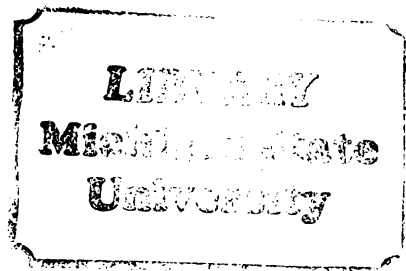


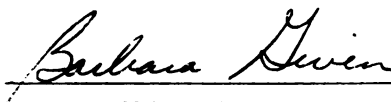
THESIS



This is to certify that the
thesis entitled
THE RELATIONSHIP BETWEEN PERCEIVED BARRIERS
TO TREATMENT AND COMPLIANCE WITH THE
HYPERTENSIVE THERAPEUTIC REGIMEN

presented by
Elaine Carol Harmon, R.N.

has been accepted towards fulfillment
of the requirements for
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THE RELATIONSHIP BETWEEN PERCEIVED BARRIERS
TO TREATMENT AND COMPLIANCE WITH THE
HYPERTENSIVE THERAPEUTIC REGIMEN

By

Elaine Carol Harmon

A THESIS

Submitted to
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ABSTRACT

THE RELATIONSHIP BETWEEN PERCEIVED BARRIERS TO TREATMENT AND COMPLIANCE WITH THE HYPERTENSIVE THERAPEUTIC REGIMEN

By

Elaine Carol Harmon

A descriptive study of 158 hypertensives in primary care was undertaken to determine the relationship between perceived treatment barriers and stated compliance with therapy. Interviews, self-administered questionnaires, and medical record audits of the sample provided data for a larger experimental project. Analysis of data utilizing descriptive statistics, product moment correlations, and multiple regression revealed significant ($p < .05$) relationships for: medication barriers to medication compliance; dietary barriers to medication, dietary, and exercise compliance; perceived efficacy to medication and dietary compliance; total perceived barriers to total stated compliance; and the combined independent variables, perceived severity and barriers, to total compliance. Two-thirds of the sample were obese, and had more dietary barriers, more doubt of efficacy, and less dietary compliance. These findings could provide a basis for nursing intervention to promote a mutual and effective plan of care for clients with hypertension.

Dedication:
to Phyllis

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CHAPTER I

THE PROBLEM

Introduction

Hypertension is a major contributor to heart disease, stroke, and renal failure, a fact clearly established by health care researchers (Working Group, 1979). Morbidity and mortality rates from these serious illnesses may be reduced if blood pressure is brought toward normal, by compliance with the therapeutic regimen.

The purpose of this study is to determine if certain variables significantly influence the hypertensive client's compliance with therapy. In particular, a component of the health belief model will be examined: perceived barriers to treatment, as they relate to compliance with the hypertension regimen.

The data utilized in study were collected as part of a federally funded research project, Patient Contributions to Care: Link to Process and Outcome (5ROINU00662, 1982), B. Given and C. W. Given, co-principal investigators. Portions of this thesis were written in collaboration with Brooks (1983).

Background

Hypertension is a chronic condition with potential attending morbidity and mortality from heart disease, stroke, and kidney

failure. Cardiovascular disease is the number one cause of death in the United States, accounting for 50% of all deaths (National Heart, Lung, and Blood Institute Fact Book for Fiscal Year 1980). High blood pressure has been confirmed as the dominant contributor to cardiovascular disease by the Framingham study (Kannel, 1978). The risk of cardiovascular events has been noted to occur in direct proportion to degrees of blood pressure elevation. Kannel (1978) reports that adequate and continuous control of hypertension significantly protects a person against heart disease and stroke.

Dimensions of this major health concern are estimated by the National Heart, Lung, and Blood Institute (High Blood Pressure Control, 1982). Sixty million Americans, over one-fourth of the United States' population, have high blood pressure. Of the 60 million, 35 million have readings over 160/95mm Hg, and 25 million have a pressure between 140/90 to 160/95mm Hg. The Institute concurs with Framingham findings: (1) hypertension is the most important contributor to stroke, the third leading cause of death in the United States, (2) hypertension is a major accelerating factor in atherosclerosis, a disease responsible for 1.25 million heart attacks per year, (3) the incidence of renal failure is directly related to blood pressure elevation. The cost of hypertension is approximately eight billion a year in health care, lost wages, and lost productivity, not taking into account the toll of suffering (Levy, 1982).

The National Heart, Lung, and Blood Institute also reports: of the 35 million with pressures above 160/95, two-thirds know it,

and 80% of the aware two-thirds have their blood pressure checked regularly. However the majority are not under control. Only 24% of the 35 million have their blood pressure in control, 24% are aware but not on treatment, 20% are on inadequate treatment, and the remaining 32% are not aware of their hypertensive condition (High Blood Pressure Control, 1982).

The Michigan Department of Public Health (1981) estimates there are 1.8 million adult hypertensives in Michigan which represents 28% of the adult population. Only 46% of the Michigan hypertensives are aware of their condition, and of these, half have uncontrolled hypertension. Therefore an estimated 23% of total hypertensives have their condition in control.

Hypertension Defined

The following definition of essential hypertension was adopted by the World Health Organization in 1963: "The term hypertensive disease is synonymous with essential hypertension and should properly be restricted to designate the as yet unidentified physiological disturbance (or disturbances) characteristic of this disease and which leads ultimately to elevation of diastolic and systolic blood pressures, anatomical changes in the vascular tree, and functional impairment of the involved tissues. Hypertensive disease is considered to be a clinical entity in which an unknown pressor mechanism initiates arteriolar vasoconstriction, elevated blood pressure and vascular sequelae. Hypertension, as such, like arteriolar changes, is conceived to be a sequela appearing during the progressive development of the disease" (Kaplan & Lieberman,

p.44). The World Health Organization criterion for hypertension is a blood pressure over 160/95mm Hg (Levy, 1982).

The definition by the World Health Organization is controversial, as others believe hypertension is not a specific disease with an arbitrary dividing line separating it from the normal (Kaplan & Lieberman, 1978). The 1980 Report of the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure stratified hypertension by diastolic pressure: 90-104mm Hg = mild, 105-114mm Hg = moderate, >115mm Hg = severe. "Mild" hypertension is somewhat of a misnomer because even with low levels of hypertension there is a relationship to cardiovascular disease (Borhani, 1981). Therefore treatment of mild hypertension is efficacious in reducing mortality and morbidity. The greatest number of hypertensives have a diastolic 90-100mm Hg. Epidemiologically speaking, successful treatment of this group has the potential to reduce or eliminate 42% of deaths associated with hypertension (Borhani, 1981).

In this study, hypertension not under control is operationalized as a systolic pressure above 140mm Hg and/or a diastolic pressure above 95mm Hg on two occasions at least two months apart, a definition considered the standard of practice (Chobanian, 1982; Given & Given, 1982, p.61).

Coordination of Efforts to Control Hypertension

In 1972 the National High Blood Pressure Education Program coordinated by the National Heart, Lung and Blood Institute, sponsored efforts to (1) educate health professionals and the public on hypertension, and (2) mobilize resources to

detect, evaluate, and control hypertension (Guidelines for Educating Nurses in High Blood Pressure Control, 1981).

Cunningham and Hill (1982) report the rate of decline of hypertension coincides with the activities of the National High Blood Pressure Education Program founded in 1972. Activities included establishment of task forces representing various professional groups. In 1975 the National High Blood Pressure Education Program, in cooperation with the American Nurses' Association and the National League of Nurses, sponsored a Task Force on the Role of the Nurse in High Blood Pressure Control. The Task Force goal was to review the role of nursing and delineate education necessary to fulfill that role (Grim & Grim, 1981).

As the largest health professional group in the United States, nurses are an invaluable resource in delivering health care services to those with hypertension. Nurses provide the major portion of direct patient care in a wide variety of settings. Therefore nurses have frequent opportunities for detection, follow up, and education concerning high blood pressure. With specialized education nurses can assume major responsibility in the primary care of those with hypertension. Nurses are well qualified to monitor chronic illnesses, to evaluate prescribed therapy, and to provide psychological support and health education. The major challenge is accomplishing long-term control which hinges on compliance with a carefully tailored treatment program (Grim & Grim, 1981; Guidelines for Educating Nurses in High Blood Pressure Control,

1981).

Specific Task Force recommendations for nurses were developed: (1) understanding by the patient and family of hypertension and prescribed treatment, (2) successful adjustment of patient and family to diagnosis and therapy, (3) assumption of responsibility for care by the patient within psychological and physical limits, (4) achievement of stable blood pressure in accordance with the medical goal, (5) limitations of side effects of medications, and (6) limitation of target organ damage. The Task Force designed certain objectives to support and accomplish their recommendations. Greater emphasis on hypertension in nursing curricula and continuing education programs is a specific Task Force objective. Another objective promotes the preparation of more nurses to provide primary care for hypertensive clients. A third objective is research by nurses relative to the care of hypertension (Grim & Grim, 1981).

The Compliance Issue in Control of Hypertension

Comprehensive objectives have been developed to promote accomplishment of the National High Blood Pressure Education Program goals concerning hypertension. A primary objective is the detection of high blood pressure in those presently unaware of their condition. A second objective is to achieve adequate blood pressure control for those individuals aware of their diagnosis. Statistics reveal that adequate control of hypertension has not been achieved for many persons with high blood pressure although highly effective and relatively safe therapy

has been developed (Chobanian, 1982).

Noncompliance with antihypertensive therapy is considered to be the most common problem in failure to control hypertension (Baile & Gross, 1979). Webb (1980) stated poor compliance presents a particularly difficult challenge in treating hypertension since only about 50% of hypertensive clients comply with their prescribed treatment. Noncompliant clients with uncontrolled hypertension pose a momentous health threat due to the probable vascular consequences. Compliance with long-term treatment is essential to reduce risk of heart disease, stroke, and renal failure (Levy, 1982). Thus the compliance issue has been found to be of considerable importance in the control of hypertension.

Compliance with therapy is defined as the extent to which clients follow recommendations of health providers. Compliance behavior, as such, is a human response to illness and treatment. Professional nurses, by definition, provide diagnosis and treatment of human responses to health problems (American Nurses' Association, 1980). Therefore client compliance is a relevant phenomenon for nursing research, and according to the National High Blood Pressure Education Program Task Force, hypertension represents a pertinent issue for studying methods to improve client compliance.

Past researchers have studied a multitude of factors for their possible relationship to compliance behavior. Examples of factors studied are: disease characteristics, referral process, clinic setting, client-provider interactions, and

features of the therapeutic regimen (Haynes, 1979; Hulka, 1979).

Becker et al, (1979) specifically looked at the correlations between client perceptions and compliance behavior. Client perception factors include perceptions of illness threat, such as susceptibility to the illness and seriousness of the illness, and perceptions of treatment benefits and/or barriers. This set of factors about client perceptions has been placed in a theoretical formulation called the health belief model (Rosenstock, 1974; Becker et al., 1979). The health belief model has been used as a basis for considerable study of client compliance with the therapeutic regimen (Andreoli, 1981; Greene et al., 1982; Loustau, 1979; Stunkard, 1981; Watts, 1982).

The health belief model was developed to describe how a set of beliefs an individual has about an illness and its treatment influences the person's decision to undertake health-related action. Therefore the model potentially has value in predicting client compliance. According to the health belief model, an individual's readiness to take action with regard to a given health condition is based upon: (1) his/her perceived susceptibility to the illness and the probable severity of the consequences of that illness (the symptoms, disability, and sequelae); (2) the perceived benefits of taking action as compared to the perceived barriers to taking action (the financial and psychosocial costs of recommended action); and (3) the cues to action which trigger the behavior (Becker, 1974;

Rosenstock, 1974).

One component of the complex health belief model, perceived barriers to treatment, has been selected for study. The interrelationship of perceived severity and perceived barriers also will be analyzed for its effect on compliance behavior. Although components of the model are hypothesized to be interrelated, it is beyond the scope of this research to examine all possible relationships.

Research Question

The specific research question of this study is: How do clients' perceptions of barriers to treatment relate to their stated compliance with the hypertensive therapeutic regimen?

This problem warrants further study, as it is important for health providers to understand health-related behavior. Understanding of such behavior is essential to obtain the cooperation and participation of clients for the purpose of their implementation of the therapeutic regimen.

The health belief model describes an approach to the understanding of health-related behavior at the level of individual decision making. The approach implies that attempts to influence the behavior of clients must be based on knowledge of client health beliefs and perceptions. For optimal health outcomes, the problems related to compliance behavior must be appropriately overcome.

Definition of Concepts

The definitions of concepts were written in collaboration with Brooks (1983). The study variables are (1) perceived

barriers to treatment, (2) stated compliance with the therapeutic regimen, and will include (3) perceived illness severity as an independent variable combined with perceived barriers.

Perception refers to the individual's view of reality: the awareness of persons, objects, and events (King, 1981, p.20). Although people share common experiences, individuals differ in what they select for their perceptual milieu. Sensory and intellectual processes vary among persons. The input which is sensed and assimilated is related to past experience, to the concept of self, and biological heritage. As processes and contexts vary, so do perceptions of common experiences.

Nursing theorist King (1981, p.24) defined perception; "Perception is a process of organizing, interpreting, and transforming information from sense data and memory. It is a process of human transactions with environment. It gives meaning to one's experience, represents one's image of reality, and influences one's behavior," Learned behavior is conditioned by how a person views a particular activity and how it will or will not produce an outcome (Bandura, 1977, pp. 9-10).

For this study, client perception of barriers to treatment is defined as the expressed beliefs and attitudes of the client concerning the barriers to undertaking aspects of the therapeutic regimen (Given & Given, 1982, p.27; Yoos, 1981). The following dimensions of barriers to implementation of therapy are addressed: (1) beliefs about difficulties with medications,

(2) beliefs about difficulties with changes required for diet,
 (3) Disbelief or doubt concerning efficacy of therapy, and
 (4) beliefs about effects of job on therapy. Perceptions about treatment were selected for study to address the need for new patterns of behavior required for treatment, and to address beliefs in efficacy of treatment.

Beliefs about difficulties with medications refer to the confusion of taking a number of medications, the habit changes required, the concern over medication dependence, the disruption of daily activities to take medications, and the necessity of continued medication.

Specific beliefs about difficulties with changes required for diet include interference with normal activities and personal life, feelings of hunger, dislike of the taste of allowed foods, the time required to follow a diet, and the need for family support.

Disbelief or doubt concerning efficacy of therapy includes belief that treatment is inappropriate or not worth it, confusion by advice from a number of health providers, disbelief in the doctor, and the belief that any treatment would be of little benefit.

Client beliefs about effects of job on therapy include job interference with taking medications, job interference with following a diet, job interference with losing weight, and difficulty following prescribed work habits.

Recommended treatment of hypertension, while safe, has the disadvantage of attendant life style changes (Haynes, 1980). Baile and Gross (1979) suggest that inquiry should be made about the meaning of hypertensive treatment to the patient, and its impact on job status and behavior change, for the purpose of identifying obstacles to therapy. Therefore this research is directed toward beliefs about the intangible

barriers to treatment: difficulties incorporating required changes into life style, and doubt or nonconviction concerning efficacy of treatment.

Client perception of severity of illness is defined as the expressed beliefs and attitudes of the client concerning the effect of the condition upon present and future health states (Given & Given, 1982, p.27). The dimensions included are (1) perceived comparative seriousness of hypertension, (2) perceived psychosocial effects of hypertension, and (3) perceived impact of hypertension on work.

Comparative seriousness is the client's perception of hypertension compared to other worries, problems, and conditions such as diabetes and pneumonia.

Perceived psychosocial effects are the social changes, and the extent of interference with social roles, which are related to having hypertension.

The perceived impact on work refers to illness/work conflicts and the difficulties hypertension may present on the job. Such difficulties may be absenteeism, irritability, job change, or the extra effort required due to the hypertensive condition.

The Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure (1980) states that clarification of clients' attitudes and perceptions about high blood pressure may be helpful for long term compliance with therapy. The hypertensive symptoms themselves often do not impose awareness and changes in life style until organ damage results (Haynes, 1980). Therefore it is important to make sure the client understands the

asymptomatic nature, impact, and consequences of having hypertension (The 1980 Report of the Joint National Committee).

Stated compliance with the therapeutic regimen is defined as the extent to which the client carries out the therapeutic recommendations of health care providers concerning prescribed medications, diet, behavior modifications and follow up care (Given & Given, 1982, p.28). In this research measures of client compliance are based on client report of compliance with medications, diet, and exercise recommendations. The statement of compliance is elicited during the research interview with questions concerning: if medication was taken, if prescribed dosage was taken, and if medication was taken at the recommended time of day. Clients responded using a five-point scale ranging from "all the time" to "none of the time". Similar questions were asked to elicit stated compliance with diet and exercise.

Hypotheses

Primary hypothesis 1. There is a relationship between client perception of barriers to treatment and stated compliance with the therapeutic regimen.

Secondary hypotheses:

- a. There is a relationship between perception of barriers concerning medications and stated compliance with a medication regimen.
- b. There is a relationship between perception of

barriers to diet and stated compliance with a diet regimen.

c. There is a relationship between perceived efficacy of therapy and stated compliance with a medication regimen.

d. There is a relationship between perceived efficacy of therapy and stated compliance with a diet regimen.

e. There is a relationship between perceived efficacy of therapy and stated compliance with an exercise regimen.

f. There is a relationship between perceived job/therapy conflicts and stated compliance with a medication regimen.

g. There is a relationship between perceived job/therapy conflicts and stated compliance with a diet regimen.

h. There is a relationship between perceived job/therapy conflicts and stated compliance with an exercise regimen.

Primary hypothesis 2. There is a relationship among client perceptions of illness severity and barriers to treatment upon stated compliance with the therapeutic regimen.

Primary hypothesis 1 and 2 are schematically represented in Figure 1.

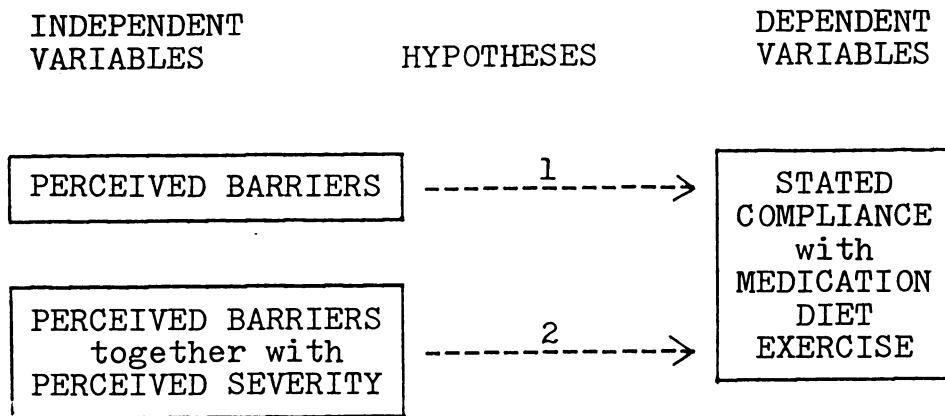


Figure 1. Primary Hypotheses

Extraneous variables examined for possible relationships to stated compliance are: age, race, sex, income, marital status, blood pressure, percentage overweight, and duration of hypertension.

Sample

The voluntary sample for study was obtained from an accessible hypertensive population under the care of resident and family physicians at four primary care sites in Michigan. The investigation was confined to sample subjects with the following defined characteristics: an established medical diagnosis of essential hypertension; 18 to 65 years of age; English literate; no evidence of stroke, end-stage renal disease, blindness, cancer, psychiatric problems, pregnancy, or lactation; and on a prescribed medication and/or dietary regimen (Given & Given, 1982, p.61). Subjects screened into the study had two elevated blood pressure readings 140/95mm Hg

or above within six months prior to the interview. The results of this study will be generalizable to a population with characteristics similar to the sample.

Assumptions

The following assumptions are made in this research:

1. Compliance with a therapeutic regimen is a health behavior that will improve present and future health states.
2. Health-related perceptions affect compliance and other health-related behavior.
3. The concepts of perceived barriers to treatment, perceived illness severity, and compliance as defined in this study are real and measurable phenomena.
4. Measurement of stated compliance is a reliable method of measuring compliance in hypertensive clients.
5. The testing instruments are sensitive to the concepts of perceived barriers to treatment, perceived illness severity and stated compliance.
6. The sample is representative of hypertensive clients receiving care in primary care sites.

This section on assumptions was prepared in collaboration with Brooks (1983).

Limitations

This research has the following limitations:

1. Subjects who agreed to participate in this study may be different from those who refuse. Therefore it is possible that research findings are not representative of all hypertensives in primary care settings.

2. The type of compliance assessed is limited to medication, diet, and exercise.

3. The one point in time at which data were collected may not be representative of the usual perceptions and behavior of this sample. Other points in time may be more typical.

4. Different, individual perceptions of the meanings of answer choices may have affected individual responses.

5. The need to express a socially desirable response may have affected the responses of participants.

6. All possible factors affecting compliance are not addressed in this study. Findings may be due, in actuality, to a interrelatedness of other factors with the ones identified. Examples of factors which are not included are: other aspects of the health belief mode, provider-patient relationships, developmental stages, and social support.

The limitations of research section was prepared in collaboration with Brooks (1983).

Overview of Chapters

Presentation of this research is organized into six chapters. In Chapter I the introduction, the background and purpose of research, the problem statements, definition of terms, the hypotheses, and the assumptions and limitations of the study were presented. In Chapter II the concepts and relevant theory are integrated into a conceptual framework upon which the study is based. A review of the literature is presented in Chapter III for the purpose of linking this study with the work and ideas of others concerned with

hypertension and compliance with treatment. Chapters II and III were written in coauthorship with Brooks (1983). Included in Chapter IV are the methods of research: design, instrumentation, procedures and human rights protection. Data and analyses are presented in Chapter V. A summary and discussion of findings, implications, and recommendations comprise Chapter VI.



CHAPTER II

CONCEPTUAL FRAMEWORK

Overview

This chapter includes a discussion of hypertension pathophysiology, the health belief model, nursing theory as delineated by King (1981), and the integration of these dimensions for nursing care of the hypertensive client. The concept of perceived barriers to treatment, perceived illness severity, and compliance behavior by the hypertensive client are to be presented within the larger context of nursing theory and the health belief model. The purpose of this study is to examine the relationships of these variables within the conceptual framework to determine which variables significantly influence the hypertensive client's compliance with the therapeutic regimen. The conceptual framework chapter was written in collaboration with Brooks (1983).

Pathophysiology of Hypertension

There are two main classifications of hypertension: primary/ essential hypertension in which the cause is unknown, and secondary hypertension in which there is a defined etiology. Ninety to ninety-five percent of hypertensives have essential hypertension (Chobanian, 1982; Kaplan &

Liebeiman, 1978; Kochar, 1981). As stated in Chapter I, hypertension is a major health problem with approximately 60 million Americans having the illness. Control of hypertension may be accomplished through following a therapeutic regimen, which is known to reduce the associated morbidity and mortality (Borhani, 1981; Kannel, 1978). This study will focus on essential hypertension which accounts for the majority of hypertensive clients seen in primary care.

There are many factors and organs responsible for normal regulation of blood pressure. Some factors that are involved are cardiac output, peripheral resistance, blood volume, and blood viscosity. Body organs that are involved in regulation are: the sympathetic nervous system, the kidneys and the adrenals (Chobanian, 1982).

Cardiac output is defined as the heart rate times the stroke volume, the amount of blood ejected by the left ventricle into the aorta per minute. The average cardiac output is approximately five liters per minute. Peripheral resistance is the vascular capacity, the muscle tone in the media of the arteriolar. Blood volume, the amount of circulating blood, can affect the blood pressure by the exertion of pressure on the vascular walls. Blood viscosity also affects blood pressure: when red blood cells are increased, there is a subsequent elevation in blood pressure. In summary, blood pressure equals cardiac output times peripheral resistance (Kochar, 1981).

The sympathetic nervous system's role in the regulation

of blood pressure is performed by increasing sympathetic activities which in response increase the secretion of catecholamines (adrenalin and noradrenalin), that cause the blood pressure to rise (Guyton, 1981). Therefore, stress and increased sympathetic activity may contribute to essential hypertension. Physiologic response to stress which is a normal body response may persist to a pathologic degree. Elevated blood noradrenalin and urine excretion of catecholamines have been found in a number of hypertensive clients (Chobanian, 1982).

