

30. While smoking, do you inhale cigarette smoke?

\_\_\_ not at all

\_\_\_ just a little

\_\_\_ moderately

\_\_\_ deeply

31. How many times, if ever, have you made a serious attempt to stop smoking cigarettes?

\_\_\_ never tried

\_\_\_ 1 time

\_\_\_ 2 times

\_\_\_ 3 times

\_\_\_ 4 times or more

32. How long has it been since you smoked your last cigarette?

\_\_\_ less than 6 months

\_\_\_ 6 months - 1 year ago

\_\_\_ 1-4 years ago

\_\_\_ 5-9 years ago

\_\_\_ more than 10 years ago

33. Approximately how many total years did you smoke cigarettes regularly?

\_\_\_ years

34. On an average, how many cigarettes did you smoke per day?

\_\_\_ 1-9

\_\_\_ 10-19

\_\_\_ 20-39

\_\_\_ 40 or more

35. How many times did you try to stop smoking before you were successful?

\_\_\_ 1 time

\_\_\_ 2 times

\_\_\_ 3 times

\_\_\_ 4 or more times

36. For what reason did you quit smoking? \_\_\_\_\_

---

37. How much physical effort is required in your work?

\_\_\_ light effort

\_\_\_ moderate effort

\_\_\_ vigorous effort

38. Is your physical activity limited in any way by a handicap, illness or injury?

\_\_\_ yes

\_\_\_ no

39. If yes, explain \_\_\_\_\_

---

(please go on to question 40 --

NEXT PAGE)

40. Listed below are a series of activities. Please read the list and check whether or not you did the activity. If you check "yes," also check the month the activity was done, the number of times per month, and the amount of time spent on each occasion. The last column is to check how vigorously you did the activity.

LEISURE TIME PHYSICAL ACTIVITIES

ACTIVITY	Did you perform this activity?		MONTH OF ACTIVITY												Ave. no. of times per month	Times per Occasion		VIGOR OF ACTIVITY		
	No	Yes	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		Hours	Minutes	Mild	Moderate	Active
Walking																				
Work in your garden/lawn																				
Calisthenics or exercise																				
Swimming																				
Bicycling																				
Running/jogging																				
Bowling																				
Tennis/other racket sport																				
Skiing/water or snow																				
Dancing																				
Skating																				
Basketball																				
Baseball/softball																				
Football																				
Volleyball																				
Weight lifting																				
Golfing																				
Scrubbing floors																				
Vacuuming/sweeping																				
Hiking																				
Fishing																				
Mowing grass																				
Hunting																				
Other																				

41. Do you now drink beer, wine or liquor?

\_\_\_ yes

\_\_\_ no

42. When do you usually drink alcoholic beverages?

- almost exclusively on the weekends
- more on weekends than during the week
- about equally on weekends and weekdays
- more during the week than on the weekends
- almost exclusively during the week

43. For how many years have you drunk alcoholic beverages?

- never drank
- less than 1 year
- 1-2 years
- 3-5 years
- 6-10 years
- 11-20 years
- 21-30 years
- more than 30 years

44. In a situation where you would have a drink of alcohol, how much would you usually drink?

- less than 1 glass, bottle or can
- 1 glass, bottle or can
- 2 glasses, bottles or cans
- 3 glasses, bottles or cans
- 4-6 glasses, bottles or cans
- 7-9 glasses, bottles or cans
- 10 or more glasses, bottles or cans

45. How many times per week do you drink an alcoholic beverage?

- less than 1 times per week
- 1 time/week
- 1-3 times/week
- 4-6 times/week
- 7-10 times/week
- more than 10 times per week



General Health Information\*

46. If I take care of myself, I can avoid illness.
- 1) true
  - 2) false
  - 3) don't know
47. Whenever I get sick it is because of something I've done or not done.
- 1) true
  - 2) false
  - 3) don't know
48. Good health is largely a matter of good fortune.
- 1) true
  - 2) false
  - 3) don't know
49. No matter what I do, if I am going to get sick I will get sick.
- 1) true
  - 2) false
  - 3) don't know
50. Most people do not realize the extent to which their illnesses are controlled by accidental happenings.
- 1) true
  - 2) false
  - 3) don't know
51. I can only do what my doctor tells me to do.
- 1) true
  - 2) false
  - 3) don't know
52. There are so many strange diseases around that you can never know how or when you might pick one up.
- 1) true
  - 2) false
  - 3) don't know

---

\*Adapted from Wallston & Wallston, 1980

53. When I feel ill, I know it is because I have not been getting the proper exercise or eating right.

- 1) true
- 2) false
- 3) don't know

54. People who never get sick are just plain lucky.

- 1) true
- 2) false
- 3) don't know

55. People's ill health results from their own carelessness.

- 1) true
- 2) false
- 3) don't know

56. I am directly responsible for my health.

- 1) true
- 2) false
- 3) don't know

Health Beliefs Questionnaire\*

--	--	--	--	--	--

Family Number

--	--	--

Subject Number

The following statements about health attitudes and beliefs require you to decide how strongly you feel about the questions being asked.

