USEFULNESS OF THE HEALTH BELIEF MODEL IN PREDICTING PREVENTIVE HEALTH BEHAVIOR

by

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CHAPTER I

INTRODUCTION

The management of chronic disease is a priority concern for today's health professionals. In recent years, disease patterns in the United States have shifted from infectious illnesses to chronic conditions such as cardiovascular disease, cancer, and diabetes. Health care workers are faced with the task of developing new and effective treatment approaches to deal with this changing pattern. Since there are no known cures for most chronic diseases, treatment is usually a process of controlling symptoms and helping patients adapt to limitations. Ultimately the only effective way to eliminate chronic disease is to prevent its occurrence.

As the major chronic disease and the leading cause of death in the United States, cardiovascular disease is a primary target for preventive efforts. Most of the risk factors which have been identified for cardiovascular disease are related to human behavior and health habits (Leventhal, 1973). Preventive measures must therefore focus on helping people change behaviors which increase their risk of developing cardiovascular disease.

Health behavior has been defined as, "any activity undertaken by a person believing himself to be healthy, for the purpose of preventing disease or detecting it in an asymptomatic stage." (Kasl & Cobb, 1966,

p. 246). The function of health professionals in preventing cardiovascular disease is to facilitate this type of positive health behavior. This function is not fulfilled by simply imparting information to individuals. Correct knowledge does not necessarily lead to correct behavior. Many variables influence the decision to take health action. Health care workers need to know which variables motivate people or deter them from taking preventive action.

One of the most extensively developed conceptual frameworks for understanding health behavior is the Health Belief Model proposed initially by Irwin Rosenstock (1974a). The model identifies the chief variables involved in the decision to take health action. A recent recommendation by proponents of the Health Belief Model suggests that it be adopted as an organizing paradigm for health behavior and "be made a regular part of the curricula of health care training programs" (Becker, Haefner, Kasl, Kirscht, Maiman, & Rosenstock, 1977, p. 42).

As one of the major health care professions involved in preventive efforts, nursing would benefit by becoming familiar with the Health Belief Model. The model can serve as a guideline for understanding why people do or do not participate in preventive health behavior. Becker et al. (1977) state that "by knowing which model components are below a level presumed necessary for compliance, the health worker might tailor interventions to suit the particular needs of each individual" (pp. 41-42). Nurses are frequently involved in education and prevention programs and therefore have opportunity to utilize and evaluate the model. Although many studies support the relevance of the model, there have been few prospective studies which assess its ability to predict health

behavior. The present study is designed to determine the value of the Health Belief Model in explaining and predicting participation in a cardiovascular disease prevention program.

Review of the Literature

Cardiovascular Disease

Cardiovascular diseases are those disorders that affect the heart and blood vessels, primarily hypertension, coronary heart disease, and stroke. The American Heart Association (1977) estimated in 1977 approximately 52% of all deaths in the United States would be caused by cardiovascular disease. According to their predictions, over a million Americans would have a heart attack in 1977, and 650,000 of those persons would die. There are today 29,270,000 Americans who have some form of cardiovascular disease. The largest portion of these are the 23,660,000 adults who have high blood pressure. Seven million persons with hypertension are not aware of their disease and are at increased risk of other diseases because of it. Hypertension in males doubles the risk of a heart attack and quadruples the risk of a stroke. Another 4,050,000 United States citizens with coronary heart disease have a history of myocardial infarction and/or angina pectoris. Cardiovascular diseases also leave many persons disabled from the residual effects of a heart attack or stroke. The Heart Association estimated financial costs of these diseases would total nearly 26.7 billion dollars in 1977.

A number of risk factors which contribute to the development of cardiovascular disease have been identified in recent years. Most of these are related to habits of daily living such as diets high in

saturated fat and cholesterol, cigarette smoking, obesity, sedentary living, and psycho-social tension. Other risk factors include family history of atherosclerotic diseases, diabetes, elevated blood lipids (cholesterol and triglycerides), and hypertension (Stamler, Beard, Connor, de Wolfe, Stokes, Willis, Lilienfeld, Dawber, Doyle, Epstein, Kuller, & Winkelstein, 1970).

The Commission on Primary Prevention of Atherosclerotic Diseases in 1970 recommended that a long-term national policy of primary prevention of atherosclertoic cardiovascular diseases be adopted in the United States. Priorities in the proposed strategy included: (1) changes in diet to prevent or control hyperlipidemia, obesity, hypertension, and diabetes; (2) elimination of cigarette smoking; and (3) detection and control of hypertension (Stamler et al., 1970).

In view of the relationships between individual living habits and the development of cardiovascular diseases, current efforts to deal with these diseases are focused on preventive changes in life-style. However, promoting preventive activity involves more than informing individuals of the actions to be taken. It is unlikely that preventive measures will be successful if the behavioral aspects are ignored (Leventhal, 1973). It is necessary to identify the factors which determine health behavior before effective behavior change programs can be established.

Health Behavior

The goal of health care professionals is to produce "a physically

fit populace resistant to chronic disease" (Mackie, 1975, p.481). The key to accomplishing this goal and making significant advances in man's state of health lies in preventive health behavior (Antonovsky & Kats, 1970) which by definition is taking action to prevent or detect disease in an asymptomatic state (Kasl & Cobb, 1966). The problem facing researchers has been to understand why and under what conditions people take such action (Rosenstock, 1966).

A number of variables and models have been proposed as explanations of health behavior. In an excellent review article, McKinlay (1970) examined research related to the utilization of health services. The six major approaches to studying the use of services, as identified by McKinlay, were: (1) the economic, (2) the socio-demographic, (3) the geographic, (4) the social-psychological, (5) the socio-cultural, and (6) the organizational approach. McKinlay concluded that the findings of the economic, the socio-demographic, and geographic approaches have been inconsistent and do not fully explain the use of health services. Utilization is generally higher for females, the better educated, and those of higher socio-economic status (McKinlay, 1970; Rosenstock, 1966). Preventive health services are used more by younger or middle aged persons while use of diagnostic and treatment services increases in older age groups, as medical and dental needs become more prevalent (McKinley, 1970; Rosenstock, 1966).

Researchers using the social-psychological, socio-cultural, and organizational approaches have examined a multitude of variables relating to the use of health services. McKinlay (1970) believed that a number of insights are provided through these study approaches but that

no one in particular offers a total answer. However, he stated that the social-psychological approach is of particular importance and has substantial empirical data supporting it. The social-psychological approach relates health behavior to the individual's perceptions, motivation, and learning. McKinlay noted that the area of motivation provided valuable insights into health activity. Three major principles of motivation stated by McKinlay are: (1) preventive behavior is determined by the perceived seriousness of a health problem and the probability of its occurrence; (2) behavior results from frequent conflict among motives and courses of action; and (3) health-related motives may not always lead to health-related behavior. McKinlay also pointed out the need for further work in the area of social-psychological factors and the evaluation of variables such as knowledge, attitudes, beliefs, and cues to health action.

Major models of health activity which have emerged out of the social-psychological approach have included: (1) Mechanic's model focusing on illness characteristics; (2) Suchman's description of five critical transition and decision-making points in seeking health care; and (3) Rosenstock's Model emphasizing health beliefs as determinants of health behavior (McKinlay, 1970). Of the models which have been proposed, the Rosenstock Health Belief Model has become the most clearly defined and widely used. A number of studies have found variables of the model to correlate with the decision to take health action. The following paragraphs will describe the Health Belief Model and major findings supporting its relevance.

The Health Belief Model

The Health Belief Model was developed during the 1950's as the result of a series of studies by Public Health Service researchers. The original investigators, Hochbaum, Kegeles, Leventhal, and Rosenstock, were trying to discover why the United States public response to disease prevention measures was generally poor (Rosenstock, 1974a).

The original basis for the Health Belief Model was the value-expectancy theory of decision-making behavior used by Kurt Lewin and other researchers such as Tolman, Rotter, Edwards, Atkinson, and Feather. A value-expectancy approach states that behavior is the result of: (1) the value placed on a particular outcome, and (2) the estimate of likelihood that a given action will result in that outcome (Maiman & Becker, 1974). Translating the concept of value-expectancy into health decision making produced the Health Belief Model which contains the following components:

> (1) the individual's psychological 'readiness to take action' relative to a particular health condition, determined by both the person's perceived 'susceptibility' or vulnerability to the particular health condition, and by his perceptions of the 'severity' of the consequences of contracting the condition; and
>
> (2) the individual's evaluation of the advocated health action in terms of its feasibility and efficaciousness (i.e., his estimate of the action's potential 'benefits' in reducing actual, or perceived, susceptibility and/or severity),

> weighed against his perceptions of psychological and other 'barriers' or 'costs' of the proposed action...
>
> (3) Finally, a 'stimulus' either 'internal' (e.g., percepton of bodily states) or 'external' (e.g., interpersonal interactions, mass media communications, personal knowledge of someone affected by the condition) must occur to trigger the appropriate health behavior; this is termed the 'cue to action' (Maiman & Becker, 1974, pp.21-22).

Rosenstock (1966) has further described the influence of each of the Health Belief Model variables in determining health action. He states that "the level of readiness (susceptibility and severity) provides the energy or force to act and the perception of benefits (less barriers) provides a preferred path of action" (p. 101). Cues are seen as the instigating events which set the process in motion and without which overt health action is unlikely to take place. The relationships between some of the health belief variables have been formulated as follows:

> Susceptibility + severity = threat, or 'readiness to take action.'
>
> Benefits - barriers = possibility of threat reduction (Becker et al., 1977, p. 29, Table 1).

The Health Belief Model predicts that a health action is more likely to take place when the individual has high levels of perceived susceptibility and/or severity. High levels of perceived benefits of the health action also increase the likelihood of its occurrence. On the other hand, high levels of perceived barriers decrease the likeli-

hood of the individual's engaging in the proposed health activity (Rosenstock, 1966). The Health Belief Model also states that while "diverse demographic, personal, structural, and social factors can, in any given instant, affect an individual's health motivations and perceptions, these variables are not considered as direct causes of health action" (Becker et al., 1977, p. 30). However, these factors are included in schematic depictions of the Health Belief Model as modifying and enabling forces. The author will use the term "expanded Health Belief Model" to denote inclusion of these variables in future discussions. The interactions of Health Belief Model variables in producing health action have been diagramatically depicted in various manners by Becker et al. (1977), Becker, Drachman, and Kirscht (1974). These diagrams are included in Appendix A.

Research of Health Belief Model Variables

The variables of the Health Belief Model have been examined in relationship to a wide range of health behaviors. Several comprehensive reviews of the available research have been published by model proponents, including Becker and Maiman (1975), Rosenstock (1966, 1974b, and 1975), and Becker et al. (1977). The model has also been used to explain illness behavior (Kirscht, 1974; Kirscht, Becker, & Eveland, 1976) and sick-role behavior (Becker, 1974; Becker et al., 1974). While no one study supports the model as a whole, there is a body of evidence supporting each variable and certain combinations of variables (Rosenstock, 1966). Research findings will be reported for each of the model variables (susceptibility, severity, benefits, barriers, and cues)

as well as for combinations of variables (see Appendix B for summary of research findings).

Perceived susceptibility refers to the subjective risks of contracting the health condition in question (Rosenstock, 1966). The importance of feeling susceptible is probably more consistently supported as a determinant of health behavior than any other model component. Kegeles (1963a; 1963b) found perceived susceptibility to be a significant variable in both retrospective and prospective studies of preventive dental behavior. In a study of women who had received information regarding cervical cancer, Kegeles (1969) also found the perception of susceptibility to be significantly higher in women who later obtained cervical cancer screening tests than in those women who did not obtain such tests.

Other studies in which perceived susceptibility has been found to be a significant factor include: (1) participation in a breast cancer screening program (Fink, Shapiro, & Lewison, 1968); (2) the use of a protective glove by sugar cane workers (Suchman, 1967); (3) participation in a screening program for Tay-Sachs disease carriers (Kaback, Becker, & Ruth, 1974); and (4) taking preventive action against Asian influenza (Rosenstock, Hochbaum, & Leventhal, 1960). Perception of re-susceptibility to rheumatic fever was found by Heinzelmann (1962) to have the greatest weight in determining the prophylactic behavior of the individual.

Several other studies do not state the statistical significance of their findings but report that perceived susceptibility is positively related to obtaining x-ray screening for tuberculosis (Hochbaum, 1956,

1958) and intentions to get health examinations (Borsky & Sagen, 1959). A lack of perceived susceptibility has been found to correlate with failure to get polio vaccinations (Glasser, 1958; Merrill, Hollister, Gibbons, Haynes, & Leslau, 1958).

A few studies have produced conflicting results relating to susceptibility. A study of rheumatic fever patients found higher perception of susceptibility among those persons not engaged in prophylactic behaviors against the disease (Gordis, Markowitz, & Lilienfeld, 1969). The authors conclude that the perception of greater susceptibility did not represent a pre-existing health belief but rather occurred as a result of failure to comply with prophylactic measures. In a survey of dental behavior (Tash, O'Shea, & Cohen, 1969), people with perceptions of lesser susceptibility were more likely to make preventive dental visits, rather than less likely as would be predicted by the Health Belief Model. The explanation given by the authors is that these people felt less susceptible as a result of the preventive actions they were taking to maintain their oral health.