The kidneys play a significant role in the regulation of blood pressure by maintaining fluid and electrolyte balance. When the blood vessel is constricted, the kidneys reabsorb filtered sodium in an attempt to expand the volume of blood. In addition, the kidneys secrete the enzyme renin, which acts upon other enzymes. Renin is increased in sodium deprivation and decreased by sodium loading. Renin is also excreted during kidney ischemia. When renin is released from the kidneys it catalyzes the conversion of angiotensinogen to angiotension I. Angiotension I is changed to angiotension II by a conversion enzyme found in the lung capillaries. Angiotension II increases blood pressure by vasoconstriction of peripheral arterioles, and stimulation of the adrenals to produce aldosterone. Sodium is reabsorbed in the kidneys' response to elevated aldosterone levels. In conjunction with sodium reabsorption there is water reabsorption, and thus, blood volume is increased causing an increase in blood

pressure (Guyton, 1981). Some investigators have found that an altered renin-angiotension-aldosterone balance may be a cause of essential hypertension (Chobanian, 1982; Kochar, 1981).

Guyton (1981) postulated that many essential hypertensives' kidneys during the early course of their illness were unable to excrete salt and water in a normal fashion. Since the kidneys were unable to excrete sufficient sodium and water this caused a new steady state with higher body fluid volume, resulting in an elevated arterial blood pressure. Thus, the renal output curve was shifted to a higher pressure level. Some possible causes for the higher pressure are thickening of the glomerular renal membrane, and increased afferent arteriolar resistance caused by vascular sclerosis. Therefore, the blood pressure is raised to maintain kidney function. Other factors thought to influence the development of hypertension are age, race, hormones, medicines, obesity, physical activity, and genetics (Chobanian, 1982; Kochar, 1981).

The mosaic theory first proposed by Page in 1949 suggests that essential hypertension will prove to be not one illness, but a combination of different conditions with a variety of origins and development. Since various theories have been offered over the years, it is concluded that no present theory is adequate to encompass all the known facts about essential hypertension (Mendlowitz, 1979).

The target organs most susceptible to the effects of hypertension are the kidneys, brain, and heart. As perfusion

diminishes, due to thickening of renal vessels, blood supply to the nephron unit decreases. The kidneys then lose their normal ability to concentrate and form urine. This may result in an increase in blood urea nitrogen and serum creatinine, and eventually chronic renal failure may develop (Marcinek, 1982).

Hypertension affects the brain by the development of arteriosclerosis and cerebral ischemia. This may result in occipital morning headaches, fatigue, forgetfulness, and irritability. Strokes in hypertensive clients are caused by atherosclerosis acceleration and multiple micro-aneurysms resulting in intracerebral hemorrhages (Marcinek, 1982).

Hypertensives tend to develop coronary artery disease at a rate of two to three times greater than normotensives. This is probably due to medial hypertrophy, vessel edema, and accelerated atherosclerosis, resulting in reduced coronary perfusion. Ultimately, the sclerotic vessels may produce angina pectoris, and if severe enough myocardial infarction may develop. Also, because of increased aortic pressure the left ventricle must pump harder. This may result in an increased strain on the left ventricle and eventually it hypertrophies, the end result being congestive heart failure (Marcinek, 1982).

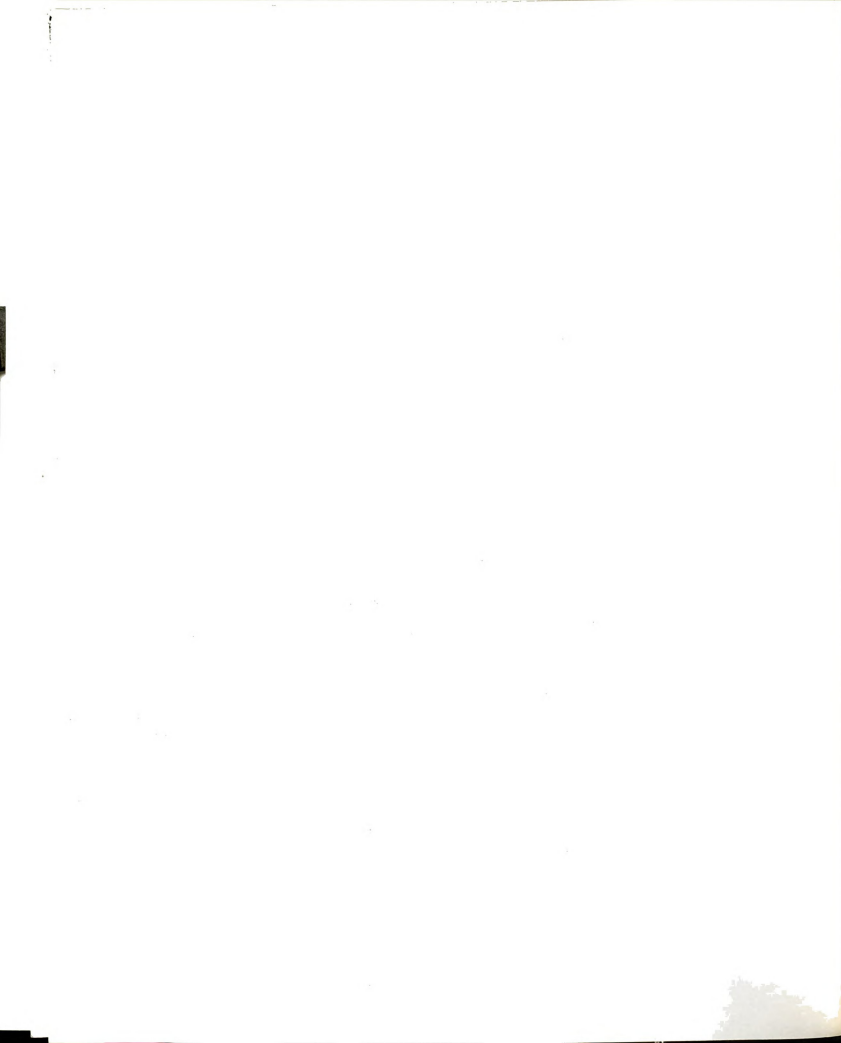
In summary, literature supports the premise there is no one cause of essential hypertension. There may be multiple interrelated factors that contribute to the incidence of

essential hypertension. Complications can result in chronic renal failure, cerebrovascular accidents, and coronary heart disease. Since each hypertensive client is unique, and presents with a combination of factors, treatment of hypertension requires individualized and optimum nursing care. For individualized nursing care the psychosocial needs, as well as physical factors (contributors and sequelae) should be addressed. One way to assess the psychosocial needs of the hypertensive client is use of the health belief model.

Health Belief Model

The health belief model as described in Chapter I is a psychosocial formulation developed to explain health-related behaviors. The model was first used as an attempt to explain why people engage in preventive health behavior at an individual level of decision-making.

The health belief model variables were drawn and adapted from the social psychological theory of Lewin (1948). Lewin's theory postulates that an individual is thought to exist in life space composed of regions, some having positive valance, some negative, and some relatively neutral. Illnesses, if they were represented in the life space, would be a region of negative valance which would be expected to exert a force moving the person away from that region, unless doing so would require the person to enter a region of even greater negative valance. Lewin's theory also assumes the subjective world of the perceiver determines behavior rather than the objective environment. The theory is more concerned with the



current subjective state of the individual than with history or experience (Maiman & Becker, 1974; Rosenstock, 1974). According to the original health belief model (Rosenstock, 1960) for individuals to take action to avoid disease they would need to believe: that they were personally susceptible to the disease; that the occurrence of the disease would have at least moderate severity on some componenet of their life; and that taking a particular action would be in fact beneficial by reducing their susceptibility to the condition or, if the disease occurred, by reducing its severity; and that the benefits would entail overcoming important psychological barriers, such as cost, inconvenience, and pain. Based on the health belief model even though an individual is ready to act, the likelihood of taking action depends on beliefs about the probable effectiveness of the action in reducing the health threat and about the difficulties (barriers) that must be encountered if such action is taken (Rosenstock, 1974).

In addition, the health belief model proposes that a stimulus (or cue to action) must occur to trigger the appropriate behavior. This cue might be internal, like perception of bodily states, or external, like interpersonal interaction and the impact of mass media. There are also modifying factors such as demographic variables; structural variables such as complexity, cost, and duration of the regimens; attitudinal variables such as satisfaction with clinic staff and procedure; interaction variables such as type of nurse/

client relationships; and enabling variables such as source of advice and social pressure (Rosenstock, 1974).

The health belief model has been utilized in examining preventive health behaviors: screening tests for tuberculosis, cervical cancer, dental disease and rheumatic fever (Rosenstock, 1974). Although the health belief model originally had been used to predict preventive behavior, there are a number of studies which have used one or more of these variables to predict patient compliance with the therapeutic regimen for chronic illnesses (Becker et al., 1977; Cummings et al., 1982; Given & Given, 1982; Greene et al., 1982; Hershey et al., 1980; Morisky et al., 1982; Taylor, 1979).

The model presented in Figure 2 is modified from the original health belief model formulated in the 1950's by Hochbaum, Leventhal, Kegeles and Rosenstock (Rosenstock, 1974). According to Kasl (1974) the same variables of perceived susceptibility, perceived severity, and benefits minus barriers are applied to chronic illness. Susceptibility and severity are perceived as threat components. The model assumption is that even if individuals recognize personal threat, they will not take action unless the course of action is believed to be beneficial in reducing the threat.

The modified model includes motivation to take necessary action, an added concept for application to chronic illness. Motivation has been operationalized as state of

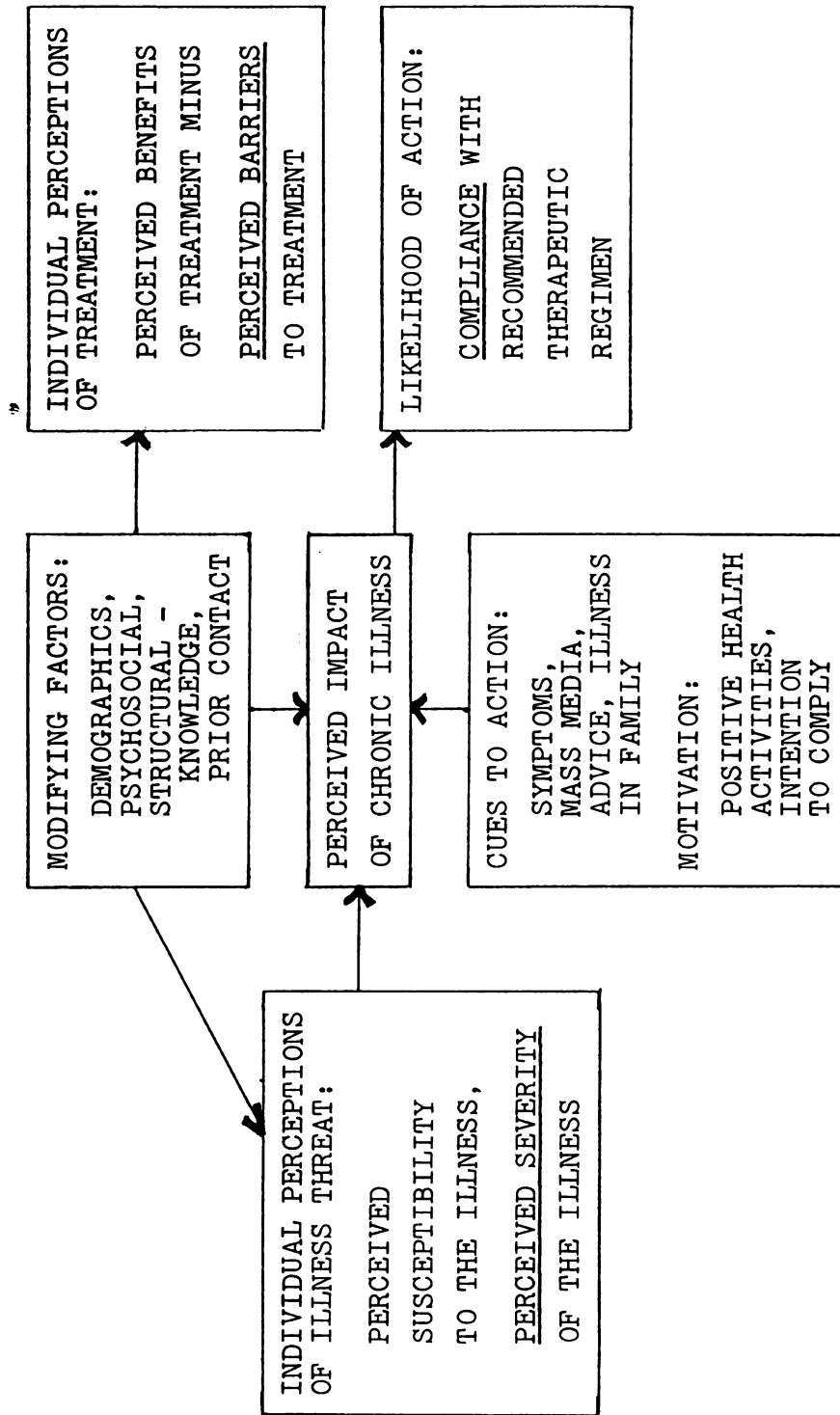


Figure 2. Health Belief Model
adapted from Becker, 1974 and Kasl, 1974.

readiness to take specific action: (1) concern about health matters in general, (2) willingness to seek and accept medical direction, (3) intention to comply, and (4) positive health activities. Kasl (1974) adds that illness behavior takes place in the presence of symptoms which may provide motivation for compliance. Whereas in the original model the health behavior takes place in the absence of symptoms or illness and thus the issue was educating people and finding the right cues for action, rather than motivation.

Therefore, the health belief model presents a framework to examine the variables of this study which are the hypertensive clients' perceived illness severity, and perceived barriers as they relate to compliance with the therapeutic regimen. The model provides some insight into why people behave in certain ways with regard to the health decision-making process. Figure 2 represents the reformulation of the health belief model for use as a predictor of compliance for hypertensive clients (Becker, 1974; Kasl, 1974).

The concept of perceived severity of illness is found in Figure 2 under Individual Illness Perceptions. How individuals recognize the seriousness of their illness in comparison to other illnesses, the possibility of complications, and the impact of the illness on significant others is implied. The perception of illness severity includes the overall consequences of having hypertension and the extent of interference with social roles (Becker, 1974; Kasl, 1974).

Nelson et al. (1978) found the impact of hypertension on lifestyle to be associated with blood pressure control, and found that perceived severity of hypertension and likelihood of complications to be related to self-reported medication taking. The Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure (The 1980 Report of the Joint National Committee) stated that clarification of clients' attitudes and beliefs about high blood pressure may be helpful for long-term compliance with therapy. Since perceived illness severity may vary from person to person, it becomes necessary for the nurse to assess the clients' perception of their hypertension severity to provide guidelines for the process of nurse-client interaction.

Perceived barriers to treatment may be found in Figure 2 under Individual Treatment Perceptions. Perceptions about treatment were selected for study to address beliefs related to the need for new patterns of behavior required for treatment, and to address doubt in efficacy of treatment. A number of studies which address the concept of barriers to treatment focus on the more tangible costs, side effects, and accessibility (Brand et al., 1977; Logan et al., 1979; Nelson et al., 1980). Results were inconsistent in finding a relationship between tangible barriers to treatment and compliance. Other researchers examined the more affective and intangible barriers of life style adjustments and did find an association to their measurements of compliance (Cummings et al., 1982; Hershey et al., 1980; Nelson et al., 1978). Baile and Gross

(1979) believe inquiry should be made about the meaning of hypertensive treatment to the client, and its impact on behavior change and employment status for the purpose of identifying obstacles to therapy. Therefore, this research is directed to beliefs about the intangible barriers to treatment: difficulties incorporating required changes into life style such as job/regimen conflicts, problems with diet or medication, and doubt concerning treatment efficacy.

Stated compliance with the therapeutic regimen is defined as the extent to which the client carries out the therapeutic recommendations of health care providers concerning prescribed medications, diet, behavior modifications, and follow up care (Given & Given, 1982, p. 28). In this research measures of client compliance are based on client report of compliance with medication, diet, and exercise recommendations. Self report of compliance is elicited concerning if medication was taken, if prescribed dosage was taken, and if medication was taken at the recommended time of day. Similar questions were asked to elicit stated compliance with diet and exercise.

Medication, diet, and exercise are the variables of compliance with therapeutic recommendations selected for this study. Medication and diet are the usual treatment for hypertension (Chobanian, 1982; Kaplan & Liebeimen, 1978). Medication reduces blood pressure through diuresis, sympathetic blocking, renin-angiotensin inhibition, or

vasodilation. Diet is prescribed to enhance medication effects or to independently normalize blood pressure through weight control and limitation of sodium intake (Langford, 1981; Reisin et al., 1978; Stamler et al., 1978). Exercise may be an adjunct prescribed for its usefulness in weight control, cardiovascular disease risk control, and stress reduction, as well as for normalizing the blood pressure through physical conditioning of the body (Horton, 1981; Michigan Heart Association, 1976).

Stated compliance is the method of measurement for this study. No perfect method of measuring compliance has been found, however there is evidence that stated compliance is acceptable (Rudd, 1979). Nelson et al. (1980) found blood pressure control and self-reported medication-taking to be highly correlated with each other. Haynes et al. (1980) found self reports were more reliable as compliance measures than blood pressure, or urine and blood tests of metabolites. Interviewing the hypertensive patient is a practical, useful approach in addressing the compliance issue (Haynes et al., 1980).

The term compliance is somewhat controversial. To some it carries the connotation of a patronized, unreliable, deviant patient, implying limitation in the patient (Stanitis & Ryan, 1982). For others (Linden, 1981) the terms compliance, adherence, participation, follow-through, and cooperation have a positive connotation. The terms adherence and compliance are often used interchangeably with no

difference in their intended meaning (Glanz, 1980). In this study the definition of compliance is not meant to be judgmental. It is the most commonly used term in the literature, and patient compliance is the key concept utilized in the Index Medicus for literature related to the subject of the extent to which the client carries out therapeutic recommendations.

Hypertensive clients are a challenge to the nurse due to their complex health problems. Individuals with hypertension must begin to adjust life styles to illness even when no symptoms are present (Sackett & Haynes, 1976). Many aspects of one's daily life must be altered to control this illness. The health regimen in many cases is complex, including special diet, medication, stress reduction, weight reduction, exercise, and elimination of smoking. The level of intervention by the nurse depends on such factors as the stage of the illness, other health problems, and the individual's ability to adapt to the illness and its treatment.

Because of the complex nature of the illness, clients often have misconceptions and a poor understanding of its causes and consequences. Control of hypertension decreases the risk of stroke, heart attack, and kidney failure. The nurse should start at the client's level of understanding, and should determine approaches to help the client take an active role in his/her care (Foster & Kousch, 1978).

Thus, the health belief model could be useful in

assessing hypertensive clients' compliance with therapeutic treatment, and also in identifying clients who are at risk for noncompliance.

How this assessment may be utilized by the nurse during interaction with the hypertensive client is described by using King's goal attainment theory.

Nursing Theory

King's goal attainment theory serves as a model for nurse-client interaction whereby each perceives the other and the situation through communication (King, 1981, pp. 141-157). The nurse and client set goals and explore means to achieve them. For example, one goal may be to help a hypertensive client think of ways to decrease the complexity of the regimen. King focuses on the overall communication and decision-making process, whereas the health belief model represents the health behavior a client may take. The health belief model has a more limited focus on health perceptions and the behavior an individual will undertake according to those perceptions. For example, do hypertensive clients perceive their illness severe enough to take the medication daily. Because compliance with treatment for hypertensive clients is a difficult challenge to nurses, the use of King's theory and the health belief model provides the nurse with a framework to guide knowledge and interventions necessary to provide effective nursing care.

According to King, goal attainment is derived from

interpersonal systems, whereby the nurse and client represent one type of interpersonal system. Concepts from the theory of goal attainment are: perception, judgment, action, reaction, interaction, and transaction. These concepts are congruent with the nursing process whereby human interaction between nurse and client take place, goals are set, ways to achieve them are explored, and interventions are implemented and evaluated. Furthermore, these concepts may have a significant impact upon the hypertensive client's compliance behavior in terms of the health belief model.

Perceptions about illnesses, about treatments, and about other life events are subjective representations of reality as defined by King (1981). The individual's awareness of objects, events, persons, and self gives meaning to experiences. Judgment of the value of objects and events is based on perceptions. King suggests that action orientation is characteristic of persons based on their judgment of reality. Verbal or nonverbal action involves a sequence of behaviors related to recognition of conditions, and efforts to control events.

Clients/patients react as total organisms responding to their unique perception of environment and experience. Using the health belief model the nurse may predict how persons will react depending upon their perceived illness severity and perceived barriers to treatment. In an effort to explore ways to increase compliance the nurse

can assess the hypertensive client's perceived illness severity and perceived barriers to treatment. Taking into account a person's perceptions and beliefs about illness and treatment is a means of acknowledging their uniqueness, their knowledge, experience, values, and expectations.

According to King interaction is defined as a process of perception and communication between person and environment. As the nurse and client set goals they are said to interact with each other. During the interaction, each individual brings knowledge, needs, goals, past experiences, and perceptions to the situation. The individual's uniqueness of mental action affects the judgments to be made and final decision making during the interaction. King believes that individuals interact with each other and the situation according to goal identification.

Transaction is viewed by King (1981) as an observable behavior of human beings in achievement of valued goals. It involves bargaining, negotiation, and social exchange. Transaction is the communication with environment that leads to goal attainment. It is viewed as growth and development. By facilitating client knowledge and skills the nurse promotes growth and development, maximizing client potential to achieve compliance with treatment, a valued goal for blood pressure control.

In the process of perception, judgment, action, reaction, interaction, and transaction, the nurse helps the client set goals and discuss alternative measures to

achieve them. The nursing mode of goal attainment involves communication with the client to help identify goals and solve problems. Figure 3 illustrates a diagram of nurse/client interaction.

Nursing is defined as providing essential services to society to maintain health (King, 1981). Health, as a goal of nursing is the basis for nursing theory. King believes that the nursing process is a mode of action applied through knowledge in caring for the well, ill, and dying. The nursing process can be implemented through perception, judgment, action, reaction, interaction, and transaction whereby the nurse assists the client to cope with illnesses and promote health.

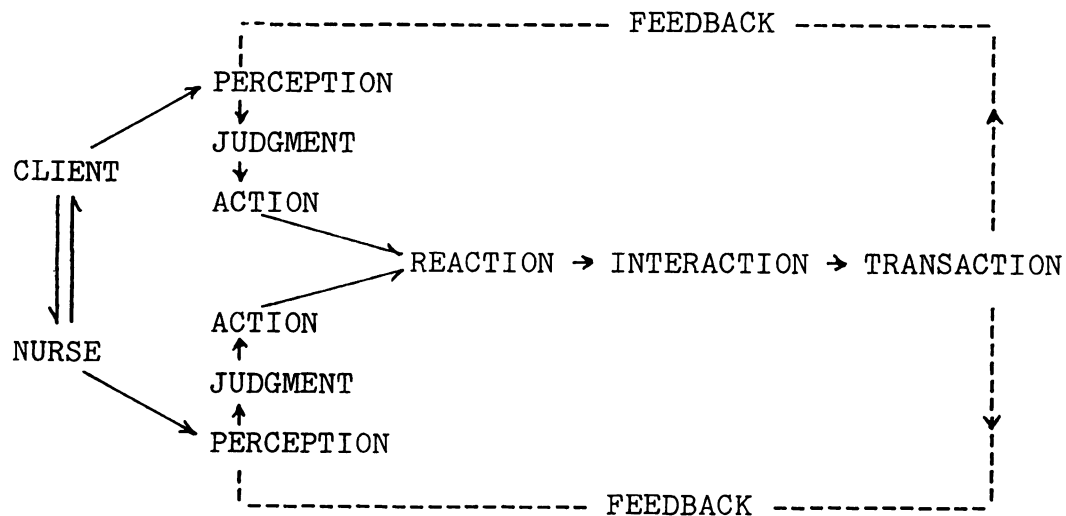


Figure 3. A process of human interaction, King, 1981.

Nursing Intervention

The problem of hypertensive compliance with a therapeutic regimen is a complex one. Compliance means following recommendations in terms of medications, diet, exercise, and life style adjustments. The nurse can intervene in this process by using components of the health belief model with King's goal attainment theory and the nursing process. In King's conceptual model, the hypertensive client and the nurse are equal partners. They each bring to the relationship perceptions, knowledge, judgments, skills, and abilities. Each is part of the environmental experience of the other. In the beginning of King's process of human interaction (Figure 4), the client may act by saying, "I have hypertension." "I've been told my blood pressure is too high." "I'd like to make an appointment." Then, a reaction by the other, "Could you tell me more?" The process continues with the assessment of health status.

The nurse can assess if clients perceive their hypertension as being severe. Do they perceive hypertension as causing other health problems? Do clients perceive hypertension as resulting in complications? To assess barriers to treatment, the nurse could explore whether or not the client has difficulty complying with the therapeutic regimen. In addition, the nurse would assess what effect the regimen has on life style and whether other family members are affected.