DIRECTIONS: Circle the number that best reflects your attitude or belief. For example, how concerned are you about your present weight?

A lot	Fair Am't			Not at all		
1	2	3	④	5	6	7

Interpretation: By circling #4, this would mean that one was fairly concerned about his/her present weight.

You may find that you haven't thought before about some of these questions; in that case please circle the first number most closely reflecting your initial response. There are no right or wrong answers to the statements.

1. Some people are quite concerned or worried about health while others are not as concerned. First, how concerned are you about your own health? Where would you place yourself on this scale?

A lot	Fair Am't			Not at all		
1	2	3	4	5	6	7

---

\*Adapted from Maiman & Becker, 1974

2. Some people are quite concerned about the chance of getting sick while others are not as concerned. How concerned are you about the chance of getting sick? (circle one number)

Alot			Fair Am't		Not at all	
1	2	3	4	5	6	7

3. How concerned are you about any of your family members' getting sick?

Alot			Fair Am't		Not at all	
1	2	3	4	5	6	7

4. How concerned are you about the possibility of getting any of the following illnesses?

a) Anemia or low blood

Alot			Fair Am't		Not at all	
1	2	3	4	5	6	7

b) Pneumonia

Alot			Fair Am't		Not at all	
1	2	3	4	5	6	7

c) Asthma

Alot			Fair Am't		Not at all	
1	2	3	4	5	6	7

d) Rheumatic fever

A lot	Fair Am't	Not at all
-------	-----------	------------

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

e) Heart trouble

A lot	Fair Am't	Not at all
-------	-----------	------------

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

f) Hardening of the arteries

A lot	Fair Am't	Not at all
-------	-----------	------------

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

5. How concerned are you about the possibility of any of your children (under 18) getting:

a) Anemia or low blood:

A lot	Fair Am't	Not at all
-------	-----------	------------

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

b) Pneumonia

A lot	Fair Am't	Not at all
-------	-----------	------------

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

c) Asthma

A lot	Fair Am't	Not at all
-------	-----------	------------

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

d) Rheumatic fever

A lot			Fair Am't		Not at all	
-------	--	--	-----------	--	------------	--

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

e) Heart trouble

A lot			Fair Am't		Not at all	
-------	--	--	-----------	--	------------	--

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

6. If any of your children were develop any of these illnesses, how worried do you think you would be about it?

a) Anemia or low blood

A lot			Fair Am't		Not at all	
-------	--	--	-----------	--	------------	--

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

b) Pneumonia

A lot			Fair Am't		Not at all	
-------	--	--	-----------	--	------------	--

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

c) Asthma

A lot			Fair Am't		Not at all	
-------	--	--	-----------	--	------------	--

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

d) Rheumatic fever

A lot			Fair Am't		Not at all	
-------	--	--	-----------	--	------------	--

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

e) Heart trouble

A lot			Fair Am't		Not at all	
-------	--	--	-----------	--	------------	--

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

f) Hardening of the arteries

Alot	Fair Am't	Not at all
------	-----------	------------

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

7. How much do you feel that doctors can cure these illnesses?

Alot	Fair Am't	Not at all
------	-----------	------------

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

8. a. Do you think a special diet could help to reduce getting any of these illnesses?

Alot	Fair Am't	Not at all
------	-----------	------------

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

b. Which illness do you think could be prevented most by a special diet? (See question 4 for illnesses)

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9. a. Do you think there are any modifications in the way you live that could help to prevent any of these illnesses?

Alot	Fair Am't	Not at all
------	-----------	------------

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

b. Which illness do you think could be prevented the most by modifying the way one lives (Please list the illness)

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10. How difficult would say it would be to change your present diet?