Perceived severity (seriousness) of a health condition is judged by: (1) the emotional arousal caused by the thought of the disease; and (2) the kind of difficulties the person believes the condition will create in terms of clinical consequences (i.e., death, disability) and in terms of effects on job, family, and social life (Rosenstock, 1975). In an attempt to define the meaning diseases have for individuals in terms of consequences and concerns, Robbins (1962) identified the following areas of anxiety: (1) diffuse anxiety or dread of illness; (2) pain and discomfort; (3) duration or curability of disease; (4) treat-

ment concerns; (5) changes in the self such as ability to function, appearance, etc.; (6) disability or activity disruption; (7) social devaluation; (8) financial loss; and (9) illness in significant others.

It has been argued that even if a person feels susceptible to a health problem, health action is not likely to occur unless the problem is perceived as having serious consequences for that individual (Becker & Maiman, 1975). However, the research results relating perceived severity to health behavior are "considerably more mixed and difficult to interpret than those for susceptibility" (Becker & Maiman, 1975, p. 14). It may be that very low levels of perceived severity are not sufficiently motivating to cause health action in asymptomatic individuals, and that perceptions of great severity may act as barriers to seeking health care (Becker & Maiman, 1975).

Perceived severity (or seriousness) has been found to be related to preventive dental care (Tash et al., 1969; Kegeles, 1963a), to taking preventive action against Asian influenza (Rosenstock et al., 1960), and to the use of a protective glove to prevent accidents (Suchman, 1967). A review article on the use of polio vaccine reports lower utilization rates by those who believed polio was less serious for persons of their age (Rosenstock, Derryberry, & Carriger, 1959). In two studies of prophylactic behavior for rheumatic fever, the perceived seriousness of past attacks and possible future attacks was related to compliance with medications (Gordis et al., 1969; Heinzelmann, 1962). Heinzelmann (1962) points out the importance of remembering that it is the individual's perception of the seriousness of a given health condition that determines his/her health behavior and not the objective facts about the

seriousness of the problem.

A number of studies (Hochbaum, 1958; Becker & Maiman, 1975; Kaback et al., 1974) have reported negative results. Perceived seriousness was not found to be significantly related to participation in x-ray screening for tuberculosis (Hochbaum, 1958). However, Hochbaum's results did show a weak, positive relationship between "fear of consequences" of getting tuberculosis and screening. There was no relationship between fear of the disease itself and participation in screening activities.

Another study failing to identify perceived severity as a significant factor is Kegeles' prospective study of preventive dental behavior (1963b). Kegeles interprets this finding by hypothesizing that most persons do not consider dental disease as very serious (Robbins, 1962; Kirscht, Haefner, Kegeles, & Rosenstock, 1966). Kegeles therefore, cautions against generalizing his negative finding to other serious diseases. In short, he suggests that perhaps perceived severity is of importance only in health conditions viewed as being relatively serious.

A negative relationship between perceived severity and participation in screening for Tay-Sachs disease was found in a 1974 study by Kaback, Becker, and Ruth. Non-participants showed less understanding of educational information relating to Tay-Sachs. It was therefore hypothesized that non-participants may have misunderstood certain information which increased their perception of the seriousness of being a carrier. They then denied their susceptibility to such a serious condition and avoided participation in the screening program.

The importance of perceived severity as a determinant of health behavior has been more consistently supported in studies of sick-role or illness behavior (Becker & Maiman, 1975). In these situations, the person is either experiencing physical symptoms or has been diaganosed as having a particular health problem. Both of these factors tend to increase realistic perceptions of severity and motivate the individual to seek care and follow medical advice (Becker & Maiman, 1975).

Belief in benefits refers to the evaluation of the safety and effectiveness of a proposed health behavior and is the Health Belief Model variable which determines the direction of the action that is taken (Rosenstock, 1966). Perception of the benefits of a health action may include a variety of factors. Kegeles found that the perceived benefits of cervical cancer screening included the belief that: "(1) a physician or a test could detect cervical cancer; (2) such an examination or test could reveal illness prior to the appearance of clinical symptoms; and (3) early detection would lead to a more favorable prognosis" (Kegeles, 1969, p. 118). Women who held these beliefs, as well as a belief in their susceptibility to cervical cancer, were more likely to participate in a cervical cancer screening program. Kegeles' 1965 survey study reports that a higher proportion of women who believed in the benefits of early detection and treatment of cervical cancer had obtained Papanicolaou tests for cancer screening (Kegeles, Kirscht, Haefner, & Rosenstock, 1965). In all groups differentiated on the basis of race, education, marital status and age, women with beliefs in benefits were more likely to have had a "Pap" test.

Hochbaum (1958) found participation in a screening program for tuberculosis to depend on several aspects of perceived benefits. Those with the belief that a chest x-ray would detect tuberculosis even in the absence of symptoms were more likely to have a chest x-ray than those who felt they could rely on symptoms alone. Persons who believed there were benefits in early detection of tuberculosis also were more likely to have had an x-ray.

Other studies which have found belief in benefits to be associated with health behaviors include: (1) work on preventive dental behavior by Kegeles (1963a), Tash, O'Shea, & Cohen (1969), and Antonovsky and Kats (1970); (2) Suchman's 1967 study of accident prevention; and (3) Fink's study of participants in a breast cancer screening program (Fink et al., 1968).

Some studies have failed to support the importance of a belief in the benefits of a health action. Researchers have found that participation in polio vaccination programs (Glasser, 1958) and Asian influenza prophylaxis measures (Rosenstock et al., 1960) was relatively low in spite of widespread public belief in the benefits of these preventive efforts. Another study (Gordis et al., 1969) found that belief in the effectiveness of prophylactic penicillin did not necessarily lead to better medication compliance among rheumatic fever patients.

Perceived barriers are the negative aspects of taking a health action and may include inconvenience, expense, or perception of the action as unpleasant, painful or upsetting (Rosenstock, 1966). The perception of such barriers may arouse conflicting responses of avoidance in a person even if perceptions of susceptibility, severity,

and benefits are at high levels (Rosenstock, 1966). Before a person takes health action, he/she must believe that the benefits of the action outweigh the disadvantages (Mackie, 1975). Suchman (1967) found that negative perceptions of a protective glove caused overwhelming rejection of its use. Suchman concluded that "unless the 'rewards' offered from using the glove outweigh the 'punishments', it is doubtful whether any combination of personal readiness or social support factors will in and of themselves be able to do the job" (p. 206).

A number of studies (Kegeles, 1963a; Tash et al., 1969; and Antonovsky & Kats, 1970) have identified fear of pain and treatment anxiety as significant barriers to making preventive dental visits. Kegeles (1963a) found that the negative perception of dentists was also a perceived barrier to preventive dental behavior. In his study the more barriers an individual perceived, the less likely he or she was to make a preventive dental visit. Hochbaum (1958) reported that persons with high fear levels were less likely to receive x-rays for detection of tuberculosis. The use of polio vaccine has also been adversely affected by fear regarding its safety and effectiveness (Merrill et al., 1958).

In explorations of other negative factors, Fink, Shapiro, and Lewison (1968) found that the inconvenience of travel distance was not a significant barrier for participants in a breast cancer screening program. Gordis et al. (1969) found that barriers of expense, convenience, and attitudes toward medical care did not significantly affect the use of prophylactic penicillin by rheumatic fever patients.

Specific demographic characteristics have been considered as possible barriers to health action, but the research findings do not consistently support this view. For example, people in higher income groups who can afford to take preventive actions do not always do so, and the removal of the direct costs of a health action does not always lead to greater participation by low-income groups (Rosenstock, 1975). Rosenstock (1975) concluded that when substantial cost is involved, higher income groups are more likely to take preventive action; but in minimal cost actions (i.e., toothbrushing), the behavior of high and low income groups is very similar. Since demographic variables do not reliably act as barriers, their function in the Health Belief Model is described as that of modifying and enabling factors which condition the individual's perceptions of his/her health situation (Becker & Maiman, 1975; Rosenstock, 1974a). Findings relevant to demographic variables are included in Appendix B which summarizes some of the research related to the Health Belief Model.

Cues to action are internal and external triggering events which set the process of health activity in motion. The retrospective nature of most health belief studies has made assessment of cues a difficult task. The cues which influence people to take a health action may be "fleeting and of little intrinsic significance (e.g., a casual view of a poster urging chest x-ray)..." (Rosenstock, 1974a, p. 6). They are therefore easily forgotten and hard to measure.

A few studies have attempted to examine the influence of cues on preventive health behavior. Internal cues such as bodily symptoms have been found to provide effective stimuli. Women who participated in a

breast cancer screening program were more likely to report that they had experienced symptoms of breast cancer (Fink et al., 1968). Reporting symptoms of tuberculosis has also been found to influence individuals in receiving chest x-rays (Hochbaum, 1958).

The health behaviors and opinions of a person's social contacts can also act as a cue to action. People who received polio vaccinations (Merrill et al., 1958) and x-rays for tuberculosis (Hochbaum, 1958) were more likely to state that they had friends and acquaintances who had also taken the health action in question.

The importance of cues is further supported by the finding that a lack of definite, positive influences directing health actions was identified as a factor in the failure of persons to receive polio vaccinations (Glasser, 1958). In a national study of health beliefs, the failure of individuals with high levels of perceived susceptibility and severity to engage in preventive or diagnostic behavior was again attributed to a lack of definite cues to stimulate or direct such activity (Rosenstock, 1975).

Suchman (1967) found that various types of communication may act as cues to motivate health actions. The use of a protective glove as a preventive measure was significantly affected by such factors as the degree of communication exposure (i.e., mass media) a person experienced and whether or not the glove was discussed with family, friends, and fellow workers.

Combinations of Health Belief Model variables have been found to be relevant in predicting health behaviors. Holding belief in more than one of the model components is usually associated with a greater likeli-

hood of taking preventive action. Kegeles' (1963a) study of dental behavior found preventive action to correlate with the number of motivating health beliefs held by the individual. Of the persons scoring high on all three beliefs (perceived susceptibility, seriousness, and benefits) 78% made preventive dental visits. As the number of high scores decreased, preventive action became less likely. Kegeles' prospective study (1963b) of dental behavior found a combined belief in susceptibility and severity to be the strongest predictor of preventive dental visits. Another dental behavior study (Antonovsky & Kats, 1970) examined variables such as health salience, belief in benefits, finances, knowledge, and anxiety. The presence of two of the variables in combination with each other was a significant predictor of preventive dental behavior. Of particular interest to the Health Belief Model, a belief in benefits in combination with salience of health was identified as a significant factor.

One of the few prospective studies of the effects of health beliefs (Rosenstock et al., 1960) reported that persons holding more than one belief were more likely to take preventive actions against Asian influenza. A belief in personal susceptibility and benefits of detection measures was associated with getting chest x-rays in Hochbaum's study (1958) of tuberculosis prevention.

Haefner and Kirscht (1970) tried to change health beliefs about cancer, tuberculosis, and heart disease. They found that the overall health belief scores of individuals were significantly related to obtaining subsequent medical check-ups. This overall belief score equalled (1) the potential threat of disease (the square root of the

susceptibility X the severity) multiplied by (2) the perceived benefits of taking action.

Several studies have failed to show the relevance of combined health beliefs. A national survey of health beliefs found no association between the combination of perceived susceptibility, severity, and benefits, and preventive behaviors for cancer, tuberculosis, tooth decay, and gum disease (Becker and Maiman, 1975; Rosenstock, 1966). As noted earlier, this failure to take action was apparently due to a lack of cues to trigger activity. Radelfinger, in a 1965 study of college students, found no significant correlations between holding any or all of the beliefs of the Health Belief Model and getting tetanus immunizations. However, since the number of students receiving injections was so small, Radelfinger believed his findings did not cast doubt on the model, particularly in light of the positive relationships shown by most investigations.

Other Variables

Motivation is a concept which has recently been reintroduced into the Health Belief Model. Motivation was originaly seen as the salience of health and illness for the individual but was dropped from the model, because "no good operational measure of salience" could be found (Rosenstock, 1974a, p. 6). The perceived susceptibility and severity of a health problem presumably acted as motivating forces. Becker and Maiman have suggested that a separate variable of general health motivation be employed in the model and state that "the desire to attain or maintain a positive state of health and to avoid a state of illness is a dimension

of health motivation" (Maiman & Becker, 1974, p. 24). This viewpoint is supported by a study of low-income mothers of children with otitis media (Becker et al., 1974). Mothers who complied with aspects of the prescribed regimen were more interested in the child's health in general and engaged in other actions to prevent future illness. Heinzelmann and Bagley (1970) also identified positive health motivations. They concluded that among the most important factors influencing participation in a physical activity program aimed at reducing the risk of heart disease was the desire to feel better and healthier and to lessen the chance of having a heart attack. Other investigators (Archer, Rinzler, & Christakis, 1967) reported that active participants in a heart disease prevention program called the Anti-Coronary Club were more likely to be concerned about their health than inactive subjects.