In the interaction phase and the planning stage of the

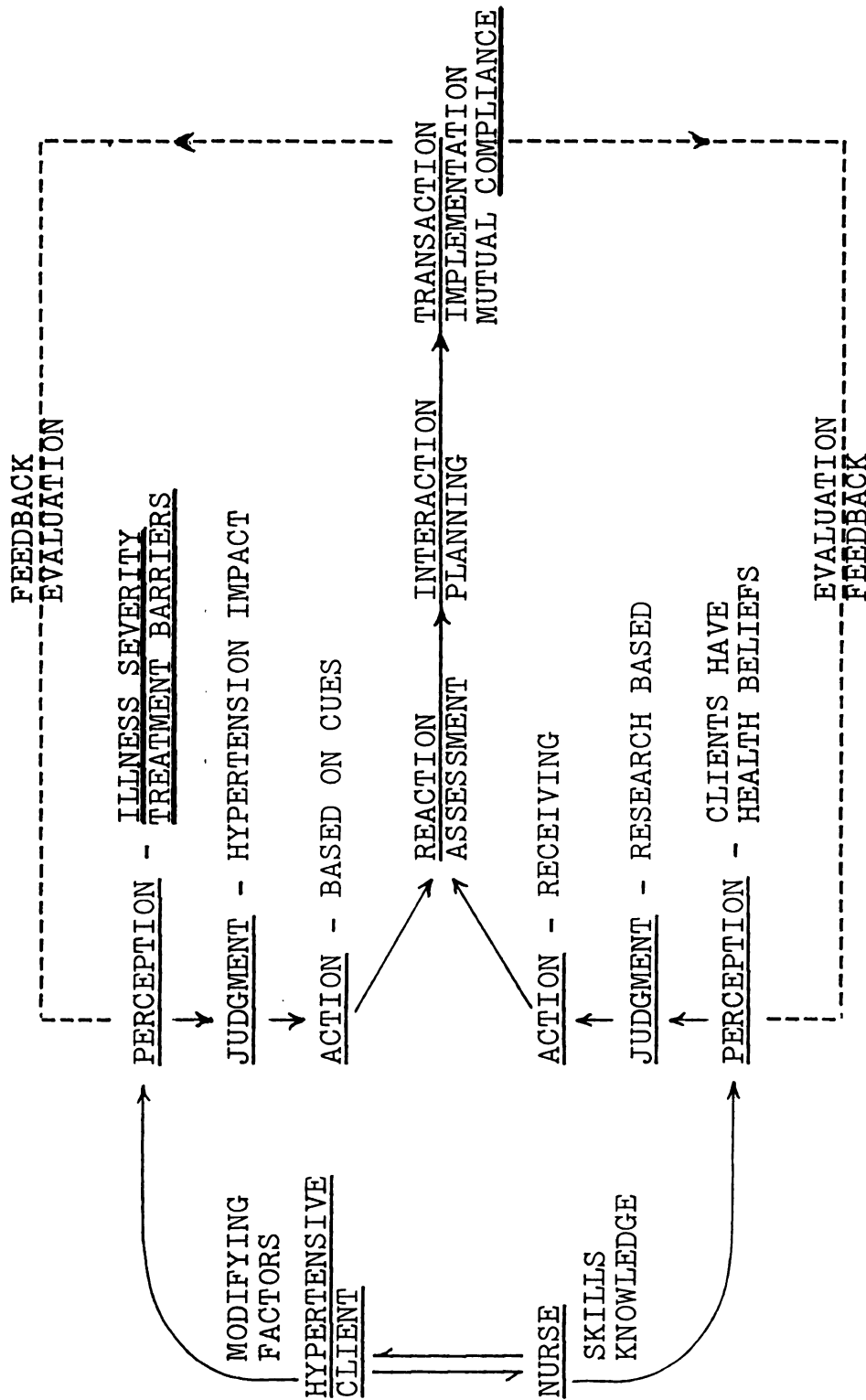


Figure 4. Combined model for the hypertensive client.

nursing process, the nurse and the client collaborate. Planning, negotiating, and mutually identifying goals are important. Means to achieve goals are explored and agreed upon during nurse/client interaction. Using the health belief model the nurse can start with clients' health beliefs about their illness, and build upon ways to help achieve compliance. The nurse can help the client develop awareness of their illness, and facilitate client behaviors to maintain health. It is at this point transaction between them begins. According to King, compliance behavior is an indicator of transaction. Effective transaction leads to compliance and ultimately blood pressure control.

Summary

In summary, King's theory of goal attainment provides a framework into which components of the health belief model may be integrated for nursing care. King's theory outlines the interaction process whereby the nurse assesses the client's perceived illness severity and perceived barriers to treatment. During the process, the client and the nurse mutually establish goals, evaluate progress, and adapt to changes to ensure goal attainment and compliance with the therapeutic regimen.

CHAPTER III

REVIEW OF THE LITERATURE

Overview

In this chapter relevant literature pertaining to the study variables of perceived treatment barriers, perceived illness severity, and compliance with the therapeutic regimen will be reviewed. The review will include literature concerned with hypertension, the health belief model, and nursing care relative to the hypertensive client. Recent research findings and expert opinion applicable to these concepts will be presented. The chapter will be divided into the following sections: hypertensive treatment, compliance behavior, the health belief model, illness severity, treatment barriers, and nursing care of hypertensive clients. This review was prepared in collaboration with Brooks (1983).

Hypertensive Treatment

Most literature on treatment of hypertension is focused on drug therapy. Some studies include nonpharmacological interventions. However major studies have not to date reflected the establishment of standards for nondrug therapy.

Several studies have reported the benefits of

antihypertensive drug treatment. Borhani (1981) and Kochar (1981) reported on the effects of antihypertensive medication which have been demonstrated by data from the Veteran's Administration Study conducted from 1967 to 1972. This was a prospective, randomized, double blind therapeutic trial including 523 males from Veteran's Administration hospitals. The participants were selected carefully for well documented, sustained hypertension and their degree of compliance with the health regimen. Subjects were randomly assigned to placebo and active treatment groups. The results demonstrated the efficacy of antihypertensive therapy in preventing congestive heart failure, myocardial infarction, and strokes in men with diastolic blood pressure ranging from 104 to 129mm Hg. Borhani (1981) added that this study had a great influence on the medical profession due to focusing on the need of treatment for hypertension.

The study conducted in Framingham, Massachusetts has demonstrated efficacy of treatment for hypertension (Kannel, 1978). The participants (n = 5,184) men and women age 30 to 62 were free of stroke prior to entry into the study. They were followed biannually for more than two decades. It was concluded that hypertension was the most powerful precursor of stroke. Hypertensives in the study were found to have twice as much occlusive peripheral arterial disease, three times as much coronary heart disease, four times as much congestive heart failure, and seven times as many brain infarctions as did normotensive participants. However, rates of morbidity

and mortality for hypertensives in control were reduced to approximately the rates for normotensives.

Efficacy of antihypertensive therapy has been well documented by a recent study with data collected from the Hypertension Detection and Follow-up Program Cooperative Group (Hypertension Detection and Follow-up Program, 1982). This was a five-year study of 10,940 hypertensive participants age 30 to 69 with a diastolic blood pressure greater than 90mm Hg. The report of the Hypertension Detection and Follow-up Program compared the morbidity and mortality outcome in a population treated with optimum antihypertensive drug therapy (called stepped care) versus the customary medical care. The subjects were randomized into two groups: stepped care and referred care. The stepped care group received stepped care therapy in the Hypertension Detection and Follow-up Program clinic, whereas the referred care group was referred to community physicians.

Mortality surveys were conducted yearly in both the stepped care and referred care groups throughout the five-year period (Hypertension Detection and Follow-up Program, 1982). Subsequently, interviews and blood pressure measurements were repeated at yearly intervals. Clinical assessments including physical examinations were performed for baseline data, and repeated at two and five years in both groups. The findings revealed a 16.9% reduction in all causes of mortality among the stepped care group compared to the community treated group ($p = .01$). More specifically the data showed the following

for stepped care subjects: (1) a reduction in incidence of stroke for all ranges of initial diastolic blood pressure, there being a 45% reduction in stroke incidence for those with diastolic pressure 115mm Hg or higher; (2) among white women a 30% reduction of stroke incidence; (3) a 27% reduction of stroke incidence among participants age 30-69. These findings support the premise that decreasing diastolic blood pressure to normal levels reduces stroke morbidity and mortality regardless of age, sex, race, and initial level of blood pressure.

The results of a recently completed Australian study demonstrated evidence for the efficacy of treatment of mild hypertension (Australian Therapeutic Trial, 1980). This was a controlled trial of drug treatment. In this study (n = 3,427) men and women, age 30 to 69 with a diastolic blood pressure 95-110mm Hg, and systolic pressure <200mm Hg, were assigned to placebo or active treatment groups. They were followed for four years. The results indicated a significant decrease in mortality from cardiovascular disease and cerebrovascular disease in the active treatment group.

Kaplan (1983) emphasized the need for a more balanced view of hypertensive drug therapy. He stated that the decreased mortality findings of the Hypertension Detection and Follow-up Program may be due to more medical care in general rather than just more frequent use of antihypertensive drugs. Also, the Australian Therapeutic Trial (1980) on mild hypertension showed less complications when the diastolic blood

pressure was brought below 100mm Hg without drugs. In addition, the MRFIT Research Group (1982) results confirmed the value of antihypertensive drugs for those with diastolic pressures above 100mm Hg, however for the majority with diastolic blood pressures of 90 to 100, a more conservative, selective approach should be employed. Kaplan (1983) suggested that for those at relatively low cardiovascular risk, non-drug therapy is preferred: weight reduction for the obese, moderate sodium restriction for all, and relaxation techniques for those willing to use them. Kaplan further adds that non-drug therapy should be offered as adjunct to all on antihypertensive drugs.

Cummings et al. (1982) reported a study conducted to evaluate the effectiveness of a blood pressure screening, referral, and follow-up program in an inner city area of Detroit. A comparison was made of two matched groups, one exposed to the blood pressure program, and the other not provided with any blood pressure services. The data collected was from a cross-sectional survey of 800 predominately black adults selected at random from the inner city directory. Results revealed that the prevalence of hypertension was 38% for both men and women under age 55. The prevalence of high blood pressure increased for both sexes above age 55, with women being more likely to have hypertension than men. Eighty percent of the 291 hypertensive subjects were aware of their illness prior to participation. Eighty-six percent of the 234 aware hypertensives were being treated and 26% of

those adequately controlled. Treatment, awareness, and control rates seemed to be age-related. The younger age groups were less likely to be aware of their hypertension, on a therapeutic regimen, and in control (BP < 140/90mm Hg).

Below the age of 54, women were more likely to be aware of their hypertension than men. Half of the men in the sample between ages 18 to 44 who had hypertension were unaware of their illness. In 1968 only 49% of hypertensives in Detroit were aware of their illness and 33% were on treatment.

Cummings et al. (1982) concluded that there still remain a large number of hypertensives who are either not on treatment, being inadequately treated, or noncompliant with the therapeutic regimen. It was suggested that in addition to widespread screening, interventions to ensure long-term maintenance of appropriate antihypertensive therapies should be employed.

Other relevant data were reported in High Blood Pressure Control (1982). The statistics indicated that the majority of hypertensives do not have their illness under control. Data from the National Health Survey showed only 24% of definite hypertensives (> 160/95mm Hg) are in control; 24% are aware of their illness, but not on treatment; and 20% are on inadequate treatment. A remarkable 32% of definite hypertensives are not even aware of their illness. "The major problem in high blood pressure control in America today is helping health professionals and their clients work together to achieve long-term compliance and blood pressure control"

(High Blood Pressure Control, 1982).

In summary, the literature supports the premise that pharmacological and non pharmacological antihypertensive therapy is of proven efficacy in reducing morbidity and mortality for hypertensives. However, there still remain a large number of hypertensives who are either inadequately treated, or noncompliant with therapy. Therefore interventions to ensure long-term compliance with therapy are crucial to improving the morbidity and mortality of the illness.

Compliance as a Health Care Concern

Considerable attention and literature have been devoted to the subject of compliance (Haynes, Mattson, Engebretson, 1980; Haynes, Taylor, Sackett, 1979). Client compliance with therapeutic regimens has been a potential problem throughout the history of prescribed remedies. It has only been since the development of treatment of established efficacy that health providers have taken compliance seriously (Haynes, 1979).

Investigators of compliance do not always agree on the concept definition. The word compliance has been criticized for being authoritarian or condescending, a connotation of professional dominance (Jonsen, 1979). Stanitis and Ryan (1982) challenged the nursing diagnosis of noncompliance, saying compliance may mean coerciveness, and noncompliance blames the victim. They fear labeling the client will subvert

the provider/client relationship, and depreciate self care and client decision-making (Stanitis & Ryan, 1982). Other writers may use the word adherence to imply greater participation by the client (Foster & Kousch, 1981; Glanz, 1980).

Jonsen (1979) saw compliance as part of the issue of free will: a question of why people knowingly neglect to do what is in their own best interest. Here the assumption is made that compliance is in their best interest. Dudley (1979) viewed the compliance concept as only part of the overall "delusion" by doctors and clients that medicine exists for specific diseases, that doctors will always diagnose correctly, that doctors will always prescribe correctly, that clients will always comply with treatment, and that clients will always respond to treatment. Dudley notes that in addition to a background of noncompliant ways (smoking, going on strike, driving over 55, etc.) clients usually have had the experience of getting well despite medical treatment.

Therapeutic compliance may be differentiated from other types of compliance (Linden, 1981). Therapeutic compliance is client behavior in terms of therapeutic recommendations which may be individualized for that client. Standard compliance is client behavior in terms of optimal medical expectations for therapy. Aspirational compliance refers to client behavior in terms of self expectations. Habitual compliance is the client's predisposition to compliance. The frame of reference for therapist compliance is the medical standards for provider performance. Therapeutic compliance

is the usual definition referred to in "patient compliance" literature as found by means of the Index Medicus (1979-1983).

In hypertensive studies compliance has been defined as: maintaining the regimen (Cummings et al., 1982; Levine et al., 1979); cooperative performance (Andreoli, 1981); remaining under care and taking medication as prescribed (Nelson et al., 1980); remaining under care and taking enough medication to achieve blood pressure control (Haynes, Taylor et al., 1980). Most authors defined compliance as the extent to which the client follows therapeutic recommendations (Haynes, 1980; Hershey et al., 1980; Inui et al., 1981; Morisky et al., 1982; Wagner et al., 1981). The definitions do not imply judgment or fault by either the client or health provider but simply that client behavior coincides with health advice (Haynes, 1980).

Blackwell et al., (1978) investigated provider educations on compliance. In a case comparison design 52 medical students were asked to role play client compliance with prescribed therapy. All preregistrants at a compliance conference were given a prescription for Vitamin C and a special diet. The hypotheses concerned failure to fill the prescription, extent and type of noncompliance, and significant differences in attitudes between compliant and non-compliant students. Only 21% were totally compliant. Forty-three percent did not fill the prescription. Failure to heed dietary precautions exceeded medication taking errors. A significant difference in attitude ($p=.05$) indicated that

noncompliant individuals considered themselves to be more independent than compliant students. Criticisms of the research centered on nonvalidity due to lack of reason to comply. However, findings supported an enhanced learning experience for those who attempted compliance.

In summary, the study of compliance is considered to be involved with choice, free will, provider attitude, provider responsibility, and client participation. Although several authors have addressed these implications, the definition of compliance in most hypertension literature is simply a descriptor of what behavior occurred, i.e. the extent to which the behavior coincided with therapeutic recommendations.

Compliance Measures

The Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure reported that blood pressure measurement is one simple indicator of compliance with hypertensive treatment. Failure to maintain blood pressure control usually means failure to follow therapeutic recommendations (The 1980 Report of the Joint National Committee). However, Dunbar (1980) and Gordis (1979) emphasized that therapeutic outcomes do not constitute a measure of compliance. Compliance is only one variable which moderated the effect of a given treatment. Other variables may be bioavailability of drug and adequacy of prescribed dose. Dunbar stated compliance and physiological response are to be viewed as related, but not interchangeable.

Gordis (1979) reviewed measures of medication compliance,

noting other forms of compliance are described in the literature: delay in seeking care, nonparticipation in health programs, breaking appointments, and failure to follow provider instructions. For compliance with medication, Gordis listed the following methods of measurement: direct methods of detecting the drug itself, its metabolites, or its markers in urine or blood; and the indirect methods of therapeutic outcome, patient interview, pill counts, and physician assessment.

In Gordis' review, each method was found to have drawbacks. The direct methods have the disadvantage of bio-availability variations--differences among individuals in absorption, distribution, metabolism, and excretion of drugs. These types of tests do not detect dosage level, or consistency of administration (Dunbar, 1980; Gordis, 1979).

The indirect method of using therapeutic outcome (e.g. blood pressure reduction) for a measurement of compliance poses certain problems. Outcomes may depend on other factors such as: (1) effects of concurrent therapy, (2) environmental effects, (3) provider compliance or noncompliance with current expert opinion, and (4) a good outcome response to low compliance which maybe due to an unexpected sensitivity to treatment or a labile condition (Gordis, 1979).

Studies on pill counts were compared to urine or blood tests for compliance measurement accuracy (Gordis, 1979). The review of pill count research indicated serious over-estimation of compliance by comparing the amount of medicine

remaining to the amount the client should have left. A second disadvantage is that pill counts do not identify consistency of administration (Dunbar, (1980)). Also, some researchers were able to obtain only 39% usable pill counts due to incomplete records or difficulty having clients bring their prescription to the appointment (Rudd, 1979).

Physician assessment of client compliance was found to be the least accurate method of measuring compliance, little better than chance estimate (Gordis, 1979). Clinicians overestimated compliance by as much as 50%, indicating clinical judgment should not be used as a compliance indicator, either in research or the clinical setting (Dunbar, 1980). Glanz (1980) believes the error in overestimation of compliance is due more to a lack of information than to inaccurate information, and that clinicians can obtain valid information by utilizing the interview.

Client interview, when compared to the pill count or urine test as a second measure of compliance, was found to be of variable accuracy. The interview studies reviewed by Gordis were conducted with mental patients, patients on digitalis, patients on PAS, and with pediatric patients. Researchers agreed many noncompliers can be identified by this practical indirect method. However, client interview is less valid for identifying those who are compliant. Generally, clients overreport compliance and underreport noncompliance (Gordis, 1979).

Dudley (1979) claimed that simply by asking in an interview, about 40% of the noncompliers can be identified. Sackett (1980) reported in a study of 240 steelworkers that asking in a nonjudgmental way found 40% of the noncompliant, uncontrolled hypertensives. Sackett said answers of "no" to the question of treatment compliance are virtually always telling the truth.

In a series of randomized trials, Haynes, Taylor et al. (1980) found the self report by interview to be a more reliable measure of compliance than blood pressure, urine tests, or blood tests when compared to pill counts. Stated compliance by interview correlated best with pill count ($r=.74$, $p=.0001$). The sample consists of 135 newly treated male hypertensives who were studied over six months. On the assumption the pill is the most accurate measurement of compliance, interviewing was found to be a useful approach to assessment of compliance with antihypertensive therapy.

Valid assessment of compliance by interview depends on what questions are asked and how they are asked (Glanz, 1980). As the interview is practical and offers information on the complexity of the compliance problem (levels and variability) it is important in the design of research to give attention to interviewing skills for the purpose of eliciting accurate data (Glanz, 1980). Accuracy depends on memory. Erratic medication taking may be related to a poor memory which in turn will hinder data collection regarding the compliance level. Therefore it is necessary to reinforce good accuracy

in recall rather than good compliance. The interview requires careful phrasing of questions to make it socially acceptable to report errors (Dunbar, 1980; Glanz, 1980).

Dunbar (1980) reported an additional compliance measure--self monitoring. Self monitoring is observing and recording one's own behavior. The advantage are it does not rely on memory, it measures over time, it indicates daily variability. The disadvantage of self monitoring is it provides self feedback which tends to correct noncompliance and alter natural compliance patterns. Dunbar concluded it is a better intervention than research method.

Rudd (1979) believed most measures of compliance sensitize the client to the monitoring of their behavior. The ideal measurement would be unobtrusive, objective, and practical. Rudd concluded that until the ideal is found, the interview is the most useful and practical measure compared to pill counts and blood tests.

A review of literature on compliance measurement is limited by the comparison of one imperfect measure to another. In summary, authors have found client interview to be one of the most satisfactory, economical methods for research if done with attention to interviewer attitude and question phrasing. Comprehensiveness in the type of questioning can provide information on compliance levels, consistancy, and patterns. Such information is not elicited by pill counts, urine and blood tests, blood pressure, and physician assessment. The interview also lends itself to

measurement of compliance with dietary and exercise recommendations, as well as with antihypertensive medications.

Compliance With Medications

Stepped care medications are the standard of hypertensive therapy for moderate or severe hypertension. Antihypertensive therapy clearly protects those with diastolic pressures 105mm Hg or higher. The goal of therapy is a diastolic pressure of 90mm Hg and below, or the lowest diastolic pressure consistent with safety and tolerance (The 1980 Report of the Joint National Committee; Kaplan & Lieberman, 1978).

The stepped care approach entails initiating therapy with a small dose of diuretic at step one. If not effective the dose is increased, then adding sequentially one drug after another as needed. At step two, adrenergic inhibitors are utilized. Vasodilators are added at step three, and the additional adrenergic inhibiting agent, guanethidine, is added at step four (The 1980 Report of the Joint National Committee).

All patients need nondrug modalities to lower blood pressure and improve health. Therapy for those with a diastolic pressure between 90-105mm Hg should be individualized. Drugs may be indicated for mild hypertensives with the additional cardiovascular risk factors of smoking, diabetes, family history of cardiovascular disease, a systolic pressure above 165mm Hg, hypercholesterolemia, and target organ damage (The 1980 Report of the Joint National Committee, Kaplan &

Liebeiman, 1978). Chobanian (1982) indicated that anti-hypertensive drugs should be considered for the mild hypertensive if the nonpharmacological approach is not effective.

In a quasi-experimental design, Haynes et al. (1982) studied the effects of pharmacological treatment, and compliance with treatment on diastolic blood pressure. A random two-thirds of 5400 steelworkers on no previous treatment for hypertension were screened for high blood pressure (mean diastolic pressure >95 mm Hg). The 230 hypertensives found were randomly assigned to plant or family physician, but not randomized for treatment. The decision to treat with medication was made by the individual physician. This study on effects of medication on blood pressure was done to take into account the decision to treat or not, and the relative pharmacologic vigor of regimens. The researchers classified drug dosage by units of vigor, one unit being equal to 50 mg chlorthalidone. The classification was done on the assumption multiple doses of the same and other drugs are additive. Results showed the 63% who were treated with antihypertensives had a significantly greater decrease in diastolic pressure than those not on medication (12.2 vs. 7.8mm Hg mean decrease, $p=.001$). Clients on more vigorous treatment had a lower diastolic ($p=.005$). Clients were dichotomized into two groups, over 80% and under 80% compliant, as measured by pill count. Twenty-seven percent of the low compliers and 44% of the high compliers had a diastolic pressure under 90mm Hg.

Using the product of patient compliance and vigor of regimen, the researchers were able to find a higher association with diastolic response ($p=.0001$) than by using either indicator alone. A limitation of the study is that a unit of vigor of medication is not equal to another depending, among other things, upon size and age of the person. Results showed an association between therapeutic outcome and the items of care: decision to medicate, vigor of treatment, and client compliance (Haynes et al., 1982).

Wagner et al. (1981) also studied the influence of drug compliance and treatment regimen on blood pressure control. In a survey design an available sample of 385 treated hypertensives were identified in a biracial community. Controlled hypertension was defined as a diastolic pressure under 90mm Hg. Compliance with antihypertensives, measured by "rarely" or "never missed" doses, was reported by 74% of the available sample. Four groups were identified: (1) compliant-and-controlled, 53% of the sample, (2) compliant-and-uncontrolled, 21%(due to inadequate treatment, resistant hypertension, or misclassified as compliant), (3) noncompliant-and-controlled, 16% (may be misclassified as noncompliant, or sensitive to drugs), (4) noncompliant-and-uncontrolled, 10% (the assumption is made that noncompliance accounts for the noncontrol), Those who had discontinued drug treatment were not represented in the study. The number in the noncompliant-and-controlled group suggests overtreatment, a problem more

consequential due to Hypertension Detection and Follow-up Program findings which support treatment of diastolic pressures as low as 90mm Hg. The overtreatment and undertreatment found to coexist in this community underlines the importance of following the standards developed by the Hypertension Detection and Follow-up Program (1979). If the noncompliant are not identified as such they are in danger of continued overprescription.