Alot	Fair Am't	Not at all
------	-----------	------------

---

1	2	3	4	5	6	7
---	---	---	---	---	---	---

11. Do you think changing your present diet could cause health problems?

(Yes/No) \_\_\_\_\_

12. How difficult would you say it would be for your children (under 18) to change their present diet to a low fat and sugar diet?

A lot		Fair Am't			Not at all	
1	2	3	4	5	6	7

13. When your children grow up, how much chance do you feel there is that they will become:

a) A cigarette smoker

A lot		Fair Am't			Not at all	
1	2	3	4	5	6	7

b) Overweight

A lot		Fair Am't			Not at all	
1	2	3	4	5	6	7



### Health History/Behavior Form

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Family number

--	--	--

Subject Number

This survey asks questions about aspects of behavior that have been found helpful in determining health status.

#### Identifying Information (All Kept Confidential)

1. Name \_\_\_\_\_  
(please print) Last name      first      middle      last
2. Listed below are a variety of foods eaten by most people. While it is difficult to remember exactly what one eats, think about an average amount at an average meal, in an average week.

Which of the following foods do you eat or drink?	What types would you usually eat or drink? (mark one)	How much? (approximate the portion per meal)	How many times per day, week or month	
			How often (circle one)	Times per (mark one)
Eggs      ___yes ___no	Whole egg ( )    Yolk only ( )    White only ( )	1eg ( )    2eg ( )    3eg ( )	1 2 3 4 5 6	dy wk mo ( ) ( ) ( )
Meat (beef, pork, lamb)      ___yes ___no	Lean ( )    Med. Fat ( )    Fatty ( )	sm 2 oz ( )    med 4 oz ( )    1rg 6 oz ( )	1 2 3 4 5 6	dy wk mo ( ) ( ) ( )
Fish & Poultry      ___yes ___no	Skin Removed ( )    Skin left on ( )	sm 2 oz ( )    med 4 oz ( )    1rg 6 oz ( )	1 2 3 4 5 6	dy wk mo ( ) ( ) ( )
Pretzels, chips, nuts      ___yes ___no	Salted ( )    Unsalted ( )	sm ½ c ( )    med ½ c ( )    1rg 1 c ( )	1 2 3 4 5 6	dy wk mo ( ) ( ) ( )
Ham, bacon, hot dogs, lunch meat      ___yes ___no	Processed ( )    Not Processed ( )	sm 2 oz ( )    med 4 oz ( )    1rg 6 oz ( )	1 2 3 4 5 6	dy wk mo ( ) ( ) ( )
Milk      ___yes ___no	whole ( )    2% ( )    skim ( )	sm 4 oz ( )    med 8 oz ( )    1rg 12 oz ( )	1 2 3 4 5 6	dy wk mo ( ) ( ) ( )
Butter, Margarine      ___yes ___no	low salt ( )    regular ( )	sm ½ tsp ( )    med 1 tsp ( )    1rg 1 tbs ( )	1 2 3 4 5 6	dy wk mo ( ) ( ) ( )

3. Do you add salt to food as you are eating a meal?

every meal                       most meals  
 some meals                       rarely or never

4. On the average, how many times per day do you eat (a meal)?

one                                       two  
 three                                     four  
 five

5. On the average, how many times a week do you eat breakfast?

never                                     1-2 times per week  
 3-4 times/week                       5-6 times/week  
 every day

6. How would you rate your weight?

very slender                       somewhat overweight  
 slender                                     moderately overweight  
 average                                     very overweight

7. On a typical work day, how much time do you spend on the following?

	-30 min.	$\frac{1}{2}$ to 1 hr.	1-2 hrs.	3-4 hrs.	more than 4 hrs
sitting					
walking					
lifting or carry- ing heavy things					

8. On a typical day, how many flights of stairs do you climb?
- less than 1 flight     1-2 flights  
 3-5 flights             6-8 flights  
 9-12 flights             more than 11 flights
9. Do you participate in a regular physical fitness program?
- yes                             no
10. If "yes," for how many months have you been doing a physical fitness/exercise program?
- less than 3 months             3-6 months  
 7-12 months                     13-24 months  
 more than 24 months
11. Listed below are a series of activities. Please read the list and check whether or not you did the activity. If you check "yes," also check the month the activity was done, the number of times per month, and the amount of time spent on each occasion. The last column is to check how vigorously you did the activity.