Antonovsky and Kats (1970 hypothesized that it is the salience of health rather than the belief in susceptibility and seriousness which acts as the motivation in the seeking of preventive dental care. They stated that "feeling susceptible highlights the goal of maintaining health and avoiding illness, i.e., that susceptibility leads to what we have called salience" (p.378). Recent review articles (Becker et al., 1977; Rosenstock, 1974a) by Health Belief Model proponents suggest that the importance of health as a motivating factor is again being recognized and included in the model.

Two studies have failed to identify the salience of health as a motivation for participation in Tay-Sachs screening (Kaback et al., 1974) or breast cancer screening (Fink et al., 1968). Health salience

was measured by asking how frequently the person thought about his/her own health.

Methodologies and Instruments

Review of the literature on health beliefs failed to reveal a standardized tool for the measurement of Health Belief Model variables. The majority of researchers have used a structured interview with questions related to the specific health action being studied. The only attempt to develop a standardized tool has been the "Semantic Differential for Health" by David Jenkins (1966). However, this instrument does not measure all the variables of the Health Belief Model, and factor analysis of the items (Jenkins & Zyzanski, 1968) has led Jenkins to some different interpretations of the model than those usually held.

Researchers agree that there is a need for standardization of measurement and analysis of health belief data in order to allow comparisons of study results (Becker & Maiman, 1975). It has been suggested that a brief, standardized index of questions employing model variables be developed and administered to patients as a part of the process of obtaining a medical history (Becker et al., 1977). Such a tool may be difficult to produce, since the Health Belief Model is aimed at decision making about specific health actions. Its categorical approach cannot easily "be expanded to cover health and illness behavior in general" (Roghman, 1975, p. 136).

Another methodological issue in Health Belief Model research is the lack of prospective and experimental studies. Most studies have measured health beliefs retrospectively or concurrently with the health

behavior being studied. However, Rosenstock (1974b, p. 35) points out that, "The hypothesis that behavior is determined by a particular constellation of beliefs can only be tested adequately where the beliefs are known to have existed prior to the behavior that they are supposed to determine." Prospective studies are needed if an investigator wishes to demonstrate that certain health beliefs are the cause of subsequent health behavior.

Perceptions of Heart Disease

Attempts have been made to assess people's beliefs and perceptions about heart disease. But little work has been done which shows how these perceptions and beliefs affect preventive health behavior. Robbins' (1962, p. 106) study of the nature of anxieties associated with various illnesses revealed that "heart disease was primarily perceived in terms of death and disability." People expressed little affect about heart disease and generally did not identify it as an experienced concern. Heart disease is most often "viewed as a hypothetical problem usually in terms of potential confinement or reduction in activities" (p. 106).

Mackie (1973) used a modified form of Jenkins' (1966) "Semantic Differential for Health" to measure perceptions of heart disease in a Canadian community. Using perceptions of cancer for comparison purposes, Mackie found that heart disease is perceived as more prevalent than cancer but less serious in terms of disability. Persons in the working class were more likely to perceive heart disease as causing permanent disabilty and also consistently reported more anxiety about the

possibility of developing heart disease. Cigarette smokers and persons having relatives with heart disease did not express more concern than other subjects, but persons 30-39 years of age were more worried than either older or younger persons. Mackie's results are similar to Robbins' (1962) and show that most people do not experience great personal concern about heart disease. About 75% of her respondents did not believe the quality of their lives would deteriorate appreciably if they developed heart disease. One-half of the subjects said heart disease would not destroy them financially, and 85% felt heart disease was one of the more pleasant ways to die.

Haefner and Kirscht (1970) in an experimental effort to change health beliefs and behavior, found perceptions of heart disease which were similar to those reported by Mackie (1973). Heart disease was viewed as nearly comparable to cancer in threat value. However, people were more likely to think they could do something to prevent heart disease. The preventive actions people were most willing to take were relatively low-cost behaviors such as getting medical check-ups. Higher cost preventive actions such as changing well-established living habits did not occur in spite of changes in health beliefs which were favorable to preventive behavior. The negative aspects (barriers) of changing such firmly-established habit patterns were apparently perceived as outweighing the advantages (benefits) of making these changes.

From the findings of Mackie (1973), Haefner and Kirscht (1970), and Robbins (1962), it can be concluded that most people have low levels of perceived susceptibility to heart disease and high levels of perceived barriers to taking preventive action against heart disease. This

information may be of value to health care professionals in their efforts to plan effective programs for the prevention of heart disease. Identifying variables of the Health Belief Model that are weak or lacking, enables the health care worker to deal with the specific perceptions which are blocking preventive health behavior (Becker et al., 1977).

In summary, the Health Belief Model provides an integrated framework for explaining and predicting preventive health behavior. The relevance of its variables (perceived susceptibility, severity, belief in benefits, perceived barriers, and cues) has been supported in studies of a wide-range of health activities. It is believed that the Health Belief Model may be useful in structuring prevention programs.

The magnitude of the cardiovascular disease problem makes it a primary target for preventive health programs. There is a critical need to understand what motivates healthy individuals to engage in health actions which reduce the risk of cardiovascular disease. In view of the reported explanatory and predictive powers of the Health Belief Model, it may be of value in identifying the factors which influence people to take preventive action against cardiovascular disease.

Purpose of the Study

The purpose of the study was to determine which variables of the Health Belief Model, alone or in combination, predict participation in a cardiovascular disease prevention program. It was hypothesized that the presence of one or more variables of the Health Belief Model (i.e., perceived susceptibility, perceived severity, perceived benefits, perceived

barriers, and perceived cues) would be predictive of attendance at the cardiovascular disease prevention program.

A second study purpose was to test the adequacy of an instrument constructed by the investigator for measuring health beliefs about cardiovascular disease.

CHAPTER II

METHODOLOGY

Design and Procedure

The design of the study was prospective in that it made predictions about the behavior of individuals based on previously measured characteristics. Health beliefs concerning cardiovascular disease (independent variables) were used to predict whether or not subjects would take a specific preventive health action (dependent variable).

The independent variables were measured by a Cardiovascular Disease (CVD) Health Belief questionnaire which subjects completed prior to being informed of a recommended preventive action against cardiovascular disease. The dependent variable (health action) was operationally defined as attendance or non-attendance at a cardiovascular disease prevention meeting called the Healthy Heart Fair.

The study was carried out at a local congregation of the Reorganized Church of Jesus Christ of Latter-Day Saints and used church members and visitors as subjects. The research was conducted in four phases as described in the following paragraphs.

Phase I: Administration of the Questionnaire

In Phase I, the health beliefs and demographic characteristics of the study participants were determined. Subjects completed a Cardiovascular Disease Health Belief questionnaire in one of two possible settings: (1) at the Reorganized Latter-Day Saint (RLDS) church on the date chosen for initial data collection; or (2) upon arrival at the Healthy Heart Fair prior to participation in the fair activities. Completion of the questionnaire required approximately 15-30 minutes.

Phase II: Cue Presentation

The Health Belief Model states that a cue or triggering event is necessary to provide a specific direction for health action. This phase of the study consisted of a two-week period of cue or stimulus presentation. During this period, subjects were made aware of a specific course of action available to them for the prevention of cardiovascular disease. They were informed of the date, time, and location of a cardiovascular disease prevention meeting called the Healthy Heart Fair. Subjects were told that the Healthy Heart Fair would include the following activities:

1. Blood Pressure Screening
2. Information Booths on Cardiovascular Disease Risk Factors (i.e., diet, exercise, high blood pressure, smoking, etc.)
3. A lecture/slide presentation by a research dietitian with expert knowledge regarding nutrition and cardiovascular diseases

4. A film on diet and cardiovascular disease.

The cue message regarding the Healthy Heart Fair was presented by the following methods:

1. Posters at the church facilities
2. Announcements in the weekly church bulletin and monthly church newsletter
3. A flyer mailed to each person enrolled in the congregation and distributed in the neighborhood surrounding the church
4. Verbal announcements at church services.

Phase III: Health Action (The Healthy Heart Fair)

During Phase III a cardiovascular disease prevention meeting called the Healthy Heart Fair was held at the church facilities. This fair was an activity designed, organized, and carried out by the investigator in order to give subjects the opportunity to take preventive action against heart disease if they so desired. Pamphlets were obtained from the Oregon Heart Association on cardiovascular disease risk factors and books on low cholesterol/low fat diets were acquired from the Family Heart Study at the University of Oregon Health Sciences Center. A number of posters and displays regarding cardiovascular disease risk factors were prepared, and a film describing the relationships between nutrition and atherosclerotic diseases was secured for subject viewing. Resource persons who were invited to share specific information with subjects included a research dietitian from the Family Heart Study, a cardiovascular nurse specialist, and a registered nurse with expertise in the beneficial effects of exercise. In

addition, two registered nurses were available to perform blood pressure screening on subjects attending the fair.

Healthy Heart Fair activities were divided into four periods. In Period 1, participants checked in with the receptionist and received instructions. The receptionist recorded the names of participants and asked if they had completed the CVD Health Belief questionnaire. Those who had completed the questionnaire were asked to fill in a brief form about reasons for attending the fair and then directed to the fair activities. Those persons who had not completed the CVD Health Belief questionnaire were asked to complete it together with the brief form.

Period 2 involved information gathering by the subjects. Pamphlets, displays, and information stations were available to help participants gain an understanding of the risk factors for cardiovascular disease and health activities which may decrease personal risk levels. Blood pressure screening was accessible, so subjects might be checked for the presence of hypertension.

Period 3 consisted of group instruction about nutrition and cardiovascular disease. Portions of the film, "Let's Eat Food," were shown to interested participants. A lecture and slide presentation was given by a research dietitian having expert knowledge regarding nutrition and cardiovascular disease.

Period 4 was open for the continuation of information gathering and blood pressure screening. The dietitian, a cardiovascular nurse specialist, and several registered nurses were present to answer questions from the program participants.

Phase IV: Follow-Up

In Phase IV follow-up information was obtained from persons who did not participate in the preventive program. They were contacted by telephone, asked if they knew about the Healthy Heart Fair, and if so, what factors had prevented them from attending.

Setting

The setting of the study was a local congregation of The Reorganized Church of Jesus Christ of Latter-Day Saints. All data collection and study procedures were carried out at the church facilities. The congregation comprised approximately one thousand enrolled members; an estimated three hundred of whom were actively involved in church activities.

Several ideals of The Reorganized Latter-Day Saint Church may have a bearing on the study results and are briefly discussed here. The major goal of the church is to help establish a society of peace and equality in which all persons can develop to their maximum potential. One of the primary methods of attaining this goal is the concept of stewardship. Stewardship is seen as the responsibility of each individual for the wise use and care of all aspects of life, including one's body and personal health. Church teachings offer suggestions for health behaviors relating to nutrition, rest, and avoidance of "strong drinks" and tobacco. However, the freedom of choice of the individual is also highly valued, and strict adherence to all health recommendations is not widespread. Abstinence from alcohol and tobacco is the most firmly

espoused health and moral standard.

Subjects

The original sample was obtained from persons attending services at the RLDS Church on the date chosen for the administration of the CVD Health Belief questionnaire. Most participants then were members of the church, but non-members were not specifically excluded from the study. The only exclusionary criterion for the study was one of age. All subjects were 13 years of age or older. There were 104 persons who completed the questionnaire at its first administration. In addition, eight other subjects were gained at the time of the scheduled CVD prevention meeting (Healthy Heart Fair). These individuals were asked to complete the questionnaire before participating in the activities of the fair. Responses of these participants were examined separately to ascertain any significant differences from the responses of the other participants. Noting their basic similarity, the responses were aggregated.

Data-Collecting Instrument

In view of the lack of a standardized instrument, it was necessary for the investigator to construct a tool to measure health beliefs concerning cardiovascular disease (specifically heart disease and hypertension). It was decided that a self-administered questionnaire would be appropriate due to the large sample size. A five-point Likert scale format was used for the majority of items.

Questionnaire items were obtained from those utilized by other researchers as well as "a priori" generation by the investigator (See Appendix C for the sources of instrument items). An initial pool of such items was pretested on approximately 38 persons including male and female adolescents, lay personnel in a psychiatric clinic, and nurses in a graduate school program. In addition, a sub-set of the original questionnaire items was pretested on 100 individuals randomly selected in door-to-door interviews. Final items were selected on the basis of their ability to elicit a wide range of responses and to discriminate among different age, sex, and educational categories. It should be noted, however, that some items which did not show good pretest results were included because of frequent use in other studies and to provide data for later comparisons with these studies.

In its final form, the questionnaire included 38 items designed to measure the five major variables of the Health Belief Model (See Appendix D for copy of the entire questionnaire). The items contained in this questionnaire pertained to perceived susceptibility (items 1-5), perceived seriousness (items 6-10), perceived benefits (items 11-15), perceived cues (items 16-22), and perceived barriers (items 32-37).

Responses to Likert scale items were expressed in terms of the following: strongly agree, agree, neutral, disagree, and strongly disagree. A numerical value from "1" to "5" was attached to each response according to the content of the statement being considered. On item statements which were positive for the presence of the health belief in question, the "strongly agree" response received a score of "5" and "strongly disagree" response received a score of "1". Statements which

indicated lack of belief in model variables were reverse scored with a value of "5" assigned to the "strongly disagree" response and a value of "1" to the "strongly agree" response (Scoring of items is indicated on questionnaire in Appendix D). According to Health Belief Model predictions, higher perceived susceptibility, seriousness, benefits, cues scores, and lower perceived barriers scores indicated a greater tendency to take health action. Scores on the items were summed and averaged to arrive at a score for that dimension from "1" to "5".

Additional Data

Demographic information was collected in order to evaluate the sample's representativeness and to provide a data base for comparisons with other research findings. The characteristics measured included sex, age, education, socioeconomic status, marital status, number of dependents, income, and religious preference. Subjects were assigned a position on the Duncan-Reise Socioeconomic Index (Reiss, Duncan, Hatt, & North, 1961) according to their reported occupation.

Subjects were asked to rate their health status on a five point scale from "1" (excellent) to "5" (poor). The perceived presence and seriousness of heart disease and high blood pressure were also measured, and subjects were asked if they were currently under treatment for either of these conditions. These items were included to evaluate their influence on preventive health action.

Two items measuring health motivation (See Appendix D, items 23 & 24) were used to assess the relative importance of this factor as a component of the Health Belief Model.

Several other questions were incorporated into the data collection instrument to provide additional information of interest to the author. Items 25-30 concerned subjects' beliefs in the effectiveness of heart disease prevention measures, item 31 concerned negative aspects of making dietary changes, and item 38 measured perceived effects of heart disease on subjects' personal life-styles. Responses to these items were not statistically analyzed or included in the discussion of study results.

Follow-Up Data Collection

Persons attending the cardiovascular disease prevention meeting were given a short form to complete, asking them to state the reasons for their decision to attend (See Appendix E). Persons who completed the CVD Health Belief questionnaire but did not attend the fair were contacted by telephone and asked about their reasons for being unable to attend (See Appendix F for copy of interview format). This information provided further insight into the cues and barriers perceived by the subjects.

CHAPTER III

RESULTS AND DISCUSSION

In order to facilitate clarity, the findings of the study will be discussed as they are presented. The subjects will be described in terms of their demographic characteristics and perceptions of heart disease. Next, the ability of Health Belief Model variables to predict health activity (i.e., attendance at the Healthy Heart Fair) will be discussed. And finally, follow-up data on perceptions of barriers and cues will be presented.

In the presentation of study findings, two specific concerns will be addressed. The first related to the generalizability of the findings in view of the restriction of the sample to persons of a specific religious preference, namely the RLDS Church. The second concern is the possibility that religious homogeneity would be reflected in restricted variance in demographic characteristics and health belief responses. These two concerns will be addressed as the data are presented.

Subjects

After the elimination of subjects for whom data were incomplete, the sample numbered 112 subjects, all but three of whom were members of the Reorganized Church of Jesus Christ of Latter-Day Saints (RLDS). Comparisons of the sample with the total U.S. population revealed the

RLDS group to be similar in most demographic characteristics (U.S. Bureau of the Census, 1976). Table 1 summarizes pertinent demographic variables. The proportion of females was slightly higher (59.8%) than in the United States general population in 1976 (51.2%). The median age was 41 years, as opposed to a median age of 28 years for the U.S. population. Subjects ranged in age from 13 to 86 years with a mean of 41.8 and a standard deviation of 16.9. The median educational level of 13 years in the study population corresponds closely to the median of 12.3 years in the U.S. population. The sample was homogeneous with respect to education having a range of 7.0 to 19.0 years but a standard deviation of only 2.5 years with a mean of 12.9 years. The median income of the sample was approximately $13,176 which was only slightly lower than the median U.S. income of $14,300. In the U.S. population, 69.8% of the people are married. The RLDS group had a slightly higher proportion of 74.1% married persons. In general, it can be said that the study sample did not differ radically from the U.S. population on demographic variables except for age. This latter difference was expected in that children were ineligible for inclusion in the study. Insofar as these demographic characteristics are concerned, the sample would appear fairly representative of the larger population.

In further description of the sample, the mean number of dependents per subject was 1.2. Thirteen of the subjects (11.6%) were currently under treatment for hypertension or heart disease. In general, the subjects considered their health to be average or better (mean score = 2.36). The subjects valued health highly with a mean "health motivation" score of 4.16.

Table 1

A Comparison of RLDS Subjects and the U.S. Population for 1976 in Relation to Selected Demographic Characteristics

Characteristic	RLDS Subjects	1976 U.S. Population
Sex		
Percent Female	59.8%	51.2%
Percent Male	40.2%	48.8%
Median Age (in years)	41	28
Median Education (in years)	13.0	12.3
Median Annual Income	$13,176	$14,300
Marital Status		
Percent Married	74.1%	69.8%
Percent Single	25.9%	30.2%

Compliance With Health Action

Of the 112 subjects, 28 persons took preventive health action by attending the Healthy Heart Fair, whereas 84 persons did not. This 25% compliance rate is slightly low in comparison to those reported in other studies of preventive health behavior. Kaback et al. (1974) reported a 50% compliance rate in their study of screening for Tay-Sachs disease. Compliance rates for PAP screening to detect cervical cancer have ranged from 35% to 50% (Kegeles, 1969; Kegeles et al., 1965). A national study of preventive health behaviors reported 71.2% of the sample had made asymptomatic visits to physicians for check-ups in the preceding five years, 50.1% had made similar visits to dentists, 54.8% had obtained asymptomatic tests for tuberculosis and 29.8% asymptomatic tests for cancer in the preceding five years (Haefner, Kegeles, Kirscht, & Rosenstock, 1967). However, these figures, for the most part, represent studies in which the subjects had more than one opportunity or an extended time period in which to take health action. The Healthy Heart Fair, on the other hand, was available on only one specific date.

Perceptions of Heart Disease

While health beliefs regarding heart disease and high blood pressure were elicited separately, they were combined into one score since these two health problems are closely related, and since the Healthy Heart Fair was designed as a preventive action against both. Therefore, whenever beliefs regarding heart disease are referred to, perceptions of high blood pressure will be included.

The Health Belief Model predicts health action will be more likely to occur when the individual perceives susceptibility, seriousness, and benefits as great, barriers to action as slight, and cues as strong (Rosenstock, 1966). How do the beliefs of the study subjects accord with this model?

From Table 2, it may be concluded that subjects generally did not believe that heart disease or high blood pressure would pose extremely serious problems for them personally. The average seriousness score of 3.20 was only slightly above the neutral position of 3.00 on the five point Likert scale. Perceived susceptibility to heart disease and high blood pressure was even less with a mean score of 2.98. These findings are in agreement with those of Robbins (1962) and Mackie (1973) who found that heart disease was viewed as a moderately serious disease with low to moderate levels of perceived susceptibility and personal concern. Subjects in Mackie's study rated their own susceptibility to heart disease as less than that of most other people and "were reluctant to apply their appreciation of disease prevalence to themselves" (Mackie, 1973, p. 448).

Perceived benefits of heart disease preventive actions was a more strongly-held belief, as demonstrated by a mean "benefits" score of 4.07. None of the subjects indicated disbelief in the effectiveness of preventive action. Scores ranged from 3.0 (neutral) to 5.0 (strong agreement with benefits). These findings concur with those of Mackie (1973) and of Haefner and Kirscht (1970) whose subjects viewed heart disease as a health problem they could do something to prevent.

Table 2

Mean Scores and Standard Deviations for Perceptions of Heart Disease as Measured by Health Belief Model Variables

Health Belief Model Variable	Mean Score of Subjects	Standard Deviation
Perceived Susceptibility	2.98	0.77
Perceived Seriousness	3.20	0.61
Perceived Benefits	4.07	0.43
Perceived Cues	2.94	0.60
Perceived Barriers	2.01	0.63

The sample members' perception of barriers to taking preventive action was low, with a mean "barriers" score of 2.01. It should be remembered that subjects were unaware that a Healthy Heart Fair would be scheduled when they completed the CVD Health Belief questionnaire. The "barriers" questions were phrased in terms of possible impediments to attending a hypothetical heart disease prevention meeting. Subjects did not perceive the cost of attending such a hypothetical meeting as prohibitive in terms of convenience, transportation, time, money, child care, or fear of detection. Since the perception of barriers to preventive measures specific for heart disease has not been explored thoroughly in the literature, this finding is difficult to interpret.

Perception of cues relevant to heart disease and hypertension is another area of Health Belief Model research in which information is scarce. The study population reported a moderate perception of cues with a mean score of 2.94. This score was based on cues the subjects received from family, friends, physicians, and the media prior to receiving the specific cue stimulus of the advertisement of the Healthy Heart Fair. Reports of cue perceptions regarding the Healthy Heart Fair will be discussed in the presentation of follow-up data. In summary, while the subjects of this research perceived benefits as great and barriers as slight, they viewed their susceptibility as low to moderate, seriousness of heart disease as moderate, and cues to action as moderate.

Health Action as a Function of Health Belief Model Variables

The purpose of the present study was to examine the relative usefulness of specific variables in the Health Belief Model, in predicting preventive action against heart disease. To achieve this purpose, correlations between individual model components and the proposed health behavior (i.e., Healthy Heart Fair attendance) will be discussed, and then results of stepwise multiple regression analyses will be presented.

Table 3 presents product moment correlations between subjects' health beliefs and their participation in preventive activity. A number of points may be made in discussing this table. First, perceived barriers was the only variable demonstrating a significant correlation with health action ($r = -.20$, $p < .05$ level). The negative relationship observed was as expected, in view of the Health Belief Model prediction that health action becomes less likely as the perception of barriers increases.

Perceived physical barriers associated with attending a heart disease prevention meeting which were assessed included inconvenience and lack of time, finances, child care facilities, or transportation. While the results show these physical factors significantly influenced the decision to take health action, barriers have been found to be unimportant in breast cancer screening (Fink et al., 1968) and use of prophylactic penicillin to prevent rheumatic heart disease (Gordis et al., 1969). However, the present findings are consistent with those of

Table 3

Product Moment Correlation Coefficients Between Health Belief Model Variables and Attendance at the Healthy Heart Fair

Health Belief Model Variable	Product Moment Correlation Coefficients
Perceived Susceptibility	.08
Perceived Seriousness	.03
Perceived Benefits	-.09
Perceived Cues	-.01
Perceived Barriers	-.20*

* $p < .05$

Archer et al. (1967) who reported participation in a dietary program to prevent heart disease to be significantly affected by the number of physical aspects of the program the subjects disliked. Among the barriers identified were time, scheduling difficulties, location of the program, procedures, and parking facilities.

Fear of heart disease or hypertension detection was not measured for its independent effects, but follow-up interviews identified only one person who stated fear as a reason for not attending the Healthy Heart Fair. This result is not consistent with those of other investigators who have found fear and anxiety to be significant barriers to preventive dental behavior (Kegeles, 1963a, 1963b; Tash et al., 1969; Antonovsky & Kats, 1970), use of polio vaccine (Merrill et al., 1958), and tuberculosis screening (Hochbaum, 1958). Perhaps fear is not a barrier in this situation, in that preventive actions against heart disease do not involve a threat of pain or discomfort such as that associated with going to the dentist or receiving a vaccination. Another possible explanation is that the subjects did not fear detection of heart disease, because they did not feel highly susceptible to it and believed it was only a moderately serious health problem.

It is not possible to determine which of the barriers (inconvenience, time, child care, transportation, money, or fear) measured in the present study were most influential in deterring Healthy Heart Fair attendance. A total "barriers" score combining these factors was used for statistical analysis. However, further insight is available from post-Healthy Heart Fair interviews and will be discussed in greater depth in the section on follow-up data.

A second point to be made from Table 3 is that perceptions of the benefits of preventive actions against heart disease were not related to taking such action (r= -.09). While two investigators have reported similar findings for immunization against polio (Glasser, 1958) and Asian influenza (Rosenstock et al., 1960), most of the existing research indicates that belief in the efficacy of action is an important motivator to health behavior (Kegeles et al., 1965; Kegeles, 1969; Fink et al., 1968; Hochbaum, 1958; Kegeles, 1963a; Tash et al., 1969; Suchman, 1967; Antonovsky & Kats, 1970). One explanation for the contrary results obtained in this study may lie in the fact that all subjects reported neutral or positive beliefs in the benefits of preventive measures for heart disease. This homogeneity of attitude effectively precluded any possibility of distinguishing between attenders and non-attenders at the Healthy Heart Fair.

Thirdly, taking preventive action against heart disease was not significantly affected by the subjects' perceived susceptibility to heart disease. This result conflicts with those of most other studies which identified perceived susceptibility as the single most important variable of the Health Belief Model (Kegeles, 1963a, 1963b, 1969; Fink et al., 1968; Kaback et al., 1974; Suchman, 1967; Rosenstock et al., 1960). The unusual results found by this investigator are again related to decreased score variability around a low mean perceived susceptibility. Since both Healthy Heart Fair attenders and non-attenders had low perceived susceptibility to heart disease, their health decisions must have been based on factors other than feelings of personal vulnerability to heart problems.

Fourthly, the perception of internal and external cues had no influence on the decision to participate in the Healthy Heart Fair ($r = -.01$). Interpretation of this finding is difficult, since few researchers have attempted to assess the transitory and often subconscious effects of cues on health behaviors. In this research, the homogeneity of responses is again the most plausible explanation of their failure to predict health action.

Fifth, the perceived seriousness of heart disease was not associated with preventive health behavior ($r = .03$). Preventive dental behavior (Tash et al., 1969; Kegeles, 1963a), use of prophylactic penicillin by rheumatic fever patients (Heinzelmann, 1962) and accident prevention (Suchman, 1967) have all been influenced by perceptions of seriousness, but non-significant results have been found for the effects of perceived seriousness on tuberculosis screening (Hochbaum, 1958), another study of preventive dental behavior (Kegeles, 1963b), and screening for Tay Sachs disease (Kaback et al., 1974). The combination of perceived susceptibility and perceived seriousness has been influential in studies of prophylactic measures for Asian flu (Rosenstock et al., 1960) and use of prophylactic penicillin to prevent rheumatic heart disease (Heinzelmann, 1962). These conflicting research results suggest that perceived seriousness is not a consistently reliable predictor of preventive health behavior, a conclusion supported by the results of the present study. One possible explanation of the inconsistent findings for perceived seriousness is the fact that very low levels of perceived severity do not motivate health action, and very high levels may act as barriers to health action (Becker & Maiman, 1975). In the case of the

present research, the perceived seriousness of heart disease was moderate and may not have been high enough to stimulate preventive health behavior. As with other Health Belief Model variables, the sample's perceptions of the seriousness of heart disease and hypertension were homogenous and did not provide a basis for explaining study outcomes.

Results of the stepwise multiple regression analyses

In Table 4, the results of the stepwise multiple regression analyses concerning the effects of Health Belief Model variables on preventive action against heart disease are presented. It should be noted that some of the study variables and relationships do not fully meet the assumptions of regression analysis, such as linear relationships, normal distribution, and equal variance. However, several statisticians advocate the use of correlational techniques even when ideal conditions are lacking (Labovitz, 1967; 1971; Gardner, 1975). Labovitz (1967; 1971) believes that use of regression analysis produces relatively slight error while providing the advantage of this powerful and critical method of analysis.

In the first column of Table 4, Health Belief Model variables are listed in the order of their emergence in the regression analysis. The second column contains the multiple correlation coefficient (R) of all variables listed to that point. The third column contains the cumulative variance explained by the variables listed to that point, and the last column presents the standardized beta value of the designated variable.

Table 4

Multiple Regression of Health Belief Model Variables
On Preventive Action Against Heart Disease

Variable	Multiple Correlation	Cumulative Variance	Beta
Perceived Barriers	.20	.04	-.25
Perceived Benefits	.24	.06	-.16
Perceived Susceptibility	.26	.07	.16
Perceived Cues	.28	.08	-.10
Perceived Seriousness	.28	.08	.02

The model component emerging first in the regression analysis, and accounting for the most variability in Healthy Heart Fair attendance, was "perceived barriers." Barriers scores explained 4% of the variance observed in health action. Perceived benefits explained another 2% of the variance while perceived susceptibility and perceived cues each added an additional 1% to the model's predictive power. Perceived seriousness failed to increase the cumulative variance explained by the Health Belief Model.

The combined Health Belief Model variables accounted for only 8% of the variance observed in health action. This leaves 92% of the variance to be explained by other factors. The results of this study would therefore suggest that the Health Belief Model has little power to predict preventive actions against heart disease.

There are several possible explanations for the failure of the Health Belief Model to explain health behavior in this study. First, the fault may lie in the lack of variability in the health belief responses discussed earlier. Subjects had very similar beliefs about heart disease, and consequently, health beliefs did not discriminate between those subjects who took preventive action and those who did not. Second, the failure may be due to the inadequacy and insensitivity of the instrument used.

However, it is possible that the fault lies in the limited predictive utility of the theory itself. It should be remembered that to date, the model has been tested mainly in retrospective rather than prospective studies. In retrospective studies, subjects may over-report perceptions of susceptibility, seriousness, benefits, and cues while

under-reporting perceived barriers to action. Therefore, the findings of the present prospective study using a self-administered questionnaire may cast doubt on the results of earlier retrospective studies.

A third, and perhaps the most reasonable, explanation for the failure of the Health Belief Model variables to account for health behavior in this instance is that subjects had only one opportunity to engage in the proposed health action. Most health belief studies have involved a health action available on more than one occasion or during a specified time period. Since the Healthy Heart Fair was accessible to subjects on only one date, there was increased likelihood that other events and previous plans could influence subject participation thus decreasing the predictive ability of the Health Belief Model.

Expanded Health Belief Model Variables

Becker's expanded version of the Health Belief Model (See Appendix A) states that certain personal and demographic characteristics, while not direct causes of health behavior, may act as modifying, enabling factors to influence health perceptions and motivations (Becker et al., 1977). Does this expanded model perform any better than the classic model in explaining health action?

Table 5 presents the results of a stepwise multiple regression analysis including selected modifying variables together with the basic components of the Health Belief Model. These modifying variables tested included socioeconomic status, health motivation, number of dependents, perceived health status, marital status, education, treatment status, age, and sex. Only two of these variables increased the predictive

Table 5

Multiple Regression of Expanded Health Belief Model Variables on Preventive Action Against Heart Disease

Variable	Multiple Correlation	Cumulative Variance	Beta
Perceived Barriers	.20	.04	-.24
Perceived Benefits	.24	.06	-.18
Perceived Susceptibility	.26	.07	.13
Perceived Cues	.28	.08	-.10
Socioeconomic Status	.29	.08	-.12
Health Motivation	.30	.09	.12
Number of Dependents	.31	.09	.12
Perceived Health	.31	.10	.05
Marital Status	.31	.10	-.05
Education	.31	.10	.04
Treatment Status	.31	.10	.04
Perceived Seriousness	.32	.10	-.04
Age	.32	.10	-.04
Sex	.32	.10	.01

power of the Health Belief Model to any extent whatsoever. Health motivation scores and perceived health ratings each accounted for an additional 1% of the variance in health action. With the addition of these two modifying variables, the expanded Health Belief Model accounted for 10% of the total variance in observed responses.

These disappointing results are perhaps understandable, given the ambiguity and inconsistency in the research literature regarding the effects of demographic and personal characteristics on health behaviors. In their comprehensive reviews, Kasl and Cobb (1966) and Marston (1970) concluded that the effects on health action of socioeconomic status, marital status, and education are far from clear. While there seems considerable consensus that young adults are more likely than others to engage in preventive action (Kaback et al., 1974; Suchman, 1967; Tash et al., 1969), the relation does not appear to be linear (Becker et al., 1977). With respect to the factor of motivation, Kaback et al. (1974) reported this element was not important in explaining participation in screening for Tay Sachs disease, while Heinzelmann and Bagley (1970) and Antonovsky and Kats (1970) claimed it was a major variable. The results are contradictory also both in respect to the effect of number of dependents (see, for example, Kaback et al., 1974, in contrast to Becker et al., 1974), and in respect to the effect of perceived health status. Kasl and Cobb (1966), and Archer et al. (1967) suggest persons viewing their health as poorer participate more in health action; but Gordis et al. (1969) reported no systematic relationship. Only with regard to sex is the research literature quite strongly in agreement. Rosenstock (1966), Kasl and Cobb (1966), McKinlay (1970), and Tash et al. (1969)

all conclude that females utilize health services more than males. In this study, gender did not significantly influence attendance at the Healthy Heart Fair. Perhaps the usual tendency for females to participate more in health action was balanced by the fact that the health activity in question was somewhat more relevant for males. The frequency of heart disease is much higher for males than females in the United States, and awareness of this fact may have produced a higher proportion of male participants than usually observed.

Follow-Up Data

Due to the noticeable lack of research findings regarding the perceived cues and barriers which influence preventive health activity, it was decided to collect additional data about these two variables of the Health Belief Model.

Information concerning perceived cues was obtained by asking Healthy Heart Fair participants to complete a brief form identifying factors affecting their decision to attend (see Appendix E). Data regarding perceived barriers were collected by telephone interviews of subjects who did not participate in the Healthy Heart Fair (see Appendix F for copy of interview questions). Subject responses for these two measures were tallied and are presented in Tables 6 and 7.

Table 6

Cues Perceived by Subjects Attending
The Healthy Heart Fair

Perceived Cue	Number of Subjects Reporting Perception of Cue (N=28)
Reading an Announcement	23
Hearing an Announcement	13
Viewing a Poster	5
Reading a Flyer	6
Informed by a Friend	8
Encouragement from Family	9
Friends were Attending	3
Friends have Heart Disease or Hypertension	11
Symptoms of Heart Disease	2
Symptoms of Hypertension	5
Presence of Heart Disease	2
Presence of Hypertension	5

Table 7

Barriers Perceived by Subjects Not Attending The Healthy Heart Fair

Perceived Barrier	Number of Subjects Reporting Perception of Barrier (N=84)
Unaware of Fair	12
Transportation Problem	3
Working During Fair	8
Ill During Fair	5
Child Care Problem	3
Financial Problem	0
Forgot About the Fair	14
Out of Town During Fair	11
Recent Physical Exam or Blood Pressure Check	12
Other Plans During Fair	27
Interference with Personal Relaxation	12
Fair Would be Boring	10
Have Enough Information About Heart Disease	16
Already Under Treatment	7
Not Worried About Heart Disease	17
Attendance at Special Church Services	6
Fear of Detection	1

As shown in Table 6, the three most frequently reported cues directing health action were reading an announcement about the Healthy Heart Fair in the church bulletin or newsletter, hearing a verbal announcement, and having friends with heart disease or hypertension. The less frequently reported cues to health action are listed in Table 6.

Table 7 shows the frequency with which various barriers to Healthy Heart Fair attendance were reported by non-participants. Most subjects reported the perception of more than one barrier.

It is interesting to note that a lack of worry about getting heart disease was mentioned by 17 of the 84 non-attenders. Glasser (1958) and Merrill et al. (1958) have stated that a lack of perceived susceptibility may itself act as a barrier to taking health action. Perceived susceptibility and seriousness are defined as the driving forces producing a state of readiness to take health action (Maiman & Becker, 1974). The results of follow-up interviews suggest that some subjects may not have been in a state of readiness to take health action due to their lack of personal concern about getting heart disease.

A number of persons (16 of the non-participants) believed they already had sufficient information about heart disease, and 12 subjects had recently undergone a physical exam and/or blood pressure screening. Seven subjects reported they were already under treatment for heart disease or hypertension and did not see the value in attending the Healthy Heart Fair.

The perception of physical barriers such as travel, expense, or inconvenience did not seem to be of great importance in this population. Transportation or child care difficulties were both reported by only 3

subjects while none of the subjects identified financial problems as a perceived barrier to attending the heart fair.

The single most important barrier appeared to be having "other plans" with 27 persons reporting events or obligations which conflicted in time with the fair. This finding suggests the possibility that the brief availability of the Healthy Heart Fair may have interfered with adequate testing of the Health Belief Model.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

One of the primary health problems affecting U.S. citizens today is cardiovascular disease. Pathology of the heart and blood vessels is the leading cause of death and disability in the nation. Engaging in preventive behavior has been identified as the most promising approach to dealing with this crucial health problem.

The Health Belief Model is one of the major paradigms which has been formulated to explain preventive health behavior. The model predicts that health action will be more likely to occur in the presence of (1) high levels of perceived susceptibility to and seriousness of the health condition in question, (2) high levels of belief in the benefits of the proposed health action, (3) a high level of perceived cues to trigger action, and (4) low levels of perceived barriers to taking the action. The Health Belief Model has been shown to explain health behavior in numerous retrospective investigations and a limited number of prospective studies.

The hypothesis tested in this investigation was that certain beliefs in accordance with the Health Belief Model would be related to attendance at a cardiovascular disease prevention meeting.

The design of the study was prospective in that health beliefs

regarding cardiovascular disease were measured prior to knowledge of or participation in the prevention meeting. All data were collected at a local congregation of the Reorganized Church of Jesus Christ of Latter-Day Saints. Subjects' beliefs about cardiovascular disease were measured using a tool constructed by the investigator called the Cardiovascular Disease Health Belief questionnaire. Demographic and personal characteristics were also assessed by the instrument. Preventive health behavior was defined as attendance at a Healthy Heart Fair, planned and carried out by the experimenter to provide a specific course of preventive action against heart disease. In addition to data collected with the CVD Health Belief questionnaire, information was obtained retrospectively regarding the cues perceived by Healthy Heart Fair participants and the barriers perceived by non-participants.

Study results identified perceived barriers as the only Health Belief Model variable correlating significantly with preventive behavior. As predicted by the model, the perceived barriers score was inversely related to taking health action; that is, the lower the perceived barriers score, the greater the likelihood of preventive activity. None of the other Health Belief Model variables was significantly related to Healthy Heart Fair attendance. Demographic and personal characteristics, defined as modifying factors in the expanded version of the Health Belief Model, also failed to show significant correlations with the proposed health response. Basic components of the Health Belief Model (i.e., perceived susceptibility, seriousness, benefits, barriers, and cues) accounted for only 8% of the variance observed in health behavior, and the addition of selected modifying factors (i.e.,

sex, age, education, socioeconomic status, marital status, number of dependents, income, motivation, and perceived health) increased total predictive ability to only 10% of the variance. Therefore the hypothesis that variables of the Health Belief Model would effectively predict preventive action against heart disease was not confirmed.

The Health Belief Model has primarily been used to explain health behavior in retrospective investigations. Although the results of this prospective study cast doubt on the Health Belief Model as a predictor of preventive health action, the findings are not conclusive. Questions may be raised regarding the validity of the instrument constructed as well as its sensitivity in view of the observed homogeneity of beliefs concerning heart disease. Failure of the Health Belief Model to predict health actions may also have been a result of the brief availability of the Healthy Heart Fair.

One of the original concerns in the study design was the possibility of sample bias due to the particular religious preference of the subjects. The sense of personal health responsibility (stewardship) common among members of the RLDS church was seen as a potential motivating force independently influencing health action. This could have biased the sample towards increased Healthy Heart Fair attendance but apparently did not since the number of participants was relatively small.

There are several recommendations for further study and evaluation of the usefulness of the Health Belief Model as a predictive tool. First, there is a need for increased utilization of the model in prospective studies of health behavior and in studies providing a more pro-

longed period of accessibility to the proposed health action. A second recommendation for future research is the development of a refined, standardized instrument to measure perceptions of cardiovascular disease according to the components of the Health Belief Model. Such a tool would be particularly valuable for nurses involved in preventive efforts against cardiovascular disease. Knowledge of individual perceptions of cardiovascular disease would be beneficial in directing nursing approaches to client education and health behavior modifications. Future explorations might also be aimed at identifying additional variables which affect decisions to take health action. Comparative studies using other paradigms may be of value in determining which variables are predictive of health behavior. These variables could then be incorporated into the model to increase its accuracy in explaining preventive health actions.

The Health Belief Model should also be tested in studies of high-cost health actions that require subjects to make changes in health behaviors and life-style. Attending a prevention meeting is a relatively low-cost health activity. It would be interesting to identify which components of the Health Belief Model, if any, would predict participation in long-term health programs involving extensive changes in behavior.

The development of standardized items to assess the perceived barriers to taking preventive action against heart disease should be a primary concern in future investigations of the Health Belief Model. Items evaluating cue perceptions are also of vital importance, since health action rarely occurs without the presence of these triggering

mechanisms to direct the course of that action. These two variables of the Health Belief Model have often been neglected by health belief researchers because of the difficulty in measuring them. Yet in the results of this study, perceived barriers was the only significant variable influencing health action. Perhaps the perception of barriers takes on greater importance in the absence of the health beliefs which provide the driving force to take health action (i.e., perceived susceptibility and seriousness). Suchman (1967) has stated that even if perceived susceptibility and seriousness are at appropriate levels, the perception of strong barriers to the proposed behavior will deter action.

In conclusion, it may be stated that the lack of significant results obtained by this experimenter does not conclusively refute the Health Belief Model's usefulness in explaining preventive health actions. A number of factors and relationships need additional exploration, and further research is necessary in order to evaluate adequately the effectiveness of the Health Belief Model as a predictor of preventive health behavior.

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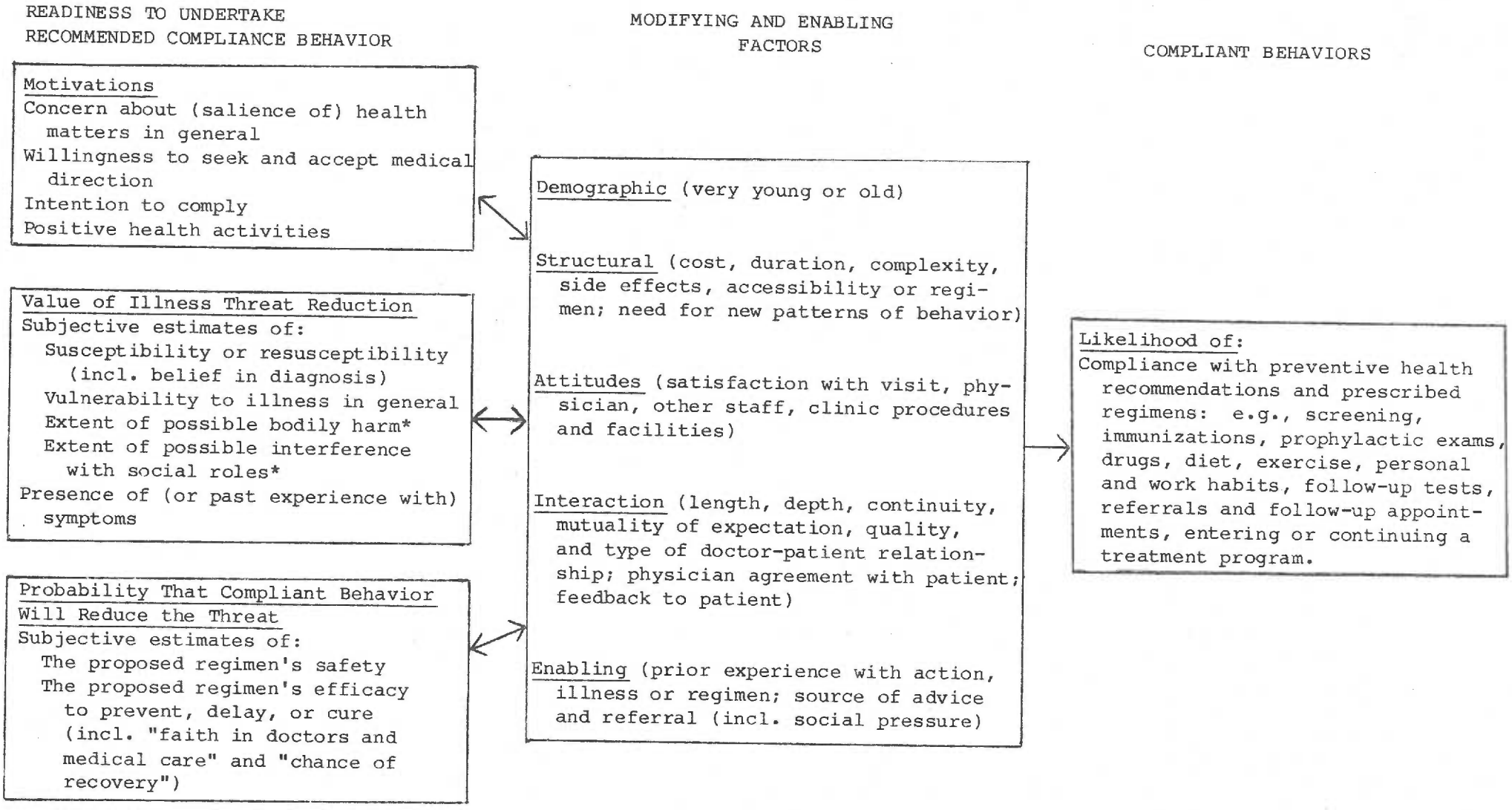
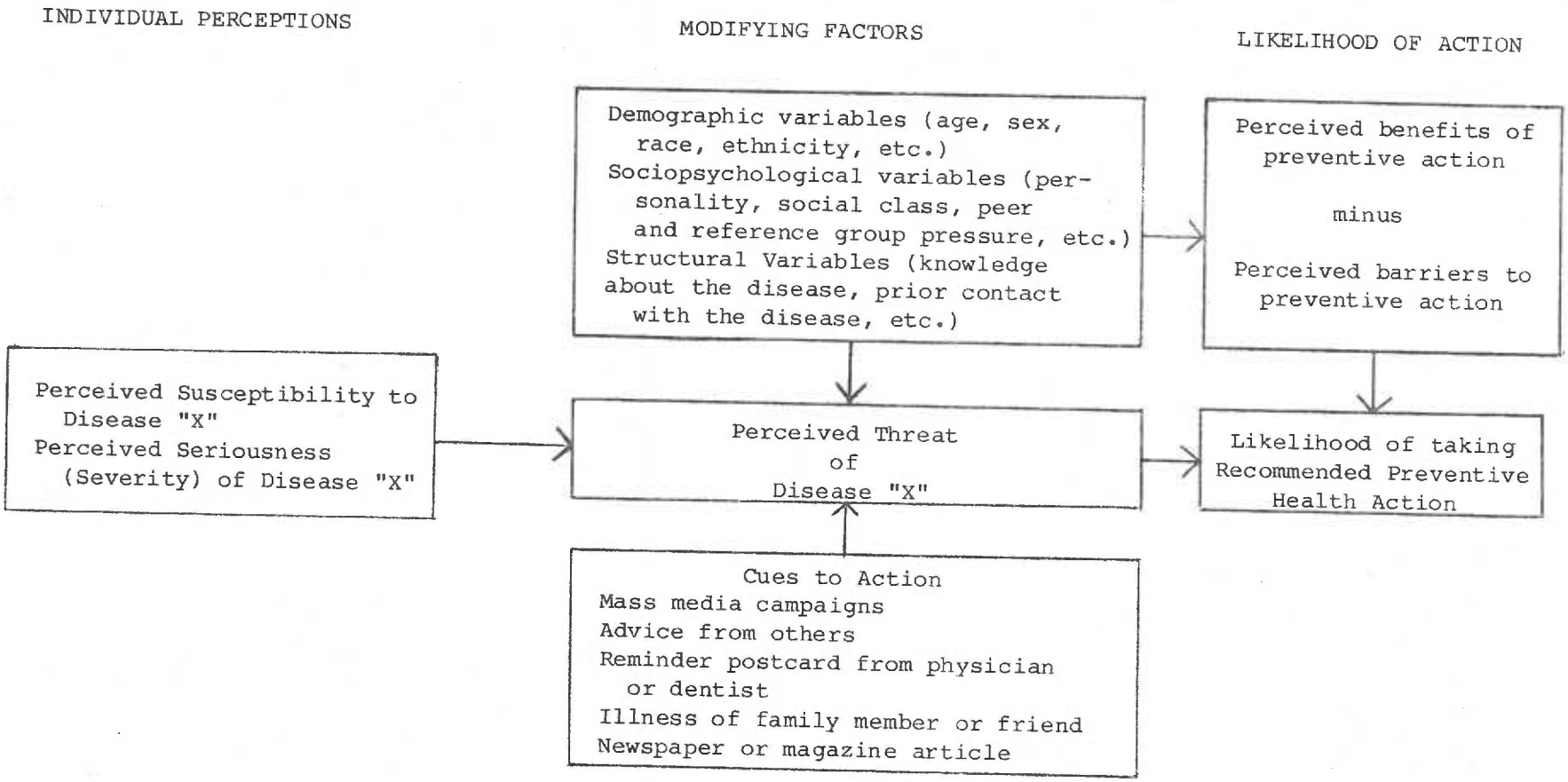
APPENDIX A

Diagrams of the Health Belief Model



*At motivating, but not inhibiting, levels.



The "Health Belief Model" as predictor of preventive health behavior.

APPENDIX B

Summary of Health Belief Model Research

STUDIES USING HEALTH BELIEF MODEL VARIABLES TO

PREDICT PREVENTIVE HEALTH BEHAVIOR

Investigators/Date	Recommended Health Behavior	Significant Variables	Non-Significant Variables	Comments
Antonovsky and Kats 1970	Preventive Dental Visits	Salience of Dental Health; Belief in Benefits; Knowledge of Dental Behavior; Anxiety acts as a Barrier; Financial Difficulty		Salience of Health Viewed as Motivation Rather than Perceived Susceptibility and Severity.
		Salience + Benefits Salience + Knowledge Salience + Anxiety Salience + Finances Benefits + Knowledge Benefits + Anxiety Benefits + Finances		Retrospective, Survey Study
Archer, Rinzler, and Christakis; 1967	Heart Disease Prevention Diet	Subject's view of his Value to the Study Benefits of study Knowledge of Heart Disease Evaluation of the Importance of Diet Willingness to Discuss with Friends Ease of Fitting Study Into Own Schedule Factors Disliked About Study acted As a Barrier Active Subjects Had More Major Illnesses and Health Concerns		Other Significant Socio-Cultural and Socio-Medical Variables Identified Retrospective, Survey Study

Investigators/Date	Recommended Health Behavior	Significant Variables	Non-Significant Variables	Comments
Fink, Shapiro, and Lewison; 1968	Breast Cancer Screening	Perceived Susceptibility Belief in Benefits Cues--Reporting of Symptoms Visits to Health Facility in Past Year Participants more likely to be young, Jewish, and have a high school education	Marital Status Ethnic Group Income, Occupation, and Work Status Barriers--Travel Distance, Ethnic Background (Native or Foreign Born)	Retrospective, Survey Study
Glasser; 1958	Polio vaccine	Decreased Use with: *Lack of cues *Lack of Perceived Susceptibility *Inaccurate knowledge Increased Use with: *High School Education *Accurate Knowledge *Friends using the vaccine	*Belief in Benefits of Vaccine *Lack of Financial Funds	Retrospective, Survey Study
Gordis, Markowitz, and Lilienfeld; 1969 *=Statistical Significance Not Stated	Prophylactic Penicillin	Decreased Use with: *Perceived Susceptibility (See Comments) *Fatalistic Attitude	*Mother's Perceptions of Child's Health Disease Etiology, Barriers--Expense, Convenience, Attitude Toward Medical Care	Retrospective, Survey Study High Perceived Susceptibility due To Non-compliance with Medications

Investigators/Date	Recommended Health Behavior	Significant Variables	Non-Significant Variables	Comments
Gordis, Markowitz, and Lilienfeld; 1969 (continued)	Prophylactic Penicillin	Increased Use with: *Perceived Seriousness *Parental Accompaniment to Clinic Visits	Future Orientation Anomie Ethnocentricity	
Haefner and Kirscht 1970	Preventive Exams For Cancer, TB, Heart Disease	Getting Exam Related to Overall Health Belief Score (Susceptibility, Severity, and Benefits) Getting Heart Disease Or TB Exam Related to Potential Threat Score (Susceptibility and Severity)	Overall Belief Score Not Related to Change In Personal Habits Potential Threat Score Not Related To Getting Cancer Exam	Prospective, Experimental Study Attempting to Alter Health Beliefs and Behavior
Heinzelmann; 1962	Penicillin Prophylaxis	Increased Use with: Perceived Susceptibility Perceived Seriousness Knowledge of Rheumatic Fever Combination of Susceptibility, Knowledge, and Seriousness Number, Recency, and Severity of Rheumatic Fever Attacks Relatives with Rheumatic Fever Presence of Rheumatic Heart Disease	Parents' Education Father's Occupation Number of Siblings	Retrospective, Survey Study Perceived Seriousness Related to Number and Severity of Attacks and to the Presence of Rheumatic Heart Disease Perceived Susceptibility Related to Number of Attacks and has Greatest Weight in Determining Preventive Behavior

*=Statistical Significance Not Stated

Investigators/Date	Recommended Health Behavior	Significant Variables	Non-Significant Variables	Comments
Hochbaum; 1958	X-ray Screening For Tuberculosis	*Perceived Susceptibility *Belief in Benefits of Early Detection *Non-reliance on TB Symptoms *Combination of Susceptibility, Benefits, and Non-Reliance on Symptoms *Cues--Knowing People Who had X-rays *Fear acted as barrier		Retrospective, Survey Study
Kaback, Becker, and Ruth; 1974	Screening for Tay Sachs Disease Carriers	Participation Related to: Perceived Susceptibility Fewer pregnancies and Living Children Increased Education Higher Social Position Younger Aged Couples Non-Participation was Related to Higher Perceived Seriousness (See comments) (All findings significant at the .05 level)	Religiosity Perceived Health Status Last Visit to a Physician Frequency of Thinking about own Health (salience) Number of Medications Using	Retrospective, Survey Study It was hypothesized that high perceived seriousness led to denial of susceptibility and failure to be screened.

*=Statistical Significance Not Stated

Investigators/Date	Recommended Health Behavior	Significant Variables	Non-Significant Variables	Comments
Kegeles; 1963a	Preventive Dental Visits	Visits Related to: Perceived Susceptibility Perceived Seriousness Belief in Benefits Belief in Natural Causation Aesthetic Concern for Child's Teeth High School Education Increased Income Higher Occupational Levels Anxiety and Fear of Pain acted as Barriers to Preventive Visits	Aesthetic Concern For Own Teeth Negative Appraisal of Dentists	Likelihood of a Preventive Visit Increased with the Number of Health Belief Variables Present Likelihood of a Preventive Visit Decreased with the Number of Perceived Barriers Present. Retrospective, Survey Study
Kegeles; 1963b	Preventive Dental Visits	Perceived Susceptibility Perceived Susceptibility + Belief in Benefits Belief in Natural Causation Aesthetic Concern for Child's Teeth High School Education High Occupational Level Perceived Susceptibility + High Income Level Past Dental Behavior Anxiety and Fear of Pain were Barriers	Perceived Seriousness (See Comments) Perceived Benefits Aesthetic Concern For Own Teeth Appraisal of Dentists Income Level	Prospective, Survey Study (Follow-up of 1963a Study) Perceived seriousness may not be relevant, since dental disease is viewed as a relatively mild health problem.

Investigators/Date	Recommended Health Behavior	Significant Variables	Non-Significant Variables	Comments
Kegeles; Kirscht; Haefner; and Rosenstock; 1965	Pap Test for Cancer Detection	*Education, Income, Occupation *Age, Race, Marital Status *Belief in Benefits of Early Cancer Detection		In all demographic categories, women believing in the benefits of cancer detection were more likely to have had a Pap test.
Kegeles; 1969	Pap Test for Cancer Detection	Perceived Susceptibility Perceived Susceptibility + Belief in Benefits	Perceived Susceptibility and Belief in Benefits Prior to Education regarding Pap Tests	Differences in the perception of susceptibility and benefits were significant only after women received information about cancer and Pap tests
Merrill; 1958 Hollister, Gibbons Haynes, & Leslau.	Polio Vaccination	Vaccine Use Related to: *Education, Income, Socio-economic status *Vaccine use by friends *Previous immunizations Barriers to Vaccine Use *Fear about its safety and effectiveness *Lack of Perceived Susceptibility and Cues		Retrospective, Survey Study
Radelfinger; 1965	Tetanus Immunizations	None	Perceived Susceptibility, Seriousness, Benefits, and Barriers	Prospective, Survey Study Lack of Subjects taking action led author to question findings.

*=Statistical Significance Not Stated

Investigators/Date	Recommended Health Behavior	Significant Variables	Non-Significant Variables	Comments
Rosenstock, Hochbaum, Leventhal; 1960	Asian Influenza Vaccination	Perceived Susceptibility + Perceived Seriousness	Belief in Benefits	Prospective, Survey Study
Suchman; 1967	Safety Glove to Prevent Accidents	Use Related To: Perceived Susceptibility Perceived Seriousness Younger Age Knowledge of Preventive Measures (Benefits) Health Knowledge *Marital Status *Income Cues Non-Use Related To: Fatalistic Attitude Barriers--Negative Evaluation of Glove in Terms of Comfort and Effects on Work	Education Number of Previous Accidents	Retrospective, Survey Study Numerous other Significant factors Identified Rewards must outweigh punishments if glove is to be used.
Tash, O'Shea, and Cohen; 1969	Preventive Dental Visits	Visits Related To: Perceived Seriousness Dental Knowledge Higher Income and Education Levels Sex (Female), Race (White), Age (Younger) Finances and Fear of Pain act as Barriers	Perceived Susceptibilty (See Comments) Belief in Benefits	Retrospective, Survey Study Perceived susceptibility low in persons making preventive visits due to their belief in the benefits of these visits.

*=Statistical Significance Not Stated

APPENDIX C

Sources of Cardiovascular Disease Health
Belief Questionnaire Items

SOURCES OF CARDIOVASCULAR DISEASE HEALTH BELIEF QUESTIONNAIRE ITEMS

Item	Variable Measured	Source(s)
1. I'm not as likely to get heart disease as most people.	Perceived Susceptibility	Kirscht, Haefner, Kegeles, and Rosenstock (1966); Jenkins (1966)
2. The foods I eat now increase my chances of getting heart disease.	Perceived Susceptibility	Author's Pre-Test
3. There's a good possibility that I have high blood pressure.	Perceived Susceptibility	Kaback, Becker, and Ruth (1974); Mackie (1973); Borsky and Sagen (1959); Kegeles (1969); Kegeles (1963a,b); Suchman (1967); Gordis et al (1969); Jenkins (1966); Heinzelmann (1962); Kirscht, Haefner, Kegeles, Rosenstock (1966); Hochbaum (1956); Radelfinger (1965); Rosenstock et al. (1960)
4. The chances that I will ever get heart disease are very small	Perceived Susceptibility	See References for Item Number 3
5. Heart disease tends to "run" in my family.	Perceived Susceptibility	Heinzelmann (1962)
6. High blood pressure would be a serious problem for me.	Perceived Seriousness	Gordis et al. (1969); Heinzelmann (1962); Kaback, Becker, Ruth (1974); Rosenstock et al. (1960); Radelfinger (1965); Kegeles (1963a,b); Kirscht, Haefner, Kegeles, and Rosenstock (1966)
7. Heart disease is an extremely painful disease.	Perceived Seriousness	Jenkins (1966); Mackie (1973); Robbins (1962)
8. Getting heart disease would lead to major financial problems for me.	Perceived Seriousness	Robbins (1962); Mackie (1973)
9. Heart disease usually leads to early death (before age 65).	Perceived Seriousness	Robbins (1962); Jenkins (1966); Mackie (1973)
10. If I had heart disease, I would have a good chance of recovering completely.	Perceived Seriousness	Robbins (1962); Jenkins (1966); Mackie (1973)

Item	Variable Measured	Source(s)
11. If I had high blood pressure, I'd know it without getting a blood pressure check-up.	Perceived Benefits	Hochbaum (1958); Kegeles et al. (1965); Kegeles (1969)
12. High blood pressure can be controlled once it is discovered.	Perceived Benefits	Mackie (1973)
13. What I do will probably have little effect on whether or not I get heart disease.	Perceived Benefits	Suchman (1967); Mackie (1973); Mackie (1975); Jenkins (1966); Borsky and Sagen (1959); Kegeles (1963a,b); Gordis, Markowitz, and Lilienfeld (1969)
14. Changing my eating habits would reduce my chances of getting heart disease.	Perceived Benefits	Kegeles (1963a,b); Suchman (1967); Antonovsky & Kats (1970); Radelfinger (1965); Rosenstock et al. (1960); Glasser (1958); Gordis, Markowitz, Lilienfeld (1969)
15. Ways of preventing heart disease usually don't work very well.	Perceived Benefits	Jenkins (1966); Mackie (1973); Kegeles et al. (1965); Borsky and Sagen (1959); Becker, Drachman, and Kirscht (1974); Haefner and Kirscht (1970)
16. My doctor gives me advice about how to prevent heart disease and high blood pressure.	Perceived Cues	Glasser (1958)
17. My family and friends give me advice about preventing heart disease and high blood pressure.	Perceived Cues	Suchman (1967); Kaback, Becker, and Ruth (1974)
18. I often hear about heart disease or high blood pressure on the radio or TV.	Perceived Cues	Suchman (1967); Kaback, Becker, and Ruth (1974)
19. I've done a lot of reading about heart disease and/or high blood pressure.	Perceived Cues	Suchman (1967); Kaback, Becker, and Ruth 1974)
20. Many of my friends have heart disease or high blood pressure	Perceived Cues	Gordis, Markowitz, and Lilienfeld (1969); Mackie (1973)

Item	Variable Measured	Source(s)
21. I sometimes have symptoms which I think might mean high blood pressure.	Perceived Cues	Hochbaum (1956, 1958); Fink, Shapiro, and Lewison (1968)
22. I sometimes have symptoms which I think might mean heart disease.	Perceived Cues	See References for Item Number 21
23. I would give a month's pay to keep from getting heart disease.	Motivation	Jenkins (1966)
24. One of my major goals in life is to be in good health.	Motivation	Antonovsky & Kats (1970); Fink, Shapiro, and Lewison (1968); Mackie (1975); Heinzelmann & Bagley (1970)
25-30. Belief in the effectiveness of preventive measures against heart disease (exercise, avoiding stress, not smoking, avoiding high cholesterol foods, treating high blood pressure, avoiding obesity).	Perceived Benefits	Author's Pre-Test
31. If I changed my eating habits to prevent heart disease, I would have to give up my favorite foods.	Perceived Barriers	Author's Pre-Test
32-37. Perception of barriers to attending a heart disease prevention meeting (inconvenience, transportation, time, interference with relaxation, money, fear).	Perceived Barriers	Author
38. If I had heart disease, I would have to change my life-style: ALMOST COMPLETELY QUITE A LOT SOMEWHAT ONLY A LITTLE NOT AT ALL	Perceived Seriousness	Mackie (1973); Heinzelmann (1962); Robbins (1962)

APPENDIX D

Cardiovascular Disease Health
Belief Questionnaire

HEALTH BELIEF QUESTIONNAIRE

SEX: MALE_____ FEMALE_____

DATE OF BIRTH: _____

Please circle the number of the last year of education you completed on the following line:

Elementary High School College

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

What is your major occupation? _____

If you are married, what is the occupation of your spouse? _____

_____

If you are a student, what are the occupations of your parents?

MOTHER'S OCCUPATION: _____

FATHER'S OCCUPATION: _____

MARITAL STATUS:

SINGLE_____

MARRIED_____

DIVORCED_____

SEPARATED_____

WIDOWED_____

How many children do you have? (Please circle)

0 1 2 3 4 5 6 7 8 9 10 11 12

Who are the members of your household? (Please check those which apply to you)

SELF_____ MOTHER_____

SPOUSE_____ FATHER_____

CHILDREN_____ OTHERS (Please specify _____

If you do not mind, would you check the group in which your total income fell in 1976. If you are married, check the group in which the combined income of both husband and wife fell in 1976.

Under $2,000_____
$2,000-3,999_____
$4,000,5,999_____
$6,000-7,999_____
$8,000-9,999_____
$10,000-11,999_____
$12,000-13,999_____
$14,000-15,999_____
$16,000-17,999_____
$18,000-19,999_____
$20,000-21,999_____
$22,000-23,999_____
$24,000-25,999_____
$26,000-or more_____

RELIGIOUS PREFERENCE: RLDS_____ OTHER (Specify)_____

Please check the one choice below which, in your opinion, best describes your present state of health.

POOR_____

BELOW AVERAGE_____

AVERAGE_____

ABOVE AVERAGE_____

EXCELLENT_____

Has a doctor ever told you that you have heart disease?

YES_____

NO_____

If you answered YES to the previous question, how would you rate the seriousness of the heart disease you have or have had?

NOT SERIOUS AT ALL_____

MILDLY SERIOUS_____

MODERATELY SERIOUS_____

EXTREMELY SERIOUS_____

Has a doctor ever told you that you have high blood pressure?

YES_____

NO_____

If you answered YES to the previous question, how would you rate the seriousness of the high blood pressure you have had in the past?

NOT SERIOUS AT ALL_____

MILDLY SERIOUS_____

MODERATELY SERIOUS_____

EXTREMELY SERIOUS_____

Are you presently under treatment for heart disease or high blood pressure?

YES_____

NO_____

The remainder of the questions concern you beliefs and opinions about heart disease and high blood pressure. This is not a test of your knowledge of the facts about heart disease and high blood pressure, but rather what you believe to be true. Please read the instructions on the next page before continuing on to the rest of the questions.

INSTRUCTIONS: Below you will find a number of statements about heart disease and high blood pressure. We want to know how much you agree or disagree with each of the statements. Please indicate your responses by using the rating scale provided to the right of the statements. Circle the letter(s) which abbreviate your choice. Leave none of the statements blank and circle only one choice for each.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I'm not as likely to get heart disease as most people.	5 SD	4 D	3 N	2 A	1 SA
2. The foods I eat now increase my chances of getting heart disease.	1 SD	2 D	3 N	4 A	5 SA
3. There's a good possibility that I have high blood pressure.	1 SD	2 D	3 N	4 A	5 SA
4. The chances that I will ever get heart disease are very small.	5 SD	4 D	3 N	2 A	1 SA
5. Heart disease tends to "run" in my family.	1 SD	2 D	3 N	4 A	5 SA
6. High blood pressure would be a serious problem for me.	1 SD	2 D	3 N	4 A	5 SA
7. Heart disease is an extremely painful disease.	1 SD	2 D	3 N	4 A	5 SA
8. Getting heart disease would lead to major financial problems for me.	1 SD	2 D	3 N	4 A	5 SA
9. Heart disease usually leads to early death (before age 65).	1 SD	2 D	3 N	4 A	5 SA
10. If I had heart disease, I would have a good chance of recovering completely.	5 SD	4 D	3 N	2 A	1 SA
11. If I had high blood pressure, I'd know it without getting a blood pressure check-up.	5 SD	4 D	3 N	2 A	1 SA
12. High blood pressure can be controlled once it is discovered.	1 SD	2 D	3 N	4 A	5 SA

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	5	4	3	2	1
13. What I do will probably have little effect on whether or not I get heart disease.	SD	D	N	A	SA
	1	2	3	4	5
14. Changing my eating habits would reduce my chances of getting heart disease.	SD	D	N	A	SA
	5	4	3	2	1
15. Ways of preventing heart disease usually don't work very well.	SD	D	N	A	SA
	1	2	3	4	5
16. My doctor gives me advice about how to prevent heart disease and high blood pressure.	SD	D	N	A	SA
	1	2	3	4	5
17. My family and friends give me advice about preventing heart disease and high blood pressure.	SD	D	N	A	SA
	1	2	3	4	5
18. I often hear about heart disease or high blood pressure on the radio or TV.	SD	D	N	A	SA
	1	2	3	4	5
19. I've done a lot of reading about heart disease and/or high blood pressure.	SD	D	N	A	SA
	1	2	3	4	5
20. Many of my friends have heart disease or high blood pressure.	SD	D	N	A	SA
	1	2	3	4	5
21. I sometimes have symptoms which I think might mean high blood pressure.	SD	D	N	A	SA
	1	2	3	4	5
22. I sometimes have symptoms which I think might mean heart disease.	SD	D	N	A	SA
	1	2	3	4	5
23. I would give a month's pay to keep from getting heart disease.	SD	D	N	A	SA
	1	2	3	4	5
24. One of my major goals in life is to be in good health.	SD	D	N	A	SA

Below is a list of commonly suggested methods of preventing heart disease. Indicate how much you agree or disagree that each method helps to prevent heart disease.

	1	2	3	4	5
25. Regular exercise (jogging, biking, etc.)	SD	D	N	A	SA
	1	2	3	4	5
26. Avoiding tension and stress.	SD	D	N	A	SA
	1	2	3	4	5
27. Not smoking cigarettes.	SD	D	N	A	SA

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
28. Avoiding foods high in cholesterol and fat.	SD	D	N	A	SA
	1	2	3	4	5
29. Discovering and treating high blood pressure.	SD	D	N	A	SA
	1	2	3	4	5
30. Avoiding being overweight.	SD	D	N	A	SA
	1	2	3	4	5
31. If I changed my eating habits to prevent heart disease, I would have to give up my favorite foods.	SD	D	N	A	SA

Suppose a free meeting offering a blood pressure check-up and information about preventing heart disease was available to you at the RLDS Metropole Center. Please indicate how much you agree or disagree that each of the following statements would be true for you in deciding whether or not to attend such a meeting.

	1	2	3	4	5
32. It would be inconvenient for me to get to such a meeting.	SD	D	N	A	SA
	1	2	3	4	5
33. Transportation would be a problem for me in getting to this meeting.	SD	D	N	A	SA
	1	2	3	4	5
34. I don't have enough time to go to such a meeting.	SD	D	N	A	SA
	1	2	3	4	5
35. I wouldn't want to give up free time for recreation and things I enjoy in order to attend this kind of meeting.	SD	D	N	A	SA
	1	2	3	4	5
36. Even if this were a free meeting, money problems would make it difficult for me to attend.	SD	D	N	A	SA
	1	2	3	4	5
37. If I had heart disease or high blood pressure, I'd rather not know about it.	SD	D	N	A	SA

For the following statement, check the one choice which best represents your feelings.

38. If I had heart disease, I would have to change my life-style:

5 ALMOST COMPLETELY_____

4 QUITE A LOT_____

3 SOMEWHAT_____

2 ONLY A LITTLE_____

1 NOT AT ALL_____

APPENDIX E

Follow-Up Questions for Healthy Heart Fair Participants

QUESTIONNAIRE

1. How did you find out about the Healthy Heart Fair?

   Please read the following list and check the items which apply to you:

   A. Saw a poster.

   B. Read an announcement in the church bulletin or newsletter.

   C. Read a "flyer" about it.

   D. Heard an announcement in church.

   E. A friend told me about it.

2. Why did you decide to come to the Healthy Heart Fair?

Please read the list below and place a check in the "YES" column beside those items which influenced you to come to the fair. Place a check in the "NO" column beside those items which did not influence your decision to come.

	YES	NO
A. My family wanted me to come		
B. Came because my friends were coming		
C. Some of my friends have heart disease or high blood pressure and I may get these problems too		
D. I already have heart disease		
E. I already have high blood pressure		
F. Sometimes I have symptoms of heart disease		
G. Sometimes I have symptoms of high blood pressure		
H. I want to learn how proper nutrition can help prevent heart disease		
I. I want to learn about ways of preventing heart disease other than diet:		
1. In myself		
2. In my husband or wife		
3. In my children		
4. In other family members		
5. In other persons (non-family)		
K. Other reasons for attending the Fair		

Please state other reasons briefly below:

If you do not mind, please sign your name on the following line:

Name _____

APPENDIX F

Follow-Up Questions for Healthy Heart
Fair Non-Participants

NAME: _____

1. Were you aware of the Healthy Heart Fair which took place at the Center on Saturday, November 12th?

   YES_____ NO_____

2. I will read some possible reasons for your decision not to attend the fair. As I read each one, please tell me if this was one of your reasons for not attending. A "Yes" or "No" answer is fine.

	YES	NO
A. Some people did not have transportation. Was this a problem for you?		
B. Were you working at the time of the fair?		
C. Were you ill during the fair?		
D. Did you have problems getting a babysitter?		
E. Sometimes money can be a problem even if the activity is free. Was this true for you?		
F. Had you planned to come but just forgot it?		
G. Were you out of town during the fair?		
H. Some people may have felt it was too much to come after attending the special services on worship all week. Was this true for you?		
I. Did you have other things planned that kept you from coming?		
J. Sometimes people feel an activity like the fair would interfere with their time to relax and enjoy themselves. Was this how you felt?		
K. There are some people who find an activity like the Heart Fair to be very uninteresting or boring. Was this true for you?		
L. Or there are many people who already feel that they have enough information about heart disease and high blood pressure. Was this how you felt?		
M. Some people are already receiving treatment for heart or blood pressure problems. Was this your reason for not coming to the fair?		
N. Many people believe that there is not really anything that can be done to prevent heart disease or high blood pressure Was this why you chose not to come?		

O. And some people don't really feel that worried about getting heart disease or high blood pressure. Was this one of your reasons for not coming?

P. Some people would rather not think about illnesses like heart disease or high blood pressure. Was this one reason for your decision not to come?

Q. Are there any other reasons you might have for not coming to the fair?

If there are other reasons, please tell me about them.

_____

_____

CONSENT FOR HUMAN RESEARCH PROJECT

I, _____
(First Name) (Middle Initial) (Last Name)

herewith agree to serve as a subject in the investigation named, Usefulness of the Health Belief Model in Predicting Preventive Health Behavior, conducted by Carolyn Petrie under the supervision of Julia Brown, PH.D. The investigation is aimed at discovering the beliefs and opinions people have about heart disease and high blood pressure.

The procedure to which I will be subjected is to fill out a questionnaire requiring 15 to 30 minutes of my time. While I may not benefit directly from this study, the results may be of help in the development of programs to prevent heart disease and high blood pressure. The only risk involved for me is the inconvenience of taking my time to fill out the questionnaire.

The information obtained will be kept confidential. My name will not appear on the records and anonymity will be insured by the use of code numbers. Results from the study will be reported only in terms of statistics. However, it will be known that respondents are members of the Reorganized Church of Jesus Christ of Latter-Day Saints.

Carolyn Petrie has offered to answer any questions that I might have about my participation in this study. I understand I am free to refuse to participate or to withdraw from participation in the study at any time.

I have read the preceding explanation and agree to participate as a subject in the study described.

_____ _____
(Date) (Subject's Signature)

_____ _____
(I.D. Number) (Witness' Signature)

AN ABSTRACT OF THE THESIS OF

CAROLYN K. PETRIE

For the: MASTER OF NURSING

Date of receiving this degree:

Title: USEFULNESS OF THE HEALTH BELIEF MODEL IN PREDICTING PREVENTIVE HEALTH BEHAVIOR

Approved: _____
Julia Brown, PhD Adviser

The purpose of this prospective study was to determine if belief in one or more variables of the Health Belief Model (i.e., perceived susceptibility, seriousness, benefits, barriers, and cues) would predict preventive action against heart disease.

Beliefs about heart disease and high blood pressure were measured in 112 persons at The Reorganized Church of Jesus Christ of Latter-Day Saints. Perceptions were measured by a Cardiovascular Disease Health Belief questionnaire constructed by the investigator. Subsequently, a Healthy Heart Fair designed to be a cardiovascular disease prevention activity was made available to subjects at the RLDS church. Attendance or non-attendance at the fair was used as the observable measure of preventive health action.

Results of the study showed that the only model component significantly related to Healthy Heart Fair attendance was "perceived barriers" which explained 4% of the total variance. The combined variables of the Health Belief Model accounted for 8% of the variance in fair attendance. With the addition of modifying variables (age, sex, occupation, marital status, education, number of dependents, motivation,

and health status), the multiple R was 0.32 indicating that 10% of the variance in health action was explained by the expanded version of the Health Belief Model, and 90% of the variance was not accounted for by the model. These findings indicate that knowledge of the beliefs postulated by the Health Belief Model was not very useful in predicting preventive action against heart disease.