By measuring pharmaceutical records of prescription refills, Inui et al. (1980) researched variations in compliance with common drugs. The sample of 419 Veteran's Administration hospital outpatients, including those from a nurse practitioner hypertensive clinic, were on free, long-term medications. Their measure was validated by a significant correlation ($p=.05$) of hydrochlorothiazide-refill-record with mean diastolic pressure on a random sample ($n=25$). Of those patients on hypertensive therapy, the following compliance rates were reported: furosemide 72.7%, $n=33$; hydrochlorothiazide 63.5%, $n=192$; methyldopa 63.4%, $n=47$; propranolol 62.5%, $n=89$; potassium chloride 60.7%, $n=114$; hydralazine 50.4%, $n=25$. Findings suggested low correlations between compliance rates with different drugs in the same regimen. The researchers speculated this may be due to differing properties or side effects of drugs themselves, or client and doctor attitude. Therefore, drug mix has been demonstrated to be an important confounding

variable in compliance with medication.

In 1981 Inui et al. reported on noncompliance screening research to identify the best available measure of compliance with medication. The sample consisted of 241 predominantly middle-age, low income, black, female hypertensives under the care of medical residents. Compliance was measured by pill count, self report, and a combined rule of blood pressure and self report. The combined rule defined compliance as stated compliance and a diastolic pressure below 100mm Hg; and noncompliance as stated noncompliance with any diastolic pressure, or stated compliance with diastolic pressure over 100mm Hg. The researchers found their combined decision rule of blood pressure/self-report was more sensitive for identifying noncompliance than self-report alone. The combined rule identified 83% of the non-compliers while self-report identified 55%. Noncompliers by pill count were: (1) controlled-and compliant 31%, (2) uncontrolled-and-compliant 7%, (3) controlled-and-noncompliant 23%, (4) uncontrolled-and-noncompliant 39%. Therefore, the combined rule may identify some patients as noncompliant who are compliant-and-uncontrolled due to an inadequate regimen. Also, findings emphasize the problem of nonidentification of the noncompliant who indicate they are compliant on verbal inquiry, as they may then be given more drugs, have more side effects, and have more tests and visits. A question was raised regarding the need to step down the drug regimen for those who are well-controlled but non-compliant.

In summary, compliance with medications has been found to be beneficial in the care of hypertensive clients. However compliance rates are often low and noncompliant clients are often not identified. Compliance levels may even vary for different drugs in a single regimen. The compliance issue needs to be addressed to prevent undertreatment, to prevent over prescription, to increase awareness of the possible need to step down care, and to focus on increased effectiveness within the standards of care.

Compliance with medication has been measured by a variety of means with expected variable results. Further research is indicated to identify predictors and determinants of compliance, and address ways to apply the findings to clinical practice.

Compliance With Diet

A review of the literature brings to our attention the importance of diet in the therapeutic management of hypertension. Epidemiologic studies show a strong correlation between blood pressure and body weight, and blood pressure and sodium intake (Berchtold & Sims, 1981; Freis, 1976; Langford, 1981). Dietary management is a reasonable initial approach for those with mild hypertension and no additional cardiovascular risk. Diet is definitive therapy if blood pressure is then reduced and maintained at normal levels (The 1980 Report of the Joint National Committee).

Weight reduction is often associated with significant decreased in blood pressure and is particularly useful

treatment for mild hypertension (Chobanian, 1982). A 25 pound weight loss in the obese may reduce the systolic pressure by 10mm Hg. The obese should decrease intake of saturated fats and cholesterol as well as lose weight to decrease their cardiovascular risk (Kaplan & Lieberman, 1978).

Stamler et al. (1978) reported findings related to weight and blood pressure from the hypertensive screening of one million Americans. Persons were self-classified as overweight, normal weight or underweight. The self-classified overweight group had 50-300% higher rates of hypertension. The frequency of hypertension in the overweight, age 20 to 39, was double that in the normal weight, and triple that of the underweight. Age 40 to 64, the overweight group had a 50% higher rate of hypertension than the normal weight, and 100% higher than the underweight. With each higher degree of blood pressure, the relative frequency of hypertension with overweight was higher. Stamler et al. concluded that consistent findings on the relationship of weight and blood pressure, together with reported effectiveness of weight loss in blood pressure reduction indicates the association between overweight and elevated blood pressure maybe causative. Overweight is probably one factor in the complex etiology of hypertension. Therefore, it is assumed that the prevalence of hypertension in the population could be lowered through the prevention and control of obesity.

Reisin et al. (1978) studied the effect of weight loss

without salt restriction on blood pressure. The sample of overweight hypertensive patients in Israel included 24 on no drugs and a group of 83 on inadequate drug therapy. All of the no-drug group and 57 randomly selected from the inadequate drug group were placed on a weight loss regimen. For those 10 to 20% overweight, males were assigned a 1200 calorie diet and females a 1000 calorie diet. Those over 20% overweight were given 1000 and 800 calorie diets, males and females respectively. Dieting patients visited a dietitian every two weeks. After six months, all dieters lost a least three kilograms (mean, 10.5kg). Seventy-five percent of the no-drug group, and 61% of the dieting drug group attained a normal blood pressure, a significant ($p=.001$) and direct association with weight loss. In the nondieters there was no change in blood pressure or weight. The researchers concluded that weight loss is an important part of hypertensive therapy: being efficient, low cost, and free of side effects. Since a large proportion of hypertensives are obese, weight loss should be the initial step. The authors acknowledged the problem of compliance with diet as being the major reason physicians do not see weight loss as a reliable means of blood pressure reduction.

Knapp (1978) reported on a one-year Canadian study of dietary compliance in obesity. The sample of 100 patients 30% or more overweight were placed on 1000 calorie diets of various composition. Diastolic blood pressure was above 90mm Hg in 13 of the patients at the beginning of the study. Within 12 weeks, the diastolic fell below 90mm Hg

in all but one. The relationship of blood pressure to weight loss was not calculated. Additional results showed weight loss was related to ingestion of fewer calories regardless of dietary composition. All experienced weight loss when the diet was complied with; however, there was a dropout rate 39% at eight weeks, 50% at 12 weeks, and 78 to 95% at one year.

Tuck et al. (1981) investigated the effect of weight loss on blood pressure. Twenty-five obese patients, 30 to 182% overweight, were placed on a stringent 320 calorie diet for 12 weeks. Twelve of the subjects had blood pressures 140/95 to 180/114mm Hg. More severe hypertensives were excluded from study. Subjects were randomly assigned to a group of 15 who received 120mmol sodium per day, and a group of 10 who received 40mmol sodium. Mean arterial pressure fell significantly and equally in both groups correlating ($r=.58$, $p=.05$) with weight loss throughout the study. A reduction in urinary sodium excretion indicated a smaller sodium intake in both groups compared to usual amounts. The mechanism accounting for decline in blood pressure may be the reduction in plasma renin activity and aldosterone which accompanied weight loss in this study. Renin and aldosterone were not shown to be influenced by sodium intake. Results did not necessitate attainment of ideal body weight as only six reached their goal. A 10 to 30% reduction toward normal was sufficient to lower blood pressure to the normotensive range.

Berchtold and Sims (1981) have summarized the known

physiology of the association between obesity and hypertension. Noting that the mechanisms have not been clarified, obesity and overeating apparently bring about endocrine and metabolic derangements which contribute to hypertension. Possible mechanisms may be intracellular accumulation of sodium, hyperinsulinemia, and increased sympathetic tone, all of which will decline with physical training and decrease in caloric intake. As a large proportion of hypertensive patients lack physical training and overeat, the treatment for mild and moderate hypertension should be exercise and a decrease in calories. The issue of sodium restriction is still a matter of debate (Berchtold & Sims, 1981). Needed are large-scale studies on diet, weight loss, and physical training as a fair trial of prepharmacological therapy in mild and moderate hypertension.

Other authors claim epidemiological studies evidence a reduction of salt in the diet to below two grams a day will prevent exxential hypertension as a major public health problem (Freis, 1976). Hypertension may be a homeostatic response to the maintained increase in extracellular fluid volume resulting from high sodium intake.

Parfrey et al. (1981) studied 16 mild hypertensives and eight normotensives in England. In a crossover, randomized, observer-blind design subjects were placed on a normal diet plus 100mmol sodium for 12 weeks, and on a no-added-salt diet plus 100mmol potassium for 12 weeks. On the no-added-salt diet plus potassium, blood pressure fell sharply within two weeks. At six weeks, the hypertensives' blood pressures

were a mean of 8.9mm Hg lower, normotensives' blood pressures were 3.7mm Hg higher. On the normal diet plus sodium, blood pressure rose slowly in both hypertensives and normotensives. At 12 weeks, the mean elevation was 8.9mm Hg in hypertensives, and 5.3mm Hg (non-significant) in the normotensives. The researchers indicated the fall in blood pressure may be due mainly to the increased potassium intake, the mechanism of which is unknown.

MacGregor et al. (1982) reported a double blind, randomized, crossover research of moderate sodium restriction in essential hypertension. In a 10-week study, 19 English patients with mild hypertension were placed on a no-added-salt diet and avoidance of sodium-laden foods. For one month the subject was on 7-12 tablets of 10mmol sodium, enough to estimate past usual intake. The alternate month the subject was on the same number of placebo tablets, during which the mean blood pressure (mean of diastolic and systolic) was 7.1mm Hg lower than the month sodium was administered. The authors concluded the fall in mean blood pressure was the same as that obtained with a diuretic alone or a beta blocker alone. Therefore, the first line of treatment for mild or moderate hypertension should be moderate sodium restriction. The authors noted two problems in application of findings: compliance with diet which requires careful reinforcement and encouragement, and the need for food labeling as to sodium content.

Ram et al. (1981) investigated sodium restriction with diuretic therapy for the effects of potassium wasting and

blood pressure control. In a times series, crossover design, 12 patients with mild hypertension were randomly assigned various diuretics with a high or low sodium diet. Chlor-thalidone, hydrochlorothiazide, or furosemide were given for four-week intervals. Mean fall in blood pressure was 13.9mm Hg with the lower sodium diet and 9.1mm Hg with the higher sodium diet. Potassium fell a mean of 225mEq on the lower sodium intake, and 455 mEq on the higher sodium intake. Findings indicate a diet moderately restricted in sodium and a single morning dose of diuretic of intermediate duration offers the best balance of efficacy and safety of treatment.

Morgan et al. (1978) studied hypertension treated by salt restriction over a two-year period. Thirty-one Australian clients with a diastolic pressure of 95-109mm Hg were placed on a moderately sodium restricted diet by avoiding salty foods and not adding salt at the table. Diastolic pressures fell a mean of 7.3mm Hg, compared to a control group of 31 on no treatment whose diastolic pressures rose 1.8mm Hg. A third group of 62 on antihypertensives experienced a drop in diastolic pressure similar to the low-sodium group, plus a greater decline in systolic pressure. However, the 31 thiazide treated subjects experienced a decline in serum potassium and elevation of serum uric acid (significance level not reported). The authors did not suggest salt restriction to 100mmol/day is a suitable treatment for clients with established hypertension, but that findings may indicate the epidemic of hypertension in

Australia could be prevented if mean sodium intake were reduced to 100mmol/day. The authors added that the high sodium content of many prepared foods make it difficult to reduce intake and comply with a low sodium diet.

Kaplan and Lieberman (1978) stated the usual amounts of 15 to 20 grams of salt ingested by many clients may negate the antihypertensive effects of diuretics. Restricted sodium intake lowers blood pressure by reducing plasma volume, potentiating the effects of diuretics. Chobanian (1982) reported that restriction of sodium chloride intake to less than 50 grams daily should reduce blood pressure 10 to 15mm Hg in at least half of those with mild hypertension. Sodium restriction minimized the kaliuretic effects of diuretics.

In literature concerned with dietary compliance it was noted that there are similar compliance problems as with pharmacological therapy (Report of Working Group on Critical Patient Behaviors, 1981). However Glanz (1980) emphasized specific differences in compliance problems with dietary and pharmacologic therapy: whereas medication adds new, fairly simple behaviors, the diet imposes restrictive behavior. Diet behaviors are widely variable resulting in more dimensions on which to error. Dietary regimens present unique problems for clients. They must be applied across usual meals, snacks, eating out, weekends, vacations, changes in schedule, and special occasions (Glanz, 1980).

Other factors which present unique problems for dietary compliance are: (1) diet regimens control rather than cure,

and (2) the medical profession has not been educated to provide ongoing support for dietary management (Glanz, 1980).

Becker et al. (1977) noted compliance with weight reduction is unusual because the obesity health threat is future oriented, not immediate. Obesity may not be regarded as an illness even when identified as a health problem. Also, compliance with diet may be undertaken for non health reasons such as body image and social acceptance.

The widely variable pattern of the regimen presents unique problems in measurement for the researcher of dietary compliance (Glanz, 1980). Validity of information by self-report depends on question phrasing and interview skills. Researchers have been inconsistent in including numbers of meals, times of day, across the week, snacks, eating out. The different methods and criteria used make data on dietary compliance difficult to interpret. Glanz suggested different types of dietary regimens may require specific approaches for assessment, but recommends standardization of methods and scoring for useful comparisons of compliance findings.

Although weight loss usually correlated with stated compliance, Glanz criticized the use of weight loss as a compliance measure. Weight loss may be due to laxatives, diuretics, or vigorous exercise when weight loss behavior, and not eating-related behavior, is reinforced. It is not valid to compare the very obese to those less overweight as actual weight loss favors the obese in measure of

compliance. Weight loss compared with initial weight is arbitrary but may be satisfactory for an indirect, therapeutic outcome measure of compliance (Glanz, 1980).

In a review of studies on dietary compliance for cardiovascular disease Glanz (1980) found rates of compliance ranging from 13 to 76%. For weight loss, compliance research problems of small sample size, volunteer participants, and high attrition rates were cited. For further research Glanz recommends sound measures of dietary compliance, attention to determinants of compliance, and evaluation of the outcomes of interventions.

Possible determinants of compliance include demographics, illness characteristics, treatment characteristics, knowledge, psychosocial factors, provider relationships, motivations, and attitudes. Glanz noted the health belief model has been somewhat successful in predicting compliance with low sodium and low calorie diets among hypertensives.

The specific researched interventions of written messages, nurse phone calls, self monitoring, and social support were not found to be related to compliance with diet and medication in a three year study by Glanz et al. (1981). Compliance with the different antihypertensive therapies was rated by various means for 432 hypertensive clients. The low sodium diet was measured by self report: 26% compliance; the weight loss diet was measured by weight loss as compared to physician recommendations: 12% compliance. Medication was measured by self report: 42% compliant; as compared to

pharmacy records: 63% compliant.

The Report of the Working Group on Critical Patient Behaviors (1981) emphasized health professionals have an obligation to explain rationale for dietary alterations and assist behavioral changes. Providers must deal with individual beliefs, backgrounds, support systems, and needs.

In summary, the value of diet therapy in the management of hypertension is widely recognized. Authors and researchers agree weight control is important for blood pressure control. The role of sodium and potassium in the prevention and treatment of hypertension is controversial but supported by experts in a number of recent small studies. The problem of dietary compliance has not been satisfactorily addressed and apparently has prevented some health providers from considering dietary management seriously.

Few studies were found in the literature review for rates of compliance with diet in hypertensive regimens. Rates of noncompliance in obesity were found to be high, 39-95% (Knapp, 1978). Measurement of dietary compliance is difficult due to the complexity of measuring restrictive behavior across various situations by interviewing the client. The problems of the use of weight loss as a measure of dietary compliance have been enumerated by Glanz (1980).

Research is also needed to discover determinants and predictors of dietary compliance so appropriate interventions may be designed and implemented.

Compliance with Exercise

A classic study often cited as the rationale for exercise prescription for hypertension is "Exercise Therapy in Hypertensive Men" by Boyer and Kasch (1970). Over a six-month period, 23 hypertensive and 22 normotensive middle-aged men participated in a walk/job exercise program. Hypertensive group experienced a drop of 11.8mm Hg in mean diastolic pressure and 13.5mm Hg in mean systolic pressure ($p=.01$). In the normotensive group a mean diastolic pressure decrease of 6.0mm Hg occurred but without significant change in systolic pressure.

Messerli (1981) stated that although exercise is regularly prescribed for hypertension, the antihypertensive mechanism of prolonged exercise remains obscure. Noting that general vasodilation occurs immediately after exercise Messerli hypothesized aerobic exercise reduces total peripheral resistance. In addition blood volume is lowered through the fluid and electrolyte loss of sweat and respiration, plus a fluid shift to the extravascular space.

In a review of literature on the association of hypertension with obesity, and the role of diet and exercise management, Horton (1981) speculated exercise may result in (1) altered renal tubular handling of sodium secondary to decrease in plasma insulin, (2) less sympathetic nervous system activity with lower plasma concentration of norepinephrine and epinephrine, and (3) reduced peripheral vascular

resistance.

Roman et al. (1981) researched the effects of long-term physical training on 30 female hypertensives not on hypertensive medications. Subjects were prescribed a combination of calisthenics and walk/jog exercises 30 minutes three times a week. In a time series design, four phases were described: three months low intensity training, training discontinued for three months, 12 months low intensity training, and 12 months high intensity training. The most significant decreases in resting blood pressure occurred at the end of three and twelve months low intensity phases: mean 182/114mm Hg that decreased to 154/97mm Hg ($p=.001$). When training was discontinued during the three-month phase, blood pressure rose to pretraining levels. Increasing the intensity of training did not bring further lowering of blood pressure. A 30% dropout rate was reported by the end of the study.

Stamler et al. (1980) studied 115 men with mild hypertension, diastolic pressures 90-110mmHg, and 101 men with high normal diastolic pressures 80-89mm Hg in a five-year time series design. A nondrug therapeutic regimen was initiated for the purpose of coronary disease prevention. Individual recommendations were made for life style changes in regards to diet, exercise, and smoking. Results indicated long-term normalization of blood pressure by a sustained fall in diastolic pressure of 13mm Hg for the hypertensives, and 4mm Hg reduction for the high normal group ($p=.05$).

Weight loss averaged 10 pounds. Findings could not be independently assigned to exercise or diet. The authors concluded that long-term improvements in eating and exercise habits yielding moderate sustained weight loss are useful in preventing high blood pressure in hypertension-prone individuals, and in controlling mild hypertension.

Uman and Hazard (1981) investigated life style changes in hypertensives age 75 and older. The program was designed to provide the elderly with knowledge, skills, and support needed to make life style changes which are likely to lower blood pressure. Sample subjects evaluated over one year were 100 clients, 52 of whom had a blood pressure above 160/95mm Hg. The plan for potential life style change included areas of diet, exercise, medications, and visits to their physician. Aerobic exercise (as measured by self-report) was complied with almost as well as diet. Although among those whose blood pressure remained or became elevated there was less compliance. Exercise was more complied with than medication and physician visits. Of the 67 patients who initially had an acceptable blood pressure, one-third became elevated to above 160/95mm Hg. Half of the initial 33 with elevated blood pressure changed to the acceptable range ($< 160/95$ mm Hg.). Compliance percentages, correlations with compliance, and significance levels were not reported.

Reid and Morgan (1979) studied compliance with exercise for 124 firefighters randomly assigned to three groups of

control, health education intervention, and health education plus self-monitoring. "Compliance" was defined as self-reported compliance plus predicted increase of maximum oxygen uptake (VO_2) by 9.5%. "Possible compliers" were defined as self-reported compliance plus no increase in maximum oxygen uptake. Noncompliers were all the others. At six months compliers comprised 26% of the control group, 32% of the health education group and 32% of the health education plus monitoring group. No significant differences in compliance were found among groups.

In research on compliance with home exercise programs, Mulder (1981) found 55.2% continued to achieve greater than 75% of their exercise goal after 32 weeks of participation. Subjects were randomly selected from individuals presenting for outpatient exercise stress testing. Twenty-two men and seven women, of whom five males were classified as cardiac patients and the rest healthy, agreed to participate. After an exercise stress test aerobic exercise was prescribed to raise the pulse to 78-85% of maximum rate for 30 to 60 minutes, three times a week. Phone contact was made every four to six weeks. It was hypothesized non-compliant predictors would be negative answers to: motivation, understanding of disease, alcohol abuse, exercising at four weeks, regular scheduling of exercise, and specific reasons for noncompliance. Predictors were found to be correct in all cases. Clients with two negative

entries were noncompliant. Clients with zero or one negative entries were compliant. The author concluded individualized exercise prescription is a beneficial, reasonable therapy and the physician/client relationship may have a bearing on compliance.

In summary, a number of recent small studies show aerobic-type exercise to be useful in the treatment of hypertension. Exercise may lower blood pressure through direct hemodynamics, or indirectly by contributions to weight loss and stress reduction. In addition, physical training is thought to reduce cardiovascular risk by increasing efficiency of oxygenation. Compliance rates with exercise prescription for hypertension were not found in the literature review, with the exception of the Roman et al. (1981) report of 30% dropout rate.

Measures for compliance with exercise included dropout rate, self report, and increase in maximum oxygen uptake, making it difficult to compare results. Several researchers addressed compliance but did not report compliance rates (Mulder, 1981; Uman & Hazard, 1981). Further research is needed to determine rates of compliance with exercise for the hypertensive regimen. Predictors and factors related to compliance with prescribed exercise have not been identified except in the Mulder study (1981). This gap in research literature will need to be addressed so that exercise may be appropriately utilized for effective

hypertensive treatment.

The Health Belief Model

Mikhail (1981), in a review and critical evaluation of health belief model research and literature, noted that the health belief model developed as a psychosocial formulation to explain health-related behavior. Development was based on the twentieth century belief that behavior can be understood and controlled through science. The assumption is made the subjective world of the perceiver determines behavior rather than the objective environment.

According to Rosenstock (1974) the original health belief model proposed that the likelihood a person will take a health related action is determined by the individuals psychological readiness to take that action and by the perceived benefit of action weighed against the perceived barriers involved. The state of psychological readiness includes perceived susceptibility to the particular health condition and the perceived seriousness of the consequences of having the condition. Perceived susceptibility and seriousness together have been identified as the threat component of the model which indicates the need for perceived treatment benefits to lower the threat.

A perceived benefit of taking action is the individual's evaluation of the advocated action in terms of its efficacy and feasibility. The perceived benefit of taking action is the individual's evaluation of the advocated action in terms

of its efficacy and feasibility. The perceived benefit is weighed against perceived psychological, physical, and financial barriers, or difficulties in taking action. It is also proposed that a cue to action must occur to trigger the behavior, and a group of modifying factors serve to condition the individuals perception. Modifying factors may be demographics, structural variables, professional attitudinal variables, and relationships (Mikhail, 1981; Rosenstock, 1974). Reformulation of the model was required for explaining behavior related to chronic illnesses. Chronic illness required the person to stay in treatment indefinitely even when not feeling sick, and when health state is not changing, and to do so with minimal social and institutional support. In reformulation for chronic illness the concept of motivation was added to the model. Motivation to take recommended health action includes the dimensions of concern about health in general, willingness to seek and accept medical direction, and positive health activities (Kasl, 1974; Mikhail, 1981).

Mikhail reviewed the health belief model research literature published from 1959 to 1979. Fifteen studies supported the perceived susceptibility variable and the perceived severity variable in their relationship to a variety of preventive health, sick role, and chronic illness behaviors. Two studies indicated that when the threat is high, and ways to cope unknown or unavailable, health related

action is not taken (Ben-Sira, 1977; Leventhal, 1970). Eight studies were cited to support that belief in efficacy of treatment will promote compliance with health recommendations. Barriers, conceptualized in a variety of ways, have been found to be negatively associated with compliance behavior (Haefner & Kirscht 1970; Haynes et al., 1976; Kirscht & Rosenstock, 1977; Taylor, 1979). Cost, convenience, accessibility, side effects, safety, complexity, and duration of treatment have been studies as barriers. Mikhail (1981) stated more data are needed on what constitutes barriers.

The health belief model is useful, as well as flexible in its approach for enabling practitioners to choose the intervention which best suits the situation (Mikhail, 1981). Additional studies are needed for different age groups and cultural backgrounds. Diversity of measures make it difficult to establish validity of measures and comparability among studies.

The health belief model is useful in nursing intervention as it provides a means of understanding behavior for the purpose of obtaining cooperation and participation of clients in their own care. Use of the model implies the attempt to influence client behavior should be based on better knowledge of their individual differences and health beliefs. The model is useful to identify risk of noncompliant behavior. Nurses can contribute to health belief

model development by refining operational definitions of constructs and testing them (Mikhail, 1981).

Leventhal et al. (1980) critically reviewed the health belief model as one theory, a motivational model, for the study of compliance. Leventhal et al. noted most studies fail to test the entire health belief model. It was reported that the model only accounts for a small proportion of explained variance in health decisions. Increased perceived severity often fails to increase compliance with health recommendations. Cues to action were shown to have no observable effect on compliance in a number of studies; people may not think in terms of probabilities and scaled threat which may be defined as cues. Also, the problem is defined in the model from a health perspective. Non-health values, self image, and risk inducing behavior such as smoking, may also be incentives to action. Leventhal et al. noted the model makes few specific suggestions for intervention, and successful intervention program features are unclear. The question was offered: Does belief change precede behavior change, or behavior change occur first? It was concluded that the health belief model has the weakness of all models for study of compliance--lack of operational specificity making it difficult to compare outcomes.

In Loustau's (1979) review of the health belief model, the following intervening variables were added to the model:

knowledge of illness, complexity of treatment, and interpersonal relations. The review included 16 studies published 1960 to 1978 in which relationships were found between the model variables of susceptibility, severity, treatment benefits and costs, to compliance with the therapeutic regimen. Severity studies were concerned with such health conditions as rheumatic fever, otitis media, strep throat, and weight problems. Barrier studies were operationalized by access to care, clinic waiting time, transportation, convenience, interference with life style, financial considerations, or treatment side effects. Results of the studies supported the use of the health belief model to predict patient compliance. Loustau recommended assessing health beliefs to identify misbeliefs and misunderstanding about illness and treatment, and concluded it is important to enable the client to participate in management of care.

Andreoli (1981) investigated compliance with antihypertensive therapy, using the health belief model as a conceptual framework. Of 71 male outpatients, 41 were found to be compliant with medications and 30 noncompliant. Noncompliance was defined as five diastolic pressure readings above 92mm Hg in one year when the patient had a previous record of control on the same medication. Compliance was defined as a maximum of one diastolic pressure above 92mm Hg in one year plus "nurse interpretation". It is unclear what

the interpretation was based on. Questionnaires measured health beliefs about susceptibility to hypertension, severity of hypertension, benefits of therapy, and a self-concept scale. Means of scores on the self-concept scale and the health belief scale were compared for complier and noncomplier groups by means of a two-tailed *t* test. Analysis revealed no statistically significant differences in scores on self-concept and health beliefs for the two groups. The author concluded there is no difference in self-concept and health beliefs between compliers and non-compliers, and recommended further research to identify other factors of behavior differences.

In a retrospective cross-sectional investigation, Greene et al. (1982) studied compliance with medications among 190 chronically ill, inner-city clients. Data were collected by interview and from the medical record. Compliance was categorized by self-report: 28% subjects were compliant all the time, 16% were compliant 3/4 of the time, 30% were compliant 1/2 to 3/4 of the time, and 26% were compliant 1/2 of the time. The independent variables explored were health beliefs, perceptions and knowledge of illness; social support; regimen complexity; satisfaction with provider. Relationships to compliance for susceptibility and severity were negative, although originally hypothesized to be positive. The relationship to compliance for social support was $r = .13$ ($p=.033$), for complexity $r = .35$ ($p=.001$), for satisfaction $r = .17$ ($p=.011$). The authors

found the greatest predictors of compliance to be the clients' ability to name and describe their drugs, the clients' ability to describe functions of their drugs, and complexity of the medication regimen. As no cause and effect is established by a retrospective design, recommendations were made for a prospective study.

Stunkard (1981) reviewed health belief model literature related to weight control. Of the variables perceived susceptibility, perceived seriousness, perceived benefits, and perceived barriers, studies showed three variables failed to predict compliance with medical treatment: susceptibility, severity, and benefits. Perceived seriousness was defined as the clients' perception of severity, some studies including the presence and degree of illness symptoms in the definition. Perceived barriers were variously defined as treatment costs, side effects, discomforts, complexity, duration, and associated life style changes. Stunkard suggested application of the health belief model may require adaptation to particular circumstances. The conclusion was made that the model is more useful after the patient has had experience with treatment.

Wyatt (1980) developed a health perception instrument based on the health belief model. The perceptions assessed were health motivation, susceptibility to illness, severity of illness, benefits of recommended actions and barriers to recommended actions. Severity was operationalized as the

degree of worry about hypertension and its effects. Barriers included perception of ease of treatment implementation, treatment interference with life style, and treatment discomfort. The sample of 78 hypertensives, age 28 to 80, were tested twice at two and four-week intervals to compute a test-retest correlation for reliability. Twenty of twenty-eight items were reliable. All perception sets, except motivation, were found to be reliable and have internal consistancy. Content, predictive, and construct validity were evaluated. Content validity was established by four nursing faculty members. Items were predictive of self-administration of medication, diet, and exercise therapy, but not for appointment keeping behavior.

In sum, a considerable body of literature has developed around the health belief model in exploration of the compliance issue. Limitations cited by some authors are incorporated as an integral part of the model by others, as motivators, barriers, or structural variables. The lack of operational specificity is cited by some researchers as a weakness, by others as flexibility which enhances its usefulness. The attention the model has received attests to its importance and contribution in the study of compliance despite the criticism, it makes no contribution to interventions for improving compliance.

Perceived severity of illness and perceived barriers to treatment are presented as components of the health belief

model which impact on compliance behavior. However, the research design is not experimental in most studies utilizing the health belief model as the conceptual framework. Therefore causal relationships were not determined. It has not been established which is first: health beliefs, or compliance behavior.

There is not consistency in the definition and measurement of health belief model variables, making it difficult to compare research results. Perceived severity has been defined as perceived worries, effects of illness on health, and illness related life style changes, usually elicited by interview and questionnaire. Some researchers included signs and symptoms from the clients' perception or from medical record audit. In many studies the severity concept was not defined.

Perceived barriers have been operationalized as access to care, convenience, treatment interference with life style, side effects, costs, discomforts, complexity, and duration. Measures of barriers included client self-report and researcher assessment of costs and clinic characteristics.

In the following two sections a review will be presented of recent literature on the health belief model variables which are the focus of this thesis: perceived illness severity, and perceived barriers to treatment.

Perceived Illness Severity

Perceived illness severity has been one of the primary variables of the health belief model studied for its relationship to client's compliance with the therapeutic regimen. Becker (1979, p. 10) suggested that a prescribed regimen indicates that a diagnosis of illness has been made, and the individual is either experiencing symptoms or has experienced them before. Therefore the presence of physical symptoms may produce an elevating or "realistic" effect on perceived severity, motivating the individual to follow the prescribed regimen. However with hypertension elevated blood pressure may be picked up on routine exam without symptoms.

In reviewing the literature on perceived severity Andreoli (1981) reported on a sample of 71 male clients enrolled in Veteran's Administration hypertensive clinic. The study was conducted to determine if there were differences in self-concept and health beliefs in hypertensive patients who were compliant, and those who were not compliant with prescribed therapy. Severity was measured by using a health belief questionnaire in which a person was asked to rate himself in three categories of health beliefs, susceptibility to hypertension, severity of hypertension, and the benefits of complying with the therapeutic regimen. The results revealed that there was

no difference in perceived severity of hypertension in clients who practice compliance than in those who practice noncompliance. It was recommended that further studies should be done on hypertensives from a variety of settings, including females, and different sets of definitive criteria be used to classify compliers and noncompliers.

Nelson et al. (1978) examined clients' perception of health, disease and medical treatment, and compliance through interviews with 142 clients under treatment for hypertension. Severity was measured using four items concerning the subject's perception about hypertension leading to a stroke, the probability of sequelae without treatment, the necessity of life time therapy, and the estimated current level of blood pressure. One item on symptoms of hypertension, eight items on impact of hypertension on life style, three items on side effects of medications, and one item on perceived hypertension symptoms when first diagnosed were also used. The multivariate analysis of data indicated a positive correlation between perceived severity of illness and compliance.

Greene et al. (1982) studied a group of 190 patients under treatment for chronic medical illnesses to determine levels of compliance. Interviews with patients on perceived severity of illness included worries about health, recent change in health status, and extent of life-style changes.

The findings indicated that patients seeing their illness as severe were less likely to follow the recommended therapy.

Taylor (1979) conducted a randomized controlled study to test health beliefs in relationship to compliance with antihypertensive regimens in a group of 230 males. Perception of seriousness of hypertension was assessed by an interview which included questions on medical history and symptoms of hypertension. The results showed that there was a positive correlation between perceived illness severity and compliance with treatment ($p=.05$) both at the beginning and at the end of a five-month period.

Gillum et al. (1979) reported a retrospective cohort study of 249 randomly selected hypertensives in a medical clinic. The median age was 53 years, with 70% females, and 51% blacks, the remainder white. The study was conducted to determine the likelihood of treatment drop out, and to determine the characteristics that predispose clients to drop out. Information about medications, side effects, complications of hypertension, and occurrence of symptoms were obtained from medical records to determine perceived severity. Gillum et al. concluded that low perceived severity of illness coupled with cost and inconvenience and a lack of physician enthusiasm for treatment of mild hypertension were the major factors leading to drop out from

treatment.

Cummings et al. (1982) also looked at perception of hypertension in relationship to compliance with treatment. Two hundred six hypertensives were asked to rate how serious a health problem they perceived their hypertension to be. A four point scale ranging from very serious to not-at-all serious was used. The results showed that participants who considered their hypertension as serious were slightly more likely to continue taking medications than those who considered their hypertension as less serious.

Morisky et al. (1982) reported on a study that examined the effects of educational interventions designed to positively influence client attitudes and behaviors toward blood pressure control. The sample consisted of 200 participants divided into two groups of which one group received the educational intervention. A four item scale with a reliability of .62 measured the belief in the seriousness of hypertension in terms of causing target organ damage. Results of the study showed that belief in seriousness displayed no significant difference between the two groups in relationship to blood pressure control.

Johnson (1979) reported on perception of severity from a survey of 85 hypertensive participants in a university family medicine practice. Results showed that 37% indicated they were bothered by having hypertension. The

principal fears were: stroke 51%, heart attack 49%, and kidney disease 35%. Demographic data indicated that those age 40 to 59 were more likely to worry about their chance of stroke and heart attack. Females (56%) were more likely to worry about their chance of stroke and heart attack than males (36%). Blacks (82%), as compared to whites (61%), were more likely to believe a kidney problem could result from hypertension. Other findings indicated that although nearly all the participants believed stroke and heart attacks to be complications, only 75% see decreased chance of these complications as a benefit of treatment, and only half of these participants have a definite fear of the complications.

In sum, there are numerous studies that report a relationship between perceived illness severity and compliance with the therapeutic regimen. Many authors did not specify how they operationalized the definition of perceived illness severity. Some researchers indicated the consequences of target organ damage were perceived severity, others looked at the "overall seriousness" of hypertension. There were also studies that showed negative relationships between severity and compliance. Generally speaking, there are more studies that show a positive relationship to overall perceived severity in relationship to compliance with the therapeutic regimen.

Perceived Barriers to Treatment

Perceived barriers to treatment have been studied in relationship to outcome health behaviors in a variety of research designs and methods. Studies have varied in the operational definitions of both the independent variable barriers, and the dependent variable compliance behavior. The outcome health behaviors have included compliance measures of taking medication, keeping appointments, following diets, and/or rating therapeutic outcomes such as blood pressure. Barriers and compliance may or may not have been conceptualized as components of the health belief model.

Kirscht and Rosenstock (1977) tested the variables of the health belief model for their relationship to compliance in a sample of 132 clients of private physicians. In a descriptive survey, compliance was measured by pharmacy records, and self-report of medication and dietary compliance. Compliance was found to be significantly related in a positive direction to susceptibility to illness, illness severity, and knowledge of regimen purpose. Significant negative relationships to compliance were correlations of low personal control, dependence on physician, and psychological barriers. Psychological barriers included economic costs, convenience, side effects, and efforts necessary to comply. Less compliance occurred in those over 60, especially to diet. The authors emphasized the importance of assessing health beliefs for individualized care and possible modifica-

tion of the medical regimen for the purpose of improved compliance. Barriers to treatment are but one of many interrelated concepts that were found to affect compliance.

Brand et al. (1977) investigated the effect of economic barriers on patient compliance. Barriers were defined as low income status, number of drugs prescribed, and frequency of dosage. In a descriptive survey, six months post hospital discharge, 225 patients were classified by age, education, income, marital status, and disease severity. Significant factors relating to noncompliance were: (1) the youngest and oldest groups; (2) single and widowed; (3) 0 to 6 years education; (4) low income; (5) inadequate communication between physician, health agencies, and clients; (6) more severe disease; and (7) heavy prescription load. The combination of prescription load when combined with high drug cost had a most marked effect. The recommendations of this study were: (1) reduce unnecessary use of drugs that result from unwarranted demands by clients and overprescription by physicians, (2) develop cooperation between doctors and pharmacists in prescribing, (3) examine the prescribing habits of providers and (4) provide drugs without charge for the needy over 60.

In a descriptive survey Hershey et al. (1980) examined perceptions of illness and treatment for their relationship to compliance. Perceived barriers included drug side effects, treatment/life style conflicts, and treatment duration. One hundred thirty-two subjects were randomly selected from an

outpatient hypertension program. The barriers of side effects, life style conflicts and treatment duration were found to have a significant negative relationship to compliance, as measured by self-report of medication taking ($p=.05$).

Foster, Fabre, and Cerone (1978) looked at the barriers of antihypertensive medication side effects associated with life style impact such as family, social life, sexual relationships, activities, and job impact. The sample consisted of 25 hypertensive outpatients selected by order of appearance at two Midwest hypertensive clinics. Eighteen were black, the remainder white. Twenty-four were taking two or more antihypertensives. Ninety-six percent reported side effects, the most common being postural hypotension 36%, weakness 36%, failure of erection and/or ejaculation 42% of males, and drowsiness 32%. Most stated side effects compromised their life style, affecting jobs 38%, sexual performance 33%, family life 33%, social life 25%, medication routine 21%, and diet 4%. Rates of compliance 24% occasional noncompliance 32%, and frequent noncompliance 44% were attributed to the burden of side effects on life style (significance level not reported).

As the treatment dropout rate by hypertensive clients is high, the National High Blood Pressure Program has focused on therapy continuation with treatment goals of (1) diastolic pressure below 90mm Hg, optimally under 85mm Hg; and (2) few side effects, optimally none. To address these

two goals, Finnerty (1981) studies 51 patients for step-down therapy: reduction in number of drugs or dosage. The patients had been on two or three drugs and had their blood pressure under control at least six months. The purpose was to reduce side effects and determine minimal medication for blood pressure control. Subjects were seen at six-week intervals in a time series design over 30 months. Dosages were reduced before drug elimination trials. In final analysis, one drug was eliminated for 27 clients and the dosage of another decreased for 43. Thirteen required restep-up therapy. Of 161 side effect complaints, 18% were unchanged, 26% were significantly decreased, and 56% absent. Finnerty stated step-down therapy has the potential to decrease side effects, maintain well-being, and enhance compliance and cost effectiveness.

Haviland (1982) conducted descriptive research on the relationship between perceived social stressors and barriers to dietary compliance with a sample of 71 middle-aged hypertensive women. Data collected by questionnaire were analyzed using Pearson product moment correlations, ANOVA, and descriptive statistics. Significant relationships were found between barriers to diet and the social stressors of parenting ($r = .57$), homemaking ($r = .41$), singlehood ($r = .57$), and finances ($r = .24$). No relationship was found between barriers to diet and the social stressors of job, homemaking/job, marriage, unemployment, and retirement/disability. The author concluded nurses should assess social stressors as

factors which may influence long-term dietary compliance behaviors for hypertensive women.

Nelson et al. (1978) examined the impact of clients; perceptions of health, disease, and medical treatment on compliance with hypertensive treatment. The barriers to treatment included in study were the perceived time costs and convenience of clinic visits, the perceived medication side effects, and the perceived impact of hypertensive treatment on life style. By means of personal interviews with 142 clients compliance was measured in terms of blood pressure control, self-reported medication-taking, and appointment keeping. Blood pressure control was found to be associated with perceived efficacy of therapy, taking medications for other chronic conditions, a high anxiety level when hypertension was first diagnosed, the impact of hypertensive treatment on life style, and a higher educational level. Older age and being employed contributed independently to improved appointment keeping behavior. The researchers concluded that emphasis on the effectiveness of treatment and on the potential consequences of having hypertension would motivate improved blood pressure control.

To summarize these and other studies concerned with perceived barriers to treatment, the relationships between barriers and compliance will be reported in the following section according to the operational definition of barriers.

The side effects of antihypertensive drugs have frequently been studied for their possible association with

compliance, as medical treatment does make some adherents feel worse physically and psychologically (High Blood Pressure Control, 1982; Baile & Gross, 1979). Foster et al. (1978), Hershey et al. (1980), Kirscht et al. (1977), and Nelson et al. (1980) found a negative relationship of side effects to compliance behavior. Cummings et al. (1982) found no relationship. Finnerty (1981) and Isiadinso (1979) stated their findings suggest side effects of medication have a negative effect on compliance behavior.

Research addressing the monetary cost of medication and service usually reports a negative relationship to compliance (Brand et al., 1977; Kirscht & Rosenstock, 1977) however Cummings et al. (1982) reported no relationship. Complexity of treatment (Brand et al., 1977; Isiadinso, 1979) and duration (Hershey et al., 1980) have been shown to have a negative relationship to compliance.

Access to treatment as a study variable has resulted in conflicting findings. Cummings et al. (1982) found a negative relationship, and Logan et al., (1979) found a positive relationship to compliance. Wasserman's (1982) observations suggested a positive relationship, but statistical significance (p) was not reported.

In this review of literature all research studies addressing treatment impact on life style found a negative relationship to compliance as a behavioral outcome (Bowler et al., 1980; Foster et al., 1978; Hershey et al., 1980; Kirscht & Rosenstock, 1977; Levine et al. 1979; Nelson

et al., 1978). The Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure (1980) said adjustment to life style change is a problem for compliance and therapeutic outcomes. There is no discernible benefit, such as relief of symptoms to impel compliance with treatment.

The operational definition of barriers specifically for diet has varied among studies. MacGregor et al., (1982) cited the barriers of inadequate food labeling as to sodium content, and lack of encouragement and reinforcement by the provider, but these barriers were not addressed in the study. Morgan et al. (1978) suggested the high sodium content of many prepared foods is a barrier, but did not investigate the relationship to dietary compliance in their research.

Glanz (1980) stated certain characteristics of dietary treatment are problems and possible barriers to compliance: (1) complex restrictive behavior resulting in many dimensions upon which to error, usual meals, special occasions, snacks, eating out, and so forth; (2) diets are identified with control, not cure; (3) dietary regimen duration; and (4) lack of provider skill in ongoing support. Glanz noted a lack of research on determinants and predictors which are dietary barriers. According to Glanz, much of the data regarding determinants of compliance are of poor quality, difficult to interpret, and do not adequately address chronic illness.

Becker et al. (1977) found a negative relationship of dietary barriers to compliance by the mothers of obese children. Barriers were operationalized as nonsafety of diet, difficulty of implementation, difficulty getting through the day and family problems. However Kirscht & Rosenstock (1977) found no correlation of dietary compliance to the barriers of inconvenience and efforts necessary to comply.

Glanz (1979) cited the dietary barriers of interference with family habits, food cost, lack of access to proper foods, and effort necessary to prepare foods. However, the concept was not examined for its association with dietary compliance.

Few barriers specific for compliance with exercise have been identified in the literature review. Reid and Morgan (1979) found that exercise tailored to life style was more associated with exercise compliance by firefighters. To carry this out subjects designed their own fitness program to overcome a possible life style conflict.

Mulder (1981) specifically addressed the exercise barriers of alcohol abuse, lack of motivation, inadequate understanding of illness, irregular exercise schedule, weather-dependent exercise, lack of time, chronic illness, and regular travel associated with employment. He found any two such barriers correlated with noncompliance with exercise.

In summary, it may be concluded from the review of literature on perceived barriers to treatment that barriers are negatively associated with compliance behavior. However in terms of treatment cost and accessibility this association is not clear. The intangible barriers of treatment impact on life style have more consistantly demonstrated this negative effect.

Research design has complicated the literature review, as have the differences in conceptual definitions. Perceived barriers have been addressed as a component of the health belief model, or studied alone in research on compliance. The same definition of a research variable may be termed "barrier" in one study, and "modifier" in another. Some barriers were a measurement of client perception by self-report, others were researcher-evaluated (costs and accessibility).

Compounding the difficulty of comparing research which addresses barriers operationalized in numerous ways, the outcome variable of compliance varied from study to study (taking medication, following a diet, keeping appointments) as did its measurement (self-report, pill counts, blood pressure).

Needed are replicated studies of barriers addressed to hypertensive treatment which can be used as a basis for the design of appropriate interventions to enhance compliance.

Nursing Intervention

Heine (1981), stated that nurses play an important role in helping hypertensive clients comply with a therapeutic regimen. Nurses have demonstrated their effectiveness in working with these clients through community health projects, health clinics, and various other hypertensive programs. Strategies included development of a therapeutic relationship which consists of establishing good rapport with open, honest communication. Guidance is another method suggested in which the nurse assists the client in making decisions and acquiring skills necessary to carry out the therapeutic plan. Determining what methods of teaching are most effective for that individual, and what factors facilitate or hinder the adaptation of clients to their illness is also important. All health care providers working with hypertensives need to explore solutions to the problems of compliance.

Daniels and Kochar (1980) described their experience in a joint practice with a nationally recognized community hypertensive control program, an inner city hypertensive clinic, and a work site hypertensive program. Monitoring and facilitating compliance to the therapeutic regimen was the responsibility of the nurse. Monitoring compliance was done on an individual level using a therapeutic relationship. The individuals' life style, perception of their illness, goals accomplished, and previous compliance with the

therapeutic regimen were assessed. Strategies for compliance were based on individual needs. The clinical setting was also considered. Services were designed and delivered to facilitate compliance, decrease waiting time, and assure adequate medication supply. Clear instructions were given should side effects occur. Joint decision-making by the clinician, client, and significant others were included in defining the priority and required activities of the therapeutic regimen.

Hogue (1979) described the effect of nursing intervention on compliance with hypertensive therapy. In this study 220 participants were divided into two groups. The experimental group received reinforcement from public health nurses over a two-year period. Control of hypertension increased from 15% to 80% in the experimental group. Two years after the visits stopped, rates of hypertension control decreased to 29% in the experimental group and to 21% in the control group. It was suggested extended supervision was the reason nursing intervention was effective.

Tagliacozzo et al.(1974) reported on the impact of nurse teaching on the compliance behavior of 192 diabetic and hypertensive clients. Participants in the experimental group received four teaching sessions while the control group received none. Results of the study showed within the experimental group participants with higher education, income,

initial disease knowledge, and lower dependence showed higher rates of compliance with medication than those with the opposite characteristics.

Grissom and Gibbs (1976) described goals to help hypertensives. These objectives were understanding of the disease, normalizing the blood pressure, relative freedom from drug side effects, control of salt intake, and elimination of other controllable risk factors for coronary heart disease and stroke. In addition, it was suggested that appointment time should be used more wisely by incorporation of client teaching.

Assuming access difficulty factors are barriers to compliance, work-site nurse-provided care was compared to regular family physician care in a randomized, controlled trial by researchers Logan et al. (1979). Four hundred fifty-seven subjects were selected from 21,906 volunteers screened at business locations, then stratified by age, sex, diastolic blood pressure, and work site, and randomized to receive care by their family physician or by a specially trained nurse. Nursing care was provided during work hours. Physician care occurred outside work time. More work-site clients were prescribed antihypertensive medications (94.7% vs. 62.7%) and reached their goal in six months (48.5% vs. 27.5%). More work-site clients were compliant (67.6% vs. 49.1%) as measured by pill counts and stated compliance. The researchers concluded these significantly improved

outcomes were due to a combination of enhanced access and provider type.

McCombs et al. (1980) reported on the Working Group study to define behaviors critical to hypertensives achieving therapeutic control and assuming active responsibility for their own care. The group focused on achievement and maintenance of long-term hypertensive control through drug therapy, and concentrated on the interactions between clients and health professionals as critical factors. The objectives of the group were to define the client's knowledge, attitudes, and skills necessary to control hypertension over a lifetime. Three premises were identified: active client participation, assisting the client in achieving self care, and interaction between provider and client, will lead to improved compliance. Critical behaviors identified were: decision to control hypertension, follow the therapeutic regimen as prescribed, monitor progress toward blood pressure control, and solve problems that blocked achievement toward blood pressure control. McCombs et al. further applied the nursing process of assessment, planning, intervention, and evaluation in the interaction with the hypertensives. Thus, the Working Group approach provides a basic framework into which the nurse could use the nursing process to facilitate critical client behaviors to achieve outcomes in hypertensive control.

In summary, the literature supports the premise that nurses have been effective in providing services to millions of clients with hypertension. Nurses have made significant contributions in the control of hypertension. However, there still remain a large number of hypertensives who are non-compliant with treatment. Therefore design of alternative interventions to help hypertensives achieve therapeutic control remains crucial to the nursing profession.



CHAPTER IV

METHODOLOGY AND PROCEDURES

Overview

A survey design was used in this study to examine the relationship between perceived barriers to treatment and stated compliance with the hypertensive therapeutic regimen. Secondary analysis of data from the hypertensive and diabetic research project conducted by Given and Given (1982) was employed. The project was federally funded by the Public Health Services Division of Nursing, Grant #5ROINU00662-03, and was carried out at four ambulatory care sites in Michigan. Intake data from one point in time were used.

The following sections of this chapter include hypotheses, instrument development, operationalization of variables, population and sample selection, human rights protection, data collection procedures, and statistical analysis techniques.

Research Hypotheses

Primary hypothesis 1. There is a relationship between client perception of barriers to treatment and stated compliance with the therapeutic regimen.

Secondary hypotheses:

- a. There is a relationship between perception of barriers concerning medications and stated compliance with a medication regimen.
- b. There is a relationship between perception of barriers to diet and stated compliance with a dietary regimen.
- c. There is a relationship between perceived efficacy of therapy and stated compliance with a medication regimen.
- d. There is a relationship between perceived efficacy of therapy and stated compliance with a diet regimen.
- e. There is a relationship between perceived efficacy of therapy and stated compliance with an exercise regimen.
- f. There is a relationship between perceived job/therapy conflicts and stated compliance with a medication regimen.
- g. There is a relationship between perceived job/therapy conflicts and stated compliance with a diet regimen.
- h. There is a relationship between perceived job/therapy conflicts and stated compliance with an exercise regimen.

Primary hypothesis 2. There is a relationship among client perceptions of illness severity and barriers to treatment upon stated compliance with the therapeutic regimen.

Primary hypothesis 2 is a joint hypothesis shared with Brooks (1983), who investigated the relationship between perceived illness severity and stated compliance with the

hypertensive therapeutic regimen by utilizing the same data source.

Development of Instruments

The instruments used in this study were designed for Patient Contributions to Care: Link to Process and Outcome (Given & Given, 1982). The Beliefs about High Blood Pressure and Effects of High Blood Pressure scales were developed in the following manner. Questions were evolved from a review of patient education material and a literature review concerning what the hypertensive client should know about his/her treatment. A sample of 25 hypertensive clients were interviewed in depth to develop statements about the nature of hypertension effects upon health, feelings about therapy, and factors that helped or made the treatment difficult to follow. From the literature and from these interviews statements about perceptual dimensions were identified.

With each instrument, statements were balanced in terms of positive and negative wording responses so that individuals would not engage in a "response set", or tend to agree with all positively worded statements. A five-point Likert scale ranging from strongly agree to strongly disagree was used to record responses.

The instruments were administered to a sample of 154 hypertensive clients and responses were factor analyzed. For purposes of further validation, the instruments were administered to a second sample of 97 hypertensive clients. (Criteria for inclusion into the instrument analysis samples

were the same as that for the research sample. The instrument analysis samples were drawn from populations of hypertensive clients receiving treatment at ambulatory care centers serving as training sites for residents in family practice.) The coefficients of invariance were computed to compare stability of the scales between both samples.

Validity refers to the degree to which an instrument measures what it is designed to measure, and is concerned with sampling adequacy. There are no objective methods of confirming the adequate content coverage of an instrument. One way to evaluate validity is by having someone with expertise and knowledge in that area analyze the items to see if they represent adequately the hypothetical context universe in the correct proportions (Polit & Hungler, 1978). Content validity is concerned with the degree to which the items comprising the scale represent all possible positions on the particular domain under consideration (Crano & Brewer, 1973). The content validity of an instrument is based on judgment. For the scales used in this study, the items were developed by literature review, interviewing of hypertensive clients, pretesting with two samples of hypertensive clients, and knowledge and judgment of the principal investigators.

Measures of reliability, or internal consistancy, were conducted for the instruments in this study. Internal consistancy refers to the extent to which all of the instrument items, or subscales, measure the same attribute.

The less the scores of an instrument are influenced by error, the more reliable is the instrument. One method of evaluation is Cronbach's alpha. The reliability coefficient alpha ranges from 0.00 to 1.00. The higher the coefficient, the more stable the measure. Reliability coefficients above 0.70 are considered satisfactory (Borg & Gall, 1979). The alpha coefficient for each scale was computed by Cronbach's method. Reliability alpha coefficients are reported in Chapter V with the data analysis.

Operationalization of Study Variables

Perception of barriers to treatment is defined as the expressed beliefs and attitudes of the client concerning the barriers to undertaking aspects of the therapeutic regimen (Given & Given, 1982, p. 27; Yoos, 1981). The following dimensions of barriers to implementation of therapy were measured: (1) beliefs about difficulties with medication, (2) beliefs about difficulties with changes required for diet, (3) disbelief or doubt concerning efficacy of therapy, and (4) beliefs about effects of job on therapy.

Perceived barriers to treatment were measured by a total of 29 questions on the Beliefs about High Blood Pressure Scale (Appendix C). Dimension 1, beliefs about difficulties with medications, refers to habit change required, concern with medication dependency, disruption of daily activities, and duration of therapy. The medication barriers were measured using eight items (items 14 to 21). Dimension 2, beliefs about difficulties with changes required for diet,

included interference with normal activities, personal life, feelings of hunger, dislike of allowed foods, time required to follow diet, and need for family support. Diet barriers were measured using eight items (items 22 to 29). Dimension 3, disbelief or doubt concerning therapy efficacy, included beliefs of inappropriateness of treatment, confusion about advice from different health providers, disbelief in health providers, and belief that any treatment would be of little benefit. Inefficacy barriers were measured using six items (items 1, 4, 5, 10, 11, 12). Dimension 4, beliefs about job/therapy conflicts, included job interference with taking medications, following a diet, losing weight, and difficulty following prescribed work habits. Job conflict barriers were measured with seven items (items 31 to 37).

The Beliefs about High Blood Pressure Questionnaire was scored using a Likert-type response (see Appendix C). The degree of barriers was ascertained by assigning a value to each possible response such that a high numerical score of barriers was indicative of a high degree of perceived barriers. Thus agreement by the participant with greater difficulties received a higher score. Scoring was reversed for questions which connotated less perceived barriers such that an agreement with less barriers received a low score.

Stated compliance with the therapeutic regimen is defined as the extent to which the client carries out the therapeutic recommendations of health care providers concerning prescribed medication, diet, behavior modifications,

and follow-up care (Given & Given, 1982, p. 28). Compliance was measured by use of a total of seven questions on the Hypertension Patient Interview Scale (Appendix C). Clients stated their frequency of compliance with prescribed medication (items 1, 2, 3), diet (items 4, 5), and exercise (items 6, 7).

The format of the questions was a statement of action followed by a five-point Likert scale of which the subject was able to indicate whether they carried out the action, i. e. "all the time", "more than half the time", "half the time", "less than half the time", or "none of the time". The numerical score was assigned to each of the possible responses such that a low score was indicative of a high degree of compliance.

Perception of illness severity is defined as the expressed beliefs and attitudes of the client concerning the effect of the condition upon present and future health states (Given & Given, 1982, p. 27). The dimensions included are: (1) perceived comparative seriousness of hypertension, (2) perceived psychosocial effects of hypertension, and (3) perceived impact of hypertension on work. The comparative seriousness dimension which compares hypertension to other worries, problems, and illnesses such as diabetes and pneumonia, was measured with items 2, 3, 6, 7, 8, and 9 on the Beliefs about High Blood Pressure Scale. The perceived psychosocial effects of hypertension were measured with items 1-21 on the Effects of High Blood Pressure Scale (Appendix C).

Psychosocial effects are concerned with interference with social roles, isolation within the family, and changes in recreation, shopping, walking, visiting, chores, responsibilities, emotions and sleep. The dimension of perceived impact of hypertension on work was measured with items 23-29 on the Effects of High Blood Pressure Scale. High perceived severity received high scoring in a Likert-type format.

Extraneous variables are defined as independent variables that may influence the results of the study (Polit & Hungler, 1978). The sociodemographic data of age, sex, race, marital status, and yearly income were elicited with items 1-6 on the Sociodemographic Scale (Appendix C). The clinical characteristics of diagnosed hypertension, highest blood pressure reading in the last six months, and percentage of body overweight at diagnosis were measured with items 1 to 3 on the Medical Record Audit (Appendix C). These sociodemographics and clinical characteristics were utilized as extraneous variables and examined for possible correlations with the major study variables.

As the participants' blood pressures were out of control in this group, it would be useful to discover if there is a relationship to the degree of compliance reported. The duration of hypertension variable may indicate the degree of experience with illness and treatment, suggesting the level of accuracy of perceptions.

A variable that may influence study findings, but for

which data was not collected, was the weight gained or lost since diagnosis. Overweight has been found by other researchers to be directly associated with blood pressure elevation (Stamler et al., 1978).

Population and Sample

The sample in this study was selected in three phases. First, a population of ambulatory hypertensive clients was identified at four sites in Michigan: Grand Rapids, Kalamazoo, Lansing, and Saginaw. Then the population was defined by two methods: by retrieving computerized data from the health information system at three family practice centers, and by a list of patients' names drawn up by the four private physicians who participated in the study.

Criteria specified for the population were: (1) ages 18 to 65; (2) male or female; (3) ability to read and write in the English language; (4) an established diagnosis of essential hypertension; (5) on a prescribed diet and/or medication regimen; and (6) no evidence of the following: stroke, end-stage renal disease, blindness, cancer, psychiatric problems, pregnancy, or lactation.

In the second phase of the sample selection, medical records were screened for the following data: name of medications, dosages and dates prescribed, type of diet, body weight, and two blood pressure measures taken at least two months apart. Potential subjects had to have had a systolic pressure of 140mm Hg or above, or a diastolic pressure of 95mm Hg or above, on two or more occasions. Using this

criteria, 256 potential participants were identified.

Letters were sent to all eligible individuals describing the purpose of the study, its potential benefit to the client, length of time of the study, and the requirements for participation. The rights of the participants were protected using the standards from Michigan State University Committee on Research Involving Human Subjects. Anonymity and confidentiality were assured. The letter was signed by either the medical director of the health care center where the participant sought care, or by the participant's private physician. (See Appendix A for a copy of the contact letter.)

Subjects willing to participate were asked to return a postcard; also those wishing additional information were given a name and telephone number to contact. Follow-up on all letters and postcards was implimented via telephone by an interviewer, and during this time the study was again described and questions answered. One hundred fifty-eight clients age 24 to 65 voluntarily agreed to be included in the study. It is the intake data on these participants that is analyzed for this thesis.

Data Collection Procedures

Data were collected from three sources: (1) interviews with clients, (2) structured self-administered questionnaires, and (3) clients' medical records. This section describes the training and supervision of interviewers, and the procedure for data collection.

The interviewers and auditors included three graduate

students from Michigan State University College of Nursing, and specially trained lay interviewers. Clinic personnel contacted potential lay interviewers from their particular sites, and the research staff interviewed them prior to being hired. The interviewers received two days of instruction and briefing, which included an overview of the research project, ethics and techniques of interviewing, how to contact clients, and participated in role-playing activities until able to carry out the procedures.

After interviewing skills were mastered interviewers were assigned a list of participants to contact. Progress was monitored weekly by research associates and spot-checks were performed to assure accuracy and quality of performance.

When the interviewer met with the participant at the site the interviewer described the study, answered questions and concerns, and upon eliciting the participant's signed consent to participate in the research, placed him/her in a private room. (See Appendix B for a copy of the consent form.) Then the interviewer administered the Hypertension Patient Interview questionnaire and explained the content of the self-administered instruments. The interviewer assured the participant that he/she would be available if questions arose. The interviewer left the room but periodically checked the participant's progress, allowing 40 to 70 minutes to complete the questionnaires.

The interviewer collected the questionnaires, checked for omission of information and returned them to the Project

personnel for computer coding. The questionnaires were pre-coded with the date of completion, site number, and participant code number.

Statistical Analysis

Descriptive and inferential statistical techniques were employed to describe the sample and test the hypothesis of this research. The descriptive analysis computed for the sociodemographic and extraneous variables included range, distribution, percentages, and means. Product moment correlations (Pearson r) were utilized to describe the relationship between the extraneous variables of age, income, duration of hypertension, systolic blood pressure, and diastolic blood pressure; and the major study variables of perceived barriers to treatment, perceived illness severity, and stated compliance with therapy. According to Borg and Gall (1979) the Pearson r describes the strength of relationships between two variables, both of which are continuous scores.

A point-biserial correlation was computed for the relationship between the extraneous variables of sex, race, and percentage overweight (participants being more than 20% overweight or less than 20% overweight); and the major study variables. The point-biserial r may be employed when one variable is a true dichotomy and the second variable is continuous (Borg & Gall, 1979). In this case the major variable scores are continuous, from 1.000 to 5.000. Race was dichotomized only for white or black participants. The

number (n) of one Mexican-American and one of "other" race was not great enough for meaningful analysis.

The correlation coefficient of Pearson product moment or point-biserial is a numerical index (r) that expresses the direction and magnitude of a relationship. The value ranges from -1.00 to 1.00. All correlations that fall between -1.00 and 0.00 are negative relationships, and correlations that fall between 0.00 and 1.00 are positive relationships (Polit & Hungler, 1978). For this study, the criteria for the strength of correlations between the variables were taken from Borg and Gall (1979, p. 513-514): 0.00 to 0.20 is indicative of no relationship, 0.20 to 0.35 is a low relationship, 0.35 to 0.85 is a moderate relationship, and 0.85 to 1.00 is a high to perfect relationship. The level of significance (p) was set at 0.05.

Inferential statistical techniques were utilized to test the hypotheses. Rates of perceived barriers, perceived severity, and stated compliance were first computed for each scale and subscale on a continuous range of 1.000 to 5.000. Total scores were derived for each participant in the sample. Frequencies, means, and standard deviations of scores were calculated. Primary Hypothesis 1 and the associated secondary hypotheses were tested with Pearson product moment correlations. The relationships are reported in Chapter V.

A multiple regression correlation was used to determine the relationship among the variables of Primary Hypothesis 2. A regression was conducted and a multiple correlation

coefficient was obtained. According to Borg and Gall (1979) the multiple regression technique may be employed to determine whether two or more of the predictor variables can be combined to predict the criterion better than any one predictor variable alone. The correlation describes the strength of the relationship among several independent variables and one dependent variable.

Summary

In this chapter the research methodology was described and discussed. The specific topics presented were the research hypotheses, instruments, operationalization of variables, extraneous variables, population and sample, human rights protection, data collection procedures, and statistical analysis techniques. In Chapter V the analysis of data and the results of findings relevant to the research hypotheses and questions are presented.

CHAPTER V

DATA PRESENTATION AND ANALYSIS

Overview

In this chapter a description and analysis of the study population is presented. A discussion of the reliability measures established for each of the scales used in measurement of study variables will be included. Data will be presented which describe the relationships between perceived barriers to treatment and stated compliance with the hypertensive therapeutic regimen among the sample subjects. Additional study findings in the areas of socio-demographics and extraneous variables will be addressed. In the concluding section, a summary of the results of statistical procedures will be presented.

Descriptive Findings of the Study Sample

Following the criteria for sample selection, 158 subjects were recruited into the study. The extraneous variables addressed in the research were age, sex, race, marital status, income, duration of diagnosed hypertension, blood pressure, and percentage overweight.

Age. The age of the sample subjects ranged from 24 to 65. The mean age was 46.8 years, standard deviation 10.4

years. The age of men ranged from 25 to 65, mean 47.7 years, standard deviation 10.4 years. The age of women ranged from 24 to 64, mean 46.0 years, standard deviation 10.5 years.

Sex. About half were male (n = 78, 49.4%) and half female (n = 80, 50.6%).

Race. Of this sample, 86.6% were white and 12.1% were black. The absolute frequency of race recorded was: white n = 136, black n = 19, Mexican-American n = 1, other n = 1, and one participant did not record race.

Marital Status. The majority of sample subjects were married (n = 124, 78.5%). Others were single (n = 11, 7.0%); separated (n = 5, 3.2%); divorced (n = 10, 6.3%); and widowed (n = 8, 5.1%).

Income. The yearly total income was elicited from 151 of the participants (95.6%). The mean range of reported income was \$17,000 - \$19,999. Eighteen of the sample (11.9%) had yearly incomes less than \$9,000; 25 (16.6%) were in the \$9,000 - \$16,999 range; 41 (27.1%) were in the \$17,000 - \$24,999 range; and 67 (44.4%) reported an income above \$25,000.

Duration of Hypertension. The duration of diagnosed hypertension was determined for 152 of the sample subjects. The mean range of hypertensive duration was 6-8 years. Approximately half (n = 83, 54.6%) had diagnosed hypertension five years or less. Twenty-two participants (14.5%) had hypertension 15 or more years.

Blood Pressure. The highest blood pressure reading in the six months preceeding study was ascertained for 151

participants (95.6%). Systolic blood pressures ranged from 108 to 210mm Hg, mean 149.3mm Hg, standard deviation 18.0mm Hg. Diastolic blood pressures ranged from 70 to 120mm Hg, mean 96.7mm Hg, standard deviation 9.6mm Hg.

Percentage Overweight. The sample subjects' weight at the time of definitive diagnosis of hypertension was compared to the ideal body weight for 150 participants (94.9%). One hundred-one (67.3%) were more than 20% overweight. Forty-nine participants (32.7%) were normal weight, or less than 20% overweight.

Summary of Descriptive Findings

In Table 1 the distribution and percentage of participants by sociodemographic and extraneous variables are depicted. The percentages for each variable may not add up to exactly 100.0% due to the rounding off of percentage figures. In summary, the presentation of descriptive statistics shows the hypertensive sample to be evenly divided between male and female participants, and evenly distributed over an age range of 24 to 65. The average duration of hypertension experienced by the sample subjects was about seven years. The means of systolic and diastolic blood pressures were 149.3mm Hg and 96.7mm Hg. Two-thirds of the participants were more than 20% overweight at diagnosis. The majority were white and married, and many were of low economic status.

TABLE 1. DISTRIBUTION AND PERCENTAGE OF SUBJECTS BY
DEMOGRAPHICS AND EXTRANEIOUS VARIABLES

	Number of Participants	Percentage
Age	n - 158	
24-35	22	13.9
36-45	45	28.5
46-55	53	33.5
56-65	38	24.1
Sex	n - 158	
Male	78	49.4
Female	80	50.6
Race	n - 157	
White	136	86.6
Black	19	12.1
Mexican-American	1	.6
Other	1	.6
Marital	n - 158	
Married	124	78.5
Single	11	7.0
Separated	5	3.2
Divorced	10	6.3
Widowed	8	5.1
Income	n - 151	
Less than \$9,000	18	11.9
\$9,000-\$16,999	25	16.6
\$17,000-\$24,999	41	27.1
\$25,000 or more	67	44.4
Duration of Hypertension	n - 152	
Less than 2 years	45	29.6
3-5 years	38	25.0
6-8 years	27	17.8
9-11 years	15	9.9
12-14 years	5	3.3
15 years or more	22	14.5



TABLE 1 (CONT'D).

	Number of Participants	Percentage
Systolic Blood Pressure	n - 151	
108 - 140mm Hg	56	37.1
141 - 165mm Hg	64	49.0
166 - 190mm Hg	17	11.3
191 - 210mm Hg	4	2.6
Diastolic Blood Pressure	n - 151	
70 - 89mm Hg	22	14.6
90 - 104mm Hg	103	68.2
105 - 114mm Hg	23	15.2
115 - 120mm Hg	3	2.0
Percentage Overweight	n - 150	
20% over ideal body weight	101	67.3
Less than 20% over ideal body weight	49	32.7

Reliability and Rates for Instrument Scales

A Cronbach's coefficient alpha was computed for each of the study instruments to establish reliability of instruments. The reliability coefficients and mean scores of instruments are reported here and in Table 2. Total scores were computed within a continuous range of 1.000 to 5.000, derived from the five point Likert responses of "strongly agree" to "strongly disagree", or "all of the time" to "none of the time" (as found in the instruments, Appendix C). High scores for barriers indicated high perceived barriers. High scores for compliance indicated a high degree of stated compliance.

The reliability established for the perceived barriers to treatment scale was .91, mean score 2.076. Reliabilities and means for barriers subscales are as follows: barriers to medication reliability .82, mean 1.804; barriers to diet reliability .77, mean 2.393; efficacy barriers reliability .75, mean 2.161; job/therapy conflicts reliability .90, mean 1.866.

The reliability coefficient for total stated compliance was .76, the mean score was 4.413. The reliabilities and means for compliance subscales are as follows: compliance with medication reliability .77, mean 4.737; compliance with diet reliability .81, mean 3.408; compliance with exercise reliability .87, mean 3.210. The reliabilities reported for all instrument scales represent acceptable levels of internal consistency.

Data Presentation of Inferential Statistics

In this section, each primary and secondary hypothesis will be presented with corresponding data. Hypotheses will be stated in the null to provide for statistical testing on a basis of disproof or rejection (Polit & Hungler, 1978). The statistical techniques utilized to calculate relationships among the study variables were Pearson product moment correlations and a multiple regression correlation. The degree and direction of the relationship will be presented with the level of statistical significance. The confidence level established for this study was $p = .05$. A summary of the inferential statistics is found in Table 3.

Primary hypothesis 1. There is no relationship between total perceived barriers to treatment scores of hypertensive clients and their total stated compliance with the therapeutic regimen scores.

The correlation between the total perceived barriers to treatment scores and total stated compliance scores was $r = -.3555$ ($p = .001$) with 157 respondents. The null hypothesis was rejected; there was a moderate, negative relationship between total perceived barriers to treatment scores and total stated compliance scores, evidencing that as barriers become greater, compliance is less.

Secondary hypothesis 1a. There is no relationship between perceived barriers concerning medication scores and stated compliance with medication scores.

The correlation between perceived barriers concerning medication scores and stated compliance with medication

TABLE 2. MEAN SCORES AND RELIABILITY COEFFICIENTS OF INSTRUMENT SCALES

	Number of Participants	Mean (Range 1-5)	Standard Deviation	Reliability
Total Compliance	158	4.413	.592	.76
Medication "	155	4.737	.612	.77
Dietary "	125	3.408	1.207	.81
Exercise "	50	3.210	1.282	.87
Total Barriers	158	2.076	.464	.91
Medication "	154	1.804	.466	.82
Dietary "	155	2.393	.583	.77
Efficacy "	157	2.161	.584	.75
Job/Therapy "	113	1.866	.564	.90
Total Severity	158	2.672	.407	.94

TABLE 3. THE RELATIONSHIP BETWEEN PERCEIVED BARRIERS TO TREATMENT AND STATED COMPLIANCE (USING PEARSON PRODUCT MOMENT CORRELATIONS)

Compliance	with Medication	with Diet	with Exercise	Total Compliance
Medication Barriers	-.3099***	-.1951*	.0286	-.2698***
Diet Barriers	-.3289***	-.4335***	-.3397**	-.3840***
Doubt of Efficacy	-.2970***	-.3142***	-.1580	-.2967***
Job/Therapy Conflict	-.0918	-.0509	.1894	-.0842
Total Barriers	-.3476***	-.3358***	-.1157	-.3555***

* <.05 significance
 ** <.01
 *** <.001

scores was $r = -.3099$ ($p = .001$), with 154 subjects responding. The null hypothesis was rejected; there was a low, negative relationship between perceived barriers concerning medication scores and stated compliance with medication scores, suggesting that barriers to medication account for part of compliance with medication, but other factors are affecting medication compliance also.

Secondary hypothesis 1b. There is no relationship between perceived barriers to diet scored and stated compliance with diet scores.

The correlation between perceived barriers to diet scores and stated compliance with diet scores was $r = -.4335$ ($p = .001$), with 124 respondents. The null hypothesis was rejected; there was a moderate, negative relationship between perceived barriers to diet scores and stated compliance with diet scores, evidencing that barriers to diet impact to a greater degree on dietary compliance.

Secondary hypothesis 1c. There is no relationship between the perceived inefficacy of therapy scores and stated compliance with medication scores.

The correlation between perceived inefficacy of therapy scores and stated compliance with medication scores was $r = -.2970$ ($p = .001$), with 154 subjects responding. The null hypothesis was rejected; there was a low, negative relationship between perceived inefficacy of therapy scores and stated compliance with medication scores, indicating doubt of efficacy accounts for compliance with medication to a small degree, but the majority of effect is from other factors.



Secondary hypothesis 1d. There is no relationship between perceived inefficacy of therapy scores and stated compliance with diet scores.

The correlation between perceived inefficacy of therapy scores and stated compliance with diet scores was $r = -.3142$ ($p = .001$), with 125 individuals responding. The null hypothesis was rejected. There was a low, negative relationship between perceived inefficacy of therapy scores and stated compliance with diet scores, suggesting that doubt of efficacy also affects compliance with diet to a small degree.

Secondary hypothesis 1e. There is no relationship between perceived inefficacy therapy scores and stated compliance with exercise scores.

The correlation between perceived inefficacy of therapy scores stated compliance with exercise scores was $r = -.1580$ ($p = .137$), 50 individuals responding. The null hypothesis was not rejected; there was no significant relationship between perceived inefficacy of therapy scores and stated compliance with exercise scores, indicating that doubt in therapy efficacy as measured in this study does not account for exercise compliance.

Secondary hypothesis 1f. There is no relationship between perceived job/therapy conflict scores and stated compliance with medication scores.

The correlation between perceived job/therapy conflict scores and stated compliance with medication scores was $r = -.0918$ ($p = .169$), 111 individuals responding. The null hypothesis was not rejected; there was no significant relationship between perceived job/therapy conflict scores

and stated compliance with medication scores, suggesting that job/therapy conflicts as tapped in this study do not account for compliance with medication.

Secondary hypothesis 1g. There is no relationship between perceived job/therapy conflict scores and stated compliance with diet scores.

The correlation between perceived job/therapy conflict scores and stated compliance with diet scores was $r = -.0509$ ($p = .316$), 91 individuals responding. The null hypothesis was not rejected; there was no significant relationship between perceived job/therapy conflict scores and stated compliance with diet scores, indicating that job/therapy conflicts also do not account for dietary compliance.

Secondary hypothesis 1h. There is no relationship between perceived job/therapy conflict scores and stated compliance with exercise scores.

The correlation between perceived job/therapy conflict scores and stated compliance with exercise scores was $r = .1894$ ($p = .131$), 37 individuals responding. The null hypothesis was not rejected; there was no significant relationship between perceived job/therapy conflict scores and stated compliance with exercise scores, indicating job/therapy conflicts do not account for compliance with exercise either.

Primary hypothesis 2. There is no relationship among perceived illness severity scores and perceived barriers to treatment scores upon stated compliance with the therapeutic regimen scores.

The multiple correlation coefficient for perceived illness severity scores and perceived barriers to

treatment scores as combined for predictors of stated compliance scores was multiple $r = .4524$ ($p < .001$). The null hypothesis was rejected; there is a moderate, statistically significant relationship among perceived illness severity scores, perceived barriers to treatment scores, and stated compliance scores, indicating improved prediction of compliance by use of both severity and barriers over use of either one alone. The independent variables of total severity scores and total barriers scores were first correlated with each other, with a moderate relationship indicated ($r = .3884$, $P < .001$). If the independent variables had correlated highly with each other, there would have been little or no improvement in use of the multiple correlation over the use of just one for the prediction of compliance. Therefore, by using both perceived illness severity and perceived barriers to treatment, more of the factors impacting compliance are accounted for.

Extraneous Variables

No significant relationships were found between the extraneous variables of income, race, blood pressure measurements, duration of hypertension, and marital status, and the major study variables. Using Pearson product moment correlations, low relationships were found between age and stated compliance with medication ($r = .2303$, $p = .002$), and age and perceived barriers to diet ($r = -.2240$, $p = .003$). These results indicate that with increasing age,

Participants reported more compliance with medication, and less barriers to dietary treatment.

Females were found to have less stated compliance with exercise than males ($r = -.2718$, $p = .028$), using a point-biserial correlation. Being 20% or more overweight correlated negatively with dietary compliance ($r = -.2205$, $p = .008$), and positively with barriers to diet ($r = .2989$, $p = .001$) and doubt of therapy efficacy ($r = .2193$, $p = .004$). This indicates overweight participants reported less dietary compliance, more barriers to diet and more doubt in therapy efficacy. The correlations for extraneous variables are presented in Tables 4, 5, and 6.

Other Findings

Other significant findings among the variables not included in the hypotheses are presented in this section.

For perceived barriers to diet scores there was a low, negative relationship to stated compliance with medication scores ($r = -.3289$, $p = .001$, $n = 152$); a low, negative relationship to stated compliance with exercise scores ($r = -.3397$, $p = .008$, $n = 50$); and a low, negative relationship to total stated compliance scores. The relationship of dietary barriers to compliance with therapy other than diet was unexpected. It appears that questionnaire items on the dietary barriers scale may in fact be measuring barriers in general.

Perceived barriers to medication scores showed a low, negative relationship to total stated compliance scores ($r = -.2698$, $p = .001$, $n = 154$), indicating that with more

TABLE 4. THE RELATIONSHIP BETWEEN AGE, INCOME, DURATION,
AND MAJOR STUDY VARIABLES (USING PEARSON
PRODUCT MOMENT CORRELATIONS)

	Age	Income	Duration of Hypertension
Medication Compliance	.2303**	.0780	.0463
Dietary Compliance	.1253	.0542	-.0547
Exercise Compliance	.1223	-.1036	.1527
Medication Barriers	-.0883	-.1170	-.0303
Diet Barriers	-.2240**	-.0520	-.1103
Efficacy Barriers	-.1060	-.1311	-.1054
Job-related Barriers	-.0664	-.0710	-.0714
Comparative Seriousness	-.0335	-.0139	.0946
Psychosocial Effects	-.0711	-.1563*	-.0041
Job-related Severity	-.0695	-.0165	-.1613
* < .05 significance			
** < .01			

TABLE 5. THE RELATIONSHIP BETWEEN SYSTOLIC PRESSURE,
 DIASTOLIC PRESSURE AND MAJOR STUDY VARIABLES
 (USING PEARSON PRODUCT MOMENT CORRELATIONS)

	Systolic Blood Pressure	Diastolic Blood Pressure
Medication Compliance	.0506	-.0506
Dietary Compliance	.1381	.0946
Exercise Compliance	.0420	-.0821
Medication Barriers	.0950	.1187
Diet Barriers	-.0903	.0298
Efficacy Barriers	-.0050	.0454
Job-related Barriers	.1024	.1891*
Comparative Seriousness	.0506	.0337
Psychosocial Effects	.0270	.0080
Job-related Severity	.0541	.1197
* < .05 significance		

TABLE 6. THE RELATIONSHIP BETWEEN SEX, MARITAL STATUS, RACE, % OVERWEIGHT, AND MAJOR STUDY VARIABLES (USING POINT-BISERIAL CORRELATIONS)

	Sex	Marital Status	Race	% Overweight
Medication Compliance	-.0437	-.0959	.1165	-.0360
Dietary Compliance	-.0559	-.0368	-.0703	-.2205**
Exercise Compliance	.2718*	-.0570	-.1745	-.2243
Medication Barriers	-.0160	-.0315	.1066	.1550*
Diet Barriers	-.0030	.1068	-.0099	.2989***
Efficacy Barriers	.0677	.0540	-.0721	.2193**
Job-related Barriers	-.1409	.0456	-.0595	.1269
Comparative Seriousness	.1229	.0521	.0339	-.0885
Psychosocial Effects	-.0332	.0093	.1504*	.1612*
Job-related Severity	-.0941	-.0428	.0369	.0357
* < .05 significance ** < .01 *** < .001				

barriers to medication there is less total compliance as measured in this study.

The correlations between the dimensions of perceived severity and stated compliance are summarized in Table 7. There was a low, positive relationship between total perceived illness severity scores and stated compliance with exercise scores ($r = .3756$, $p = .004$, $n = 50$), suggesting that the parameters of severity as tapped in this study account for a small part of the factors which impact on exercise compliance. This indicates that subjects who perceive their hypertension as severe are more compliant with exercise. However, if clients consider themselves more "ill", the provider would not expect them to follow an exercise prescription. Perhaps this finding points out that hypertensives do not feel ill and take on sick-role behavior, as in other chronic conditions.

There were low, positive relationships between perceived comparative seriousness scores and (1) stated compliance with medication scores ($r = .2568$, $p = .001$, $n = 155$), (2) stated compliance with exercise scores ($r = .2861$, $p = .022$, $n = 50$), and (3) total stated compliance scores ($r = .2088$, $p = .004$, $n = 157$). These results indicate that perceived seriousness of hypertension, as compared to other worries and conditions, has a small effect on reported compliance, particularly with medication and exercise.

TABLE 7. THE RELATIONSHIP BETWEEN PERCEIVED ILLNESS
SEVERITY AND STATED COMPLIANCE (USING PEARSON
PRODUCT MOMENT CORRELATIONS)

Compliance	with Medication	with Diet	with Exercise	Total Compliance
Comparative Seriousness	.2568***	.0052	.2861*	.2088**
Psychosocial Effects	-.0576	-.1204	.1572	-.0342
Impact on Job	.0466	.0185	.1936	.0646
Total Severity	.1152	-.0615	.3756**	.1197
* < .05 significance ** < .01 *** < .001				



Summary

In Chapter V a descriptive analysis of the study sample was discussed. Pearson product moment correlations and a multiple correlation coefficient were employed to test the hypotheses. The number of participants responding and significance levels were reported. Reliability indices of the scales also were presented. Additional statistically significant findings also were examined, including relationships to extraneous variables.

In Chapter VI the research and the data described in Chapter V will be summarized and interpreted. Conclusions and recommendations based on these findings will be discussed within the context of the conceptual framework for research. Implications for nursing practice and research will be presented.

CHAPTER VI

SUMMARY AND CONCLUSIONS

Overview

In Chapter VI the research findings will be discussed. The descriptive statistics of the sample will be presented with comparisons to other research samples. Conclusions will be drawn from the hypotheses according to the inferential statistics by which they were accepted or rejected. The implications for nursing practice, education and research will be addressed.

Sample

Sociodemographic information for the 158 study participants included age, sex, race, marital status and income. Additional extraneous variables utilized to describe the sample included the clinical characteristics of duration of hypertension, blood pressure, and percentage over ideal body weight.

Age and Sex. The sample included 80 females (50.6%) and 78 males (49.4%), both groups being evenly distributed over an age range from 24 to 65. The percentage is somewhat less for females than in the Public and High Blood Pressure (1981) sample of 1,168 controlled and uncontrolled

hypertensives of whom 58.0% were female. The Public and High Blood Pressure (PHBP) sample was obtained by the National Heart, Lung and Blood Institute from across the United States by means of a stratified cluster design.

The Hypertension Detection and Follow-up Program Cooperative Group (1979) found that women are more likely to keep their hypertension under control. As this study sample was drawn from hypertensives who were not well controlled (not $< 140/95$ mm Hg) it is expected there would be less females, than in a sample with both controlled and uncontrolled hypertensives.

Low, significant relationships were found between age and medication compliance, and between age and dietary barriers. With older age there was more reported compliance with medication and less dietary barriers. These relationships with medication compliance and dietary barriers could be accounted for by an increased acceptance of the need for treatment as one grows older. In this country the younger adults are expected to be well and have no need for diet and pills (Johnson-Saylor, 1980).

No correlation was found for this sample between gender and medication compliance or dietary compliance. However males were found to have more stated compliance with exercise than females. Other studies were not found by this author that reported the differences in exercise compliance between males and females. This may be explained by the fact that in our culture males have had more social orientation to

exercise, particularly for this age group (mean age in the forties).

Compared to the PHBP study which had 20.4% under age 35, 30.2% ages 35 to 49, and 49.4% ages 50 to 64; in this study there were less in the under 35 age group (12.0%) and more in the 35 to 49 group (43.1%). Nelson et al. (1980) found age not to be associated with compliance, but sex to be significantly related to noncompliance. Seventy percent of males in the Nelson et al. study were noncompliant and 45% of females were noncompliant. Their sample was 31% male, 69% female.

Cummings et al. (1982) and Hershey et al. (1980) found no significant relationship between age or sex and compliance. The Nelson et al. (1978) study showed a positive correlation of compliance with those over 50. Brand et al. (1977) found less medication compliance associated with the oldest and youngest groups. Kirscht and Rosenstock (1977) reported less compliance with diet in those over 60.

Race. The research sample was 86.6% white, 12.1% black, and 1.2% other. The voluntary participants included proportionally more whites, and less blacks and other races than the PHBP survey. As the PHBP study included an over-sample of 1,147 blacks, their "weighted percentages to reflect the adult American population" were utilized to compare values with this research. The PHBP sample of hypertensives was 79.0% white, 16.0% black and 5.0% other after weighing the percentages. The Cummings et al. (1982)

inner city study included 97% blacks. Thus the results of this research should only be generalized to a population similar to the research sample.

The blacks in this study exhibited a tendency (although not significant) toward more psychosocial impact of having hypertension (Table 4, Chapter V). It is possible the sample of blacks have a lower socioeconomic status and thus a tendency of more psychosocial impact. However this information was not determined by the study.

Marital Status. The majority of the participants were married. No relationships were found between marital status and the study variables. Likewise, the Haynes et al. (1982) sample of males was 90% married, with no relationship to compliance reported. Cummings et al. (1982) found no relationship between marital status and compliance in their 37% married, inner city sample. In the Nelson et al. (1980) research, noncompliance was found to be positively related to living alone or having little social interaction, suggesting that lack of social support contributed to noncompliance. Brand et al. (1977) reported singlehood correlated with less medication compliance.

Income. In this research 11.9% of participants reported less than \$9,000 income per year, and 44.4% reported above \$25,000; compared to the PHBP hypertensive sample of 61.6% below \$10,000, and only 19.0% above \$15,000. Thus, this research sample (the mean reported income being \$17,000-\$19,000) has a higher middle class income than the PHBP

sample. Low income in this study showed a tendency toward a correlation with more psychosocial effects of hypertension, indicating that for this sample the psychosocial impact of hypertension may be less as income is more. No other relationships were found with the study variables (Table 4, Chapter V).

Hershey et al. (1980) found no relationship of income to compliance. Nelson et al. (1980) also found income not to be associated with compliance; their sample mean income was \$6,200. A number of researchers (Brand et al. 1977; Cummings et al. 1982) have found that tangible barriers such as low income and high cost of medication have an effect on compliance. However, this researcher found no correlations between income and the dependent study measures of compliance.

Duration of Hypertension. For this study 29.6% of the subjects had been diagnosed for two years or less, 25.0% had been diagnosed for three to five years, 27.7% for six to eleven years, and 14.5% for fifteen or more years. In the PHBP sample 28% were diagnosed for less than two years, 26% for three to five years, 20% for six to ten years, and 25% for more than ten years. These findings indicate that participants in both studies have had considerable experience with the illness and treatment, and time to have formed and set their perceptions, beliefs, and compliance behavior. No relationships were found between the study variables and duration of diagnosed hypertension by this researcher.

Blood Pressure. Blood pressure readings for participants ranged from 108 to 210mm Hg systolic (mean 149.3) and 70 to 120mm Hg diastolic (mean 96.7). The correlation between increased diastolic pressure and increased barriers of job/therapy conflicts approached significance indicating that for some participants job/therapy barriers may result in less blood pressure control. In the Nelson et al. (1978) sample mean diastolic pressure was 103mm Hg pretreatment and 90mm Hg during treatment; the diastolic correlated highly with self reported medication taking. Haynes et al. (1980) found that blood pressure correlated with pill count compliance; the mean entry blood pressure on screening was 155/104mm Hg. However these two studies began with clients on no hypertensive medication, compared to this research in which participants were already under treatment.

It is possible that this author found no significant correlation of blood pressure to compliance because compliance may have been over reported. Higher compliance scores were expected to correlate with lower blood pressure. Another explanation is the possibility the prescription of treatment was not adequate, meaning that compliance with inadequate treatment would not have an appreciable effect on blood pressure.

Percentage Overweight. Two thirds of the participants were more than 20% overweight at diagnosis. Being overweight significantly correlated with less stated dietary compliance, increased perceptions of dietary barriers, and increased

perceptions of doubt of therapy efficacy. Relationships between being overweight and increased psychosocial effects of hypertension, increased barriers to medication, and exercise compliance were found but none were statistically significant.

This extraneous variable of percentage overweight indicates that for this sample overweight is the prevailing problem, perception of dietary barriers is a problem, dietary compliance is a problem, and in addition they doubt efficacy of treatment. Some may experience significant psychosocial effects of having hypertension, perceive barriers to medication, and would not exercise. The tendency toward psychosocial effects may stem directly from obesity rather than hypertension itself. The problem of overweight for this sample is demonstrated by the relationships of being overweight to the major study variables which in turn correlate with each other, as reported in the hypotheses section.

Having greater barriers to diet and less dietary compliance could account for persons being overweight (and thus hypertensive) at diagnosis as well as affect their subsequent attitude toward treatment. Miller (1983, p. 88) described the "powerlessness obesity cycle": powerlessness results when weight loss does not occur after attempts at dieting, and also, powerlessness is a factor that contributes to overeating. Therefore an explanation of the doubt in treatment efficacy experienced by the

overweight sample could be related to past poor success with diets, leading to feelings of powerlessness, which in turn contribute to further overeating (i.e. noncompliance) and perceptions of inefficacy. Furthermore, doubt in therapy efficacy may derive from difficulty controlling hypertension due to being overweight, as obesity is a direct contributor to the hypertensive condition.

In a hypertensive screening of 1,000,000 Americans, those who were overweight had higher blood pressures (Stamler et al., 1978). The frequency of hypertension in overweight individuals was double for ages 20 to 39, and half again as much for those 40 to 64. This relationship was higher in whites than in blacks. Overweight was measured by self estimates of being 25% overweight.

The Hypertension Detection and Follow up Program Cooperative Group (1979) found that 62% of the hypertensives under study were more than 20% overweight. In the PHBP survey 55% of the hypertensives considered themselves to be overweight, 44% had been told to go on a weight loss diet, 22% were on a weight loss diet, and 6.6% of total hypertensives felt they were very successful with their weight loss diet (11.7% felt slightly successful).

The statistical descriptive evidence of this and other studies indicates that obesity is a significant problem in the control of hypertension. And yet a search of the literature did not locate compliance research addressed to both chronic conditions of obesity and hypertension

although experts have noted the additional cardiovascular risk of having both (Chobanian, 1982; The 1980 Report of the Joint National Committee). Implications for further research addressed to the combined condition of obesity and hypertension are indicated by the current gap in literature. The research of this thesis is not specifically addressed to two chronic illnesses. To properly address this issue statistics would need to be computed separately for the non obese hypertensives and the obese hypertensives. Comparisons of two such groups may provide insight into the complexity of having both hypertension and obesity.

Inferential Statistics

A number of significant relationships have been identified between the research variables. As correlations fall in the low to moderate range application of findings must be carried out with caution as other factors not included in the study also impact on compliance with the therapeutic regimen. All significant ($p < .05$) correlations were in the expected direction. Relationships between perceived barriers to treatment and stated compliance were negative: as barriers went up, compliance went down. The correlation among perceived barriers, perceived illness severity, and stated compliance was positive (with barriers put in as a negative value).

In this section each hypothesis is presented separately in the null form followed by interpretation and discussion of the findings. The appropriate implications for nursing



practice, education, and research will be addressed. The implications for nursing were drawn from the research findings within the context of the conceptual framework upon which this study is based. However, study results may only be applicable to a group similar to the study sample.

Primary Hypothesis 1: There is no relationship between total perceived barriers to treatment and stated compliance with the hypertensive therapeutic regimen.

Null hypothesis 1 was rejected. A moderate, statistically significant correlation was found between total perceived barriers and total stated compliance. The relationship was found in the expected direction, i. e. negative. Greater perceived barriers are associated with less compliance. This finding is congruent with other research which addresses perceived life style barriers in a variety of research designs (Foster et al., 1978; Hershey et al., 1980; Kirscht & Rosenstock, 1977; Nelson et al., 1978). Although causality cannot be established by descriptive statistics, it may be concluded from these studies that intangible, life style barriers to treatment are factors affecting compliance behavior, a finding becoming more generalizable as research is replicated, or operationalized in a variety of ways with similar results.

As the correlation was in the moderate range, this finding is considered meaningful in practical application as well as statistically significant. Thus certain

recommendations for nursing practice are implied. More precisely: this finding supports the need to assess clients' perceptions of barriers.

The nurse in primary health care is responsible for providing comprehensive, coordinated care. As part of the interdisciplinary team nurses may assess for perception of barriers as their unique contribution to the provision of comprehensive health care. The nurse's contribution is the diagnosis and treatment of human responses to health problems (American Nurses' Association 1980). Perception of illness and treatment, and compliance behavior may be considered human responses to the hypertensive condition, phenomena for which the nurse is accountable.

The nurse in advanced practice utilizes theory, based upon significant research findings such as this, to establish standards of care and the services provided. Therefore, the nurse in utilizing this research finding will assess for perceived treatment barriers as a potential problem in compliance behavior. Assessment of client perceptions and behavior will provide information for mutual problem solving so that the client may have a basis for implementation of the care plan.

A documented nursing diagnosis of perceived barriers to treatment, and/or compliance behavior, is useful as a basis upon which to evaluate outcomes. In turn, clinical testing of nursing diagnoses contributes to nursing theory and standards of care (Gordon, 1982). Clinical testing

also provides information that may be evaluated for cost effectiveness and third party reimbursement for the nursing profession. Nurses provide care to a large number of hypertensive clients in primary care thus, an opportunity presents itself for nurses to define their role, expertise, and contributions to health care (Guidelines for Educating Nurses in High Blood Pressure Control, 1981).

Blood pressure was not found to be related to stated compliance in this study. Therefore it is important for the nurse to assess for perceived barriers and compliance with therapy whether blood pressure is under control or not. Uncontrolled and compliant clients may be inadequately treated. Uncontrolled and noncompliant clients are in danger of over-prescription. Controlled and noncompliant clients may have already experienced over-prescription and/or may be in need of step down therapy. Evaluation of compliance may uncover what is really going on with the client.

The major challenge of hypertension is accomplishing long term control by means of compliance with a carefully tailored treatment program (Grim & Grim, 1981). The results of this research support an integration of assessment of perceptions pertaining to illness and treatment as part of the nursing process in the care of hypertensive clients for the purpose of achieving blood pressure control.

Secondary Hypothesis 1a: There is no relationship between perceived barriers to medication and stated compliance with medication.

The null hypothesis was rejected. A low, negative

relationship was found between perceived barriers concerning medication and stated compliance with medication. This finding substantiated past research on the barriers to medication association with medication compliance. Greene et al. (1982) reported complexity of the medication regimen to be a barrier affecting compliance. Complexity was addressed in this barriers to medication subscale with a question eliciting confusion by "all the medications" prescribed. However in the Greene et al. study complexity was researcher-perceived rather than client-perceived.

In the Cummings et al. (1982) study the client-perceived barriers of difficulty following the physician's advice, and perceived difficulty of access and costs were negatively associated with stated medication compliance. Cummings et al. found no relationship of medication side effects to medication compliance. Watts (1982) reported no association between the side effects of sexual dysfunction and self reported compliance with antihypertensive medication. In this study side effects were not included in perceived barriers.

It may be concluded that, for this and other research samples, a factor affecting compliance with antihypertensive medication is the client's perception about difficulty with medications. Side effects as a barrier was not addressed in this study but has been found to have variable relationships to compliance by other researchers. As 97.5% of the participants responded to the medication questions, it is

important to know that perceived barriers to medication apart from their side effects have a significant relationship to compliance.

Barriers to medication evidenced a low correlation with total compliance (Chapter V) as well as a moderate correlation with medication compliance. Therefore it is important to assess for medication barriers and compliance with therapy. This recommendation carries an implication for skillful interviewing by the nurse. The subject of compliance could be introduced with some statement that most clients miss taking medication at some time. Thus noncompliance becomes a problem to be solved, not an admission of wrong doing (Gutmann & Meyer, 1981). This will enable the client to set goals addressed to pertinent barriers as well as to the medication prescription.

Secondary Hypothesis 1b: There is no relationship between perceived barriers to diet and stated compliance with diet.

The null hypothesis was rejected; a moderate, negative correlation was found between perceived dietary barriers and stated compliance with diet. This moderate relationship indicates a fairly strong impact on dietary compliance. (A .43 correlation indicates that 22% of the variance in dietary compliance was explained by this scale.) The importance is emphasized by the number of participants who were overweight, an established element in the development and control of hypertension. It was not determined in this study how many were on a low salt diet nor was it determined



if relationships varied by diet type. As 78.5% of the subjects responded to questionnaire items on diet, its prominence in the hypertensive regimen for this sample is accentuated.

It is notable that the strongest correlations of this research were found with dietary barriers. As the focus of research is on life style barriers and diet is a large part of everyone's life style it is particularly salient that those barriers which are the most associated with life style have the greatest impact on compliance. The issue of food intake importance includes basic survival needs as well as the social/emotional impact.

The Reisin et al. (1978), Knapp (1978), and Glanz et al. (1981) studies included information on dietary compliance but barriers to diet were not determined. Morgan et al. (1978) suggested the high sodium content of many prepared foods is a barrier to compliance with low salt diets, but the hypothesis was not tested in their research. Becker et al. (1977) found a significant relationship of barriers (difficulty and nonsafety of diet) to mothers' compliance with their obese child's diet. Kirscht & Rosenstock (1977) reported that inconvenience and the efforts necessary to comply negatively affected self-reported dietary compliance.

This pervasive problem of barriers to diet is accentuated by the relationship of dietary barriers to percentage overweight, medication compliance, dietary compliance, and exercise compliance (Chapter V).



Therefore, it would be important to assess for dietary barriers, perhaps even for the nonobese hypertensive client. Most appropriate would be to utilize the questionnaire items from this study as they proved to be successful in eliciting dietary barriers. Questions as derived from the dietary items could be phrased as follows: "Do you have time to follow through with your diet (medications, exercise)?" "Has it been difficult to follow your diet (medication plan, exercise plan)?" "Does following your diet (medication plan, exercise plan) interfere with your daily activities?" This latter question was an item on the medication questionnaire also. "When you stick to your diet (medication plan, exercise plan) are you always hungry (do you experience unpleasant side effects, e.g. sexual dysfunction, hypotension, sore muscles, tasteless food)?" "Does your personal life interfere with your diet (medication plan, exercise plan)?"

Note that the barriers to medication and exercise questions may be derived directly from the barriers to diet questions. However according to the findings of this study it is most important to elicit barriers to diet regardless of whether barriers to other forms of treatment are found. It seems that clients who percieve dietary barriers are more likely to be obese, and to have problems with compliance with diet, medications, and exercise. A potentially useful finding is that there were fewer percieved dietary barriers in the older participants. One may be able to take



advantage of the latter finding by not giving up on the older clients just because they failed at diets in the past. It is also encouraging to find that duration of diagnosed hypertension did not have an effect on compliance in this sample.

For the sake of practicality and economy it would be important to determine which questions yield the most useful answers. Development of an assessment questionnaire for clinical practice is a recommendation inferred from the research findings.

After assessment for dietary barriers it would be necessary to problem solve and, together with the client, find means to overcome barriers for the goal of enhanced compliance with all forms of therapy. The research does not address intervention but only indicates the areas that are important to assess so the nurse will be able to determine where to focus the interventions. A review of the literature is indicated to find means of intervention and addresses dietary barriers. A useful tool acquired by this researcher is Report of the Working Group on Critical Patient Behaviors in the Dietary Management of High Blood Pressure, (1981). The Working Group looked at environmental considerations to overcome barriers; available foods; thoughts, beliefs and feelings about food; how food is prepared and presented; the influence of others; how changes in diet affect family and friends; how family participation may help or hinder; identification of specific problems.

Glanz (1980) emphasized the value of weight-loss group support to address dietary barriers.

Directly tied to dietary barriers is the problem of the high incidence of overweight individuals with hypertension in the sample subjects. Hypertension is directly related to the condition of obesity, therefore dietary treatment for weight loss is of prime consideration in the overweight hypertensive (Stamler et al., 1978). Being overweight results in increased cardiovascular risk and the need for higher doses of medication due to increased body mass and the hypertensive effect of overweight. However, added to the prevalence of client's who are overweight, is the duration of hypertension experienced by many of the sample. The combined implications are formidable: more perceived diet barriers lead to less dietary compliance, more doubt of therapy efficacy, plus considerable time to become set in perceptions and behavior because of the duration of hypertension.

The implications for the nurse derived from the study findings are as follows. (1) Prevent obesity during childhood (the only possible time to deal effectively with overweight for some). This may prevent the development of hypertension, a fact the public needs to be informed of. (2) Realize clients who are overweight have more barriers to overcome, including doubt of therapy efficacy in general as well as dietary barriers. Assess and evaluate for perceptions of barriers, and develop a mutual plan to deal with them.



(3) Begin positive, active intervention at first diagnosis addressing issues of perceptions of diet barriers and doubt of therapy efficacy. Realize that duration of hypertension alone was not associated with barriers or compliance in this study. Do not assume that because a person has had hypertension for years he/she would not be amenable to change and new interventions. (4) Take advantage of the fact older clients may have less dietary barriers and more medication compliance. (5) During intervention emphasize the relationship of being overweight and hypertension. Self monitoring may accentuate this point (Glanz 1980).

Secondary Hypothesis 1c: There is no relationship between perceived doubt of therapy efficacy and stated compliance with medication.

The null hypothesis was rejected with a low, negative relationship reported. One of the factors impacting on compliance with medication for this sample was doubt of treatment effectiveness. Therefore a barrier to treatment is perceptions of ineffectiveness of treatment. Nelson et al. (1978) also studied perceived efficacy of treatment, and found it to be associated with blood pressure control (less perceived efficacy with less control), however a relationship was not found between belief in efficacy and stated compliance with medication. Morisky et al. (1982) also found perceived efficacy to be related to blood pressure control, but not to self-reported medication taking.

Nelson et al. (1980) found perceived efficacy to be associated with self-reported medication compliance and



persistance in treatment. Thus conflicting research findings limit the generalizability of the results. Perceived efficacy has usually been conceptualized as a perceived treatment benefit. In this study doubt of efficacy is operationalized as a dimension of perceived barriers with the expected negative effect on compliance.

For this sample another point may be made: the overweight group experienced increased perception of doubt in therapy efficacy and exhibited a tendency toward less medication compliance. This indicates there may be more of a problem in this area when the client is overweight. Further nursing research is recommended to explore the possible explanations of this finding for the overweight client: such as behavior patterns, mind set, motivation, locus of control.

Secondary Hypothesis 1d: There is no relationship between perceived doubt of therapy efficacy and stated dietary compliance.

The null hypothesis was rejected due to finding a low, negative relationship. Doubt of therapy efficacy impacts on dietary compliance more than for medication. With these participants, for whom diet is important, perceptions concerning treatment inefficacy have a significant effect on dietary compliance. Again, this problem would appear to be compounded for the overweight group. Perceived efficacy as a benefit of treatment was found to be positively related to dietary compliance by Becker et al. (1977). Thus, this research substantiates the results of the Becker et al. study.

Since doubt of therapy efficacy had the expected significant negative effect on total compliance, compliance with medication, and compliance with diet, the implication for nursing practice involves assessment and evaluation for such doubts. Evaluation for perceptions of inefficacy may include the following questions (derived from questionnaire items): "Has your care helped your high blood pressure?" "Are you getting too much different information about what to do for high blood pressure?" "Is your treatment exactly right for you?" "Do you feel it won't help no matter what you do?" "Is treatment worth the effort?" As these questions relate to previous experience with hypertensive treatment, it would also be important to develop questions for the pre-treatment, planning stage to elicit attitudes and opinions before prescription of any therapy, especially with the overweight hypertensive.

Secondary Hypothesis 1e: There is no relationship between perceived doubt of therapy efficacy and stated compliance with exercise.

Null hypothesis 1e. was accepted. A significant correlation was not reported for perceived doubt of efficacy and stated compliance with exercise by this sample. However the correlation was demonstrated in the expected negative direction. The number responding to exercise and doubt of efficacy questionnaire items was 50, indicating that exercise was not as often prescribed as medication and diet. It may be that the number was insufficient to demonstrate a significant correlation. If the tendency was due entirely



to chance, it may be that people exercise for reasons other than efficacy, such as enjoyment or social acceptance.

As the overweight group showed a tendency toward low exercise compliance and a definite association with doubt of therapy efficacy, the combination suggests a potential problem in the prescription of exercise for the obese hypertensive.

No literature was found by this author that hypothesized a relationship between efficacy or doubt in efficacy, and exercise compliance. Reid and Morgan (1979) reported that exercise "tailored to life style" was associated with more self reported exercise compliance plus increased maximum oxygen uptake (VO_2). Reid and Morgan, and Roman et al. (1981) did not report on the possible barriers which resulted in a 26 to 32% drop out rate for exercise compliance.

Secondary Hypothesis 1f: There is no relationship between perceived job/therapy conflicts and stated compliance with medication.

The null hypothesis was accepted. No significant relationship was reported. Job/therapy conflicts were not directly associated with medication compliance. Apparently these participants did not perceive their job caused problems for compliance with medication. It may be assumed that 70.3% were employed since 111 subjects responded to the work related items on the questionnaire. Literature was not found to substantiate or disprove this finding.

As advanced nursing practice is based on research supported theory, the clinical nurse specialist would not utilize a job conflict assessment as a predictor or possible

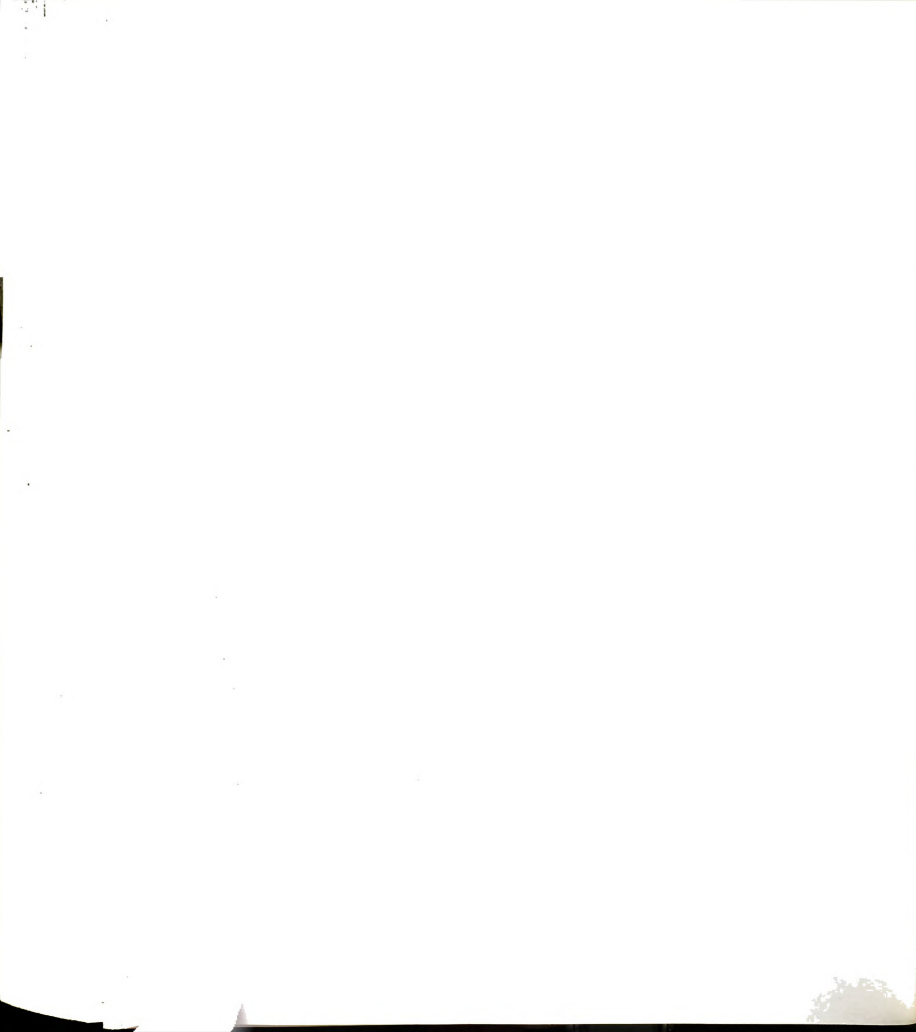


barrier to compliance until other research shows this to be useful. The nurse may consider including this concept in assessment for continued empirical observation and development of research hypotheses, but not as a supportable basis for development of care standards. In addition, since this research was not done on a random sample, the findings are generalizable only to a population similar to the participants. Further nursing research may indicate job/therapy conflicts are a barrier to compliance in a group with different characteristics.

Secondary Hypothesis 1g: There is no relationship between perceived job/therapy conflicts and stated compliance with diet.

The null hypothesis was accepted. No correlation was found for job/therapy conflicts and dietary compliance. Although one's work and employment certainly are a prominent part of their life style (Parkes 1971), for this sample it had no impact on dietary compliance--another important part of life style. This finding may be considered congruent with the fact there was no correlation found between percentage overweight and job/therapy conflicts. Again, literature was not found to substantiate or disprove this finding.

For further nursing research it would be interesting to determine if findings were different for the percentage of the sample who were female, as it is often the women who prepare meals. An additional secondary analysis would elicit this data.



Secondary Hypothesis 1h: There is no relationship between perceived job/therapy conflicts and stated compliance with exercise.

The null hypothesis concerned with job/therapy conflicts with exercise compliance was accepted. No relationship was found. However a tendency was reported in an unexpected, positive direction. That is, with more job/therapy conflicts there may be slightly more compliance with exercise. It may be speculated that perhaps for a few participants a high stress job may prompt them to exercise. But this slight tendency may also be an artifact as only 37 responded to both the job/therapy conflicts and exercise items.

Significant predictors of exercise compliance reported by Mulder (1981) were any two of the following: motivation, understanding of illness, alcohol abuse (negative), and reasons for noncompliance (negative) such as lack of time, chronic illness, and regular travel associated with work. The latter (travel) could be considered a job/therapy conflict that impacts on exercise compliance. However it would be difficult to make comparisons to this research as work-travel amounted to only 50% of Mulders "predictor" and the rate of occurrence of this variable was not reported.

It is notable that the perceived severity dimension of hypertension impact on job (Table 7) also showed no correlations with stated compliance measures. It may be concluded that neither perceptions of the hypertensive condition itself, nor its treatment in the context of job impact, have a significant effect on compliance with therapy for this sample.

Primary hypothesis 2: There is no relationship among perceived barriers to treatment and perceived illness severity upon stated compliance with the hypertensive therapeutic regimen.

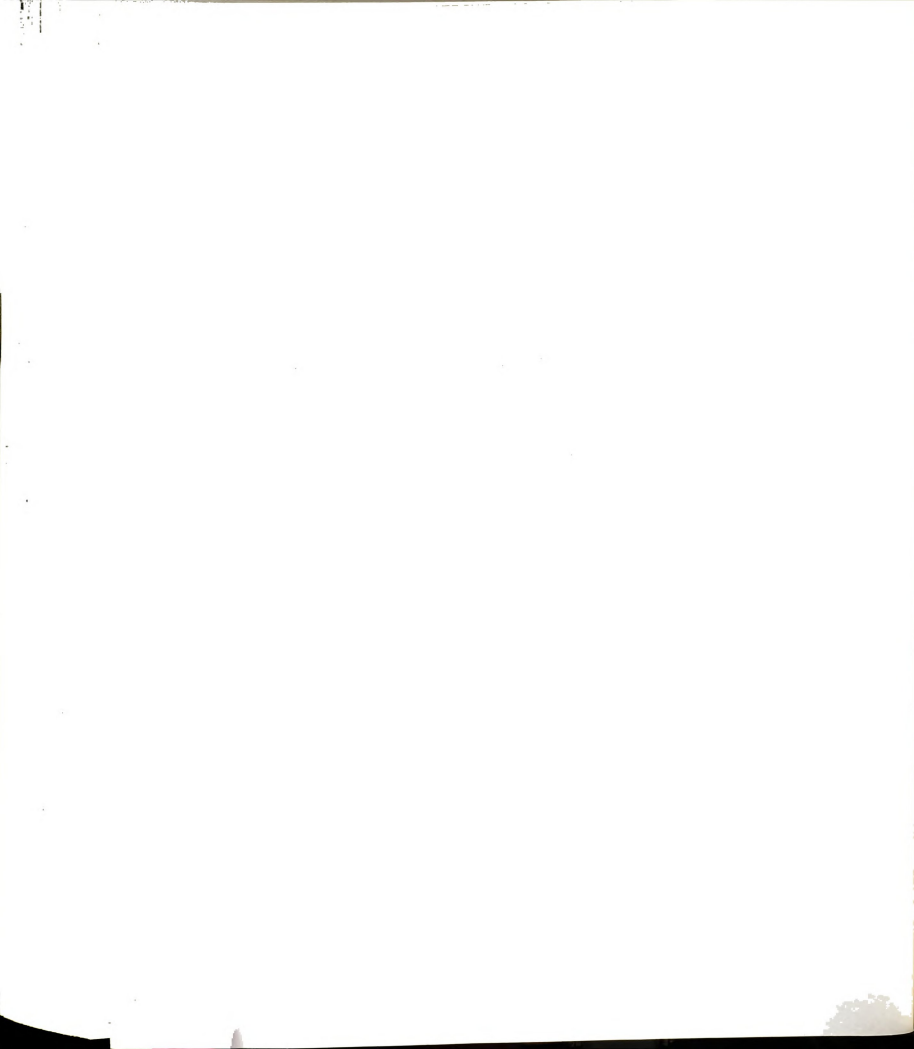
The null hypothesis was rejected. As combined predictors of stated compliance, perceived barriers and perceived severity, effected an improved moderate relationship. This result indicates that compliance behavior is accounted for by multiple perceptions and factors as hypothesized in the health belief model. Use of the health belief model for nursing assessment is supported in part by this research on the two independent variables of barriers and severity. For this sample the total variance accounted for in compliance by barriers and severity is 22.5% (derived from the .45 correlation). The strong correlations found may be due to the specific use of measures which addressed perceived life style barriers and perceived severity as compared to other worries and problems.

Becker et al. (1977) combined four components (susceptibility, severity, benefits, and barriers) of the health belief model to find a total relationship to compliance. However, Andreoli (1981) found no differences in combined health beliefs of susceptibility, severity, benefits, and barriers for compliant and noncompliant male hypertensives. Other researchers (Greene et al., 1982; Nelson et al., 1980) have combined part of the health belief model with other variables and arrived at results difficult to compare. Research that specifically addressed the two combined independent variables

of perceived barriers and perceived severity as they relate to compliance with antihypertensive therapy was not found in a search of the literature.

King's (1981) goal attainment theory is supported by this research. The theory is only tested in part: as client perceptions are related to transaction or appraisal of compliance and health outcomes (Figure 4). Important components of the theory were not incorporated into study, e.g. interaction (goals and agreement on means to achieve goals explored). However it was established by this study that it is essential for the nurse to have knowledge of client perception for assessment, interpretation, and planning so that the client may identify and achieve goals. The nurse must understand persons as systems and the influence perceptions have on human interaction.

In practice, the nurse should ascertain the client's perceived barriers and severity. An assessment tool could be used for this purpose. The nurse formulated his/her own perceptions of the client's barriers and severity and should share these perceptions with the client. The assessment process itself, and sharing the assessment with the client are a means of establishing rapport, a use of therapeutic-self. By assisting the client to become more aware of the relationship between perceived barriers, severity and compliance, the nurse may intervene with anticipatory guidance. With a mutual care plan based on his/her own perception and behavior, the client may implement the therapeutic regimen

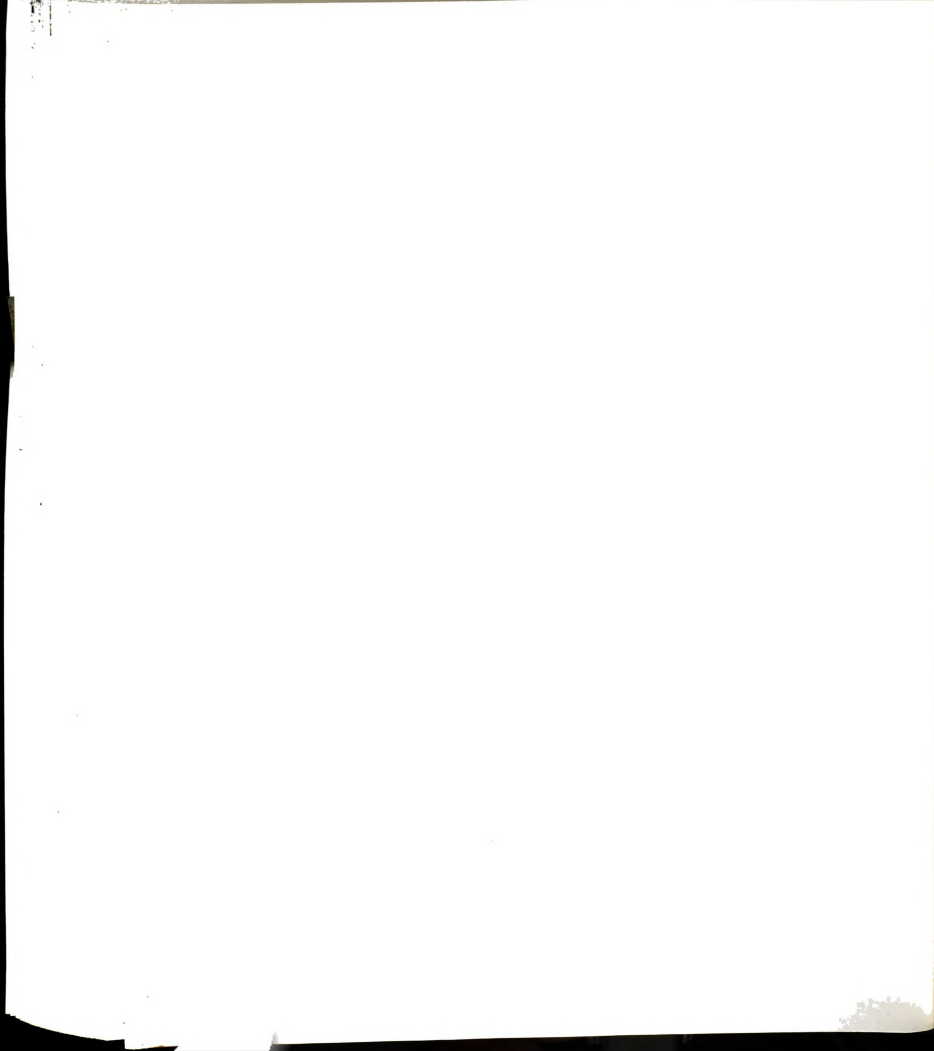


and attain the goal of improved health.

Other Statistical Findings

Three additional statistically significant correlations were identified in this research. Unexpected, low, negative relationships were found between (1) perceived dietary barriers and medication compliance and (2) between perceived dietary barriers and exercise compliance. The correlation between medication compliance and dietary barriers was even greater than between medication compliance and medication barriers. The dietary barriers measure showed some of the highest correlations with stated compliance cutting across the dimensions of medication, diet, and exercise. Two-thirds of this sample have a problem with obesity, and a significant association with dietary barriers was found for those overweight. Thus, problems for compliance with all hypertensive therapy by the obese is implicated by the findings of this research.

These unexpected results may be explained by past unsuccessful experiences with diet leading to doubt in dietary efficacy and thus affecting future attempts by this sample at compliance with any therapy. Another explanation may be that persons with dietary barriers have other psychosocial traits that affect compliance behavior. Also the findings might be accounted for by wording of dietary questions resulting in a broader focus than the category in which the items were placed. Knowing barriers to diet may help the nurse understand other barriers.



The recommendations for nursing practice indicated by these findings are diligent assessment of dietary barriers, and careful evaluation of compliances with all therapy for the obese hypertensive client. It follows that intervention based on these assessments must necessarily be creative and tailored to individual requirements. Nursing research on effective interventions for the obese is needed and would be useful for any chronic illness, such as hypertension, in which obesity is directly associated.

The third additional significant correlation reported was a low negative relationship between perceived barriers to medication and total stated compliance (Table 2). This association was not unexpected as medication is the standard of care for many hypertensives as indicated by the 97.5% of this sample who responded to medication questions.

Summary of Implications for Nursing Practice

A number of study findings have relevance for assessment, planning, and evaluation of nursing care for the hypertensive client. In King's (1981) goal attainment model, compliance with the therapeutic regimen is an indicator that mutual transaction has taken place, preceeded by accurate assessment and mutual planning. Assessment includes taking into account the client perceptions of treatment and illness. To summarize, the nursing practice implications of this research are: the need for ongoing assessment and evaluation of (1) client's weight; (2) client perceptions of dietary barriers, medication barriers, and doubt of therapy efficacy;



and (3) compliance with medication, diet, and exercise. The nurse must also (1) evaluate assessment tools developed, (2) document and communicate nursing activities, and (3) establish nursing care standards for hypertension. By testing the validity of findings in clinical practice the results of this study may be added to research based theory for the care of hypertensive clients.

Implications for Nursing Education

Kaplan and Lieberman (1978) emphasized the need for more health professionals educated in the care of hypertensives to reduce the toll of needless disability and death. The Working Group on Critical Patient Behaviors (Report of the Working Group, 1981) developed a set of concepts, knowledge, and skills needed by professionals helping clients make dietary changes for high blood pressure control. Included are knowledge in the ways weight and/or sodium control may reduce blood pressure