(SEE NEXT PAGE FOR PHYSICAL ACTIVITY SUMMARY CHECKLIST)



15. While smoking, do you inhale cigarette smoke?

- not at all                       just a little  
 moderately                       deeply

16. Have you tried to quit smoking since participating in this study?

- yes                                       no

17. If yes, how many times?

- 1 time                                       2 times  
 3 times

18. Have you successfully quit smoking?

- yes                                       no

19. For what reason did you quit smoking?

---

20. Do you now drink beer, wine, or liquor?

- yes                                       no

21. When do you usually drink alcoholic beverages?

- almost exclusively on weekends                       more on weekends than during the week  
 about equally on weekends and during the week                       more during the week than on the weekends  
 almost exclusively during the week

22. In a situation where you would have a drink of alcohol, how much would you usually drink?

- less than 1 glass, bottle or can  
 1 glass, bottle, or can  
 2 glasses, bottles or cans

(choices continue on next page)

- \_\_\_ 4-6 glasses, bottles or cans
- \_\_\_ 7-9 glasses, bottles or cans
- \_\_\_ 10 or more glasses, bottles or cans

23. How many times per week do you drink an alcoholic beverage?

- \_\_\_ less than 1 time per week
- \_\_\_ 1-3 times per week
- \_\_\_ 4-6 times per week
- \_\_\_ 7-10 times per week
- \_\_\_ more than 10 times per week

#### General Health Information

24. If I take care of myself, I can avoid illness.

- 1) true
- 2) false
- 3) don't know

25. Whenever I get sick it is because of something I've done or not done.

- 1) true
- 2) false
- 3) don't know

26. Good health is largely a matter of good fortune.

- 1) true
- 2) false
- 3) don't know

27. No matter what I do, if I am going to get sick I will get sick.

- 1) true
- 2) false
- 3) don't know

28. Most people do not realize the extent to which their illnesses are controlled by accidental happenings?

- 1) true
- 2) false
- 3) don't know

29. I can only do what my doctor tells me to do.

- 1) true
- 2) false
- 3) don't know

30. There are so many strange diseases around that you can never know how or when you might pick one up.

- 1) true
- 2) false
- 3) don't know

31. When I feel ill, I know it is because I have not been getting the proper exercise or eating right.

- 1) true
- 2) false
- 3) don't know

32. People who never get sick are just plain lucky.

- 1) true
- 2) false
- 3) don't know

33. People's ill health results from their own carelessness.

- 1) true
- 2) false
- 3) don't know

34. I am directly responsible for my health.

- 1) true
- 2) false
- 3) don't know

35. Since your participation in this study have you seen a physician?

\_\_\_\_\_ Yes

\_\_\_\_\_ No

If yes, for what reason? \_\_\_\_\_

---

36. Have you had your blood pressure measured since participating in this study?

\_\_\_\_\_ Yes                      \_\_\_\_\_ No

37. Have you had a blood test for serum cholesterol since participating in this study?

\_\_\_\_\_ Yes                      \_\_\_\_\_ No

38. What was your reason for having your blood pressure and cholesterol levels measured?

---

---

39. A history of heart attack, stroke, or peripheral vascular disease indicates the presence of atherosclerosis (hardening of the arteries).

- a) true
- b) false
- c) don't know

40. The incidence of heart attack is equal in both men and women.

- a) true
- b) false
- c) don't know

41. An increase in blood cholesterol levels is a major coronary risk factor.

- a) true
- b) false
- c) don't know

42. Cigarette smoking causes the heart to work harder to supply oxygen to the cells.

- a) true
- b) false
- c) don't know



43. Individuals who are hurried and tense are at greater risk of heart attack than individuals who are relaxed and unhurried.

- a) true
- b) false
- c) don't know

44. Dieters should omit all fat from their diets.

- a) true
- b) false
- c) don't know

45. All fats have the same amount of cholesterol.

- a) true
- b) false
- c) don't know

46. Cigarette smoking is physically healthy for some people.

- a) true
- b) false
- c) don't know

OPPOSITE THE FOODS LISTED BELOW, PLEASE WRITE:

"C" if you consider this food to be a carbohydrate  
"P" if you consider this food to be a protein  
"F" if you consider this food to be a fat

47. Corn oil

48. Fish

49. Cereal

50. Margarine

51. Donut

52. A hypertensive blood pressure is:

- |           |           |
|-----------|-----------|
| a) 120/70 | b) 130/80 |
| c) 140/95 | d) 140/85 |

53. If you have had screening for blood pressure and blood cholesterol measurements, what prompted you to do this?

television

advice from relatives

no special reason

research nurse

private physician

death in family

Other (please explain) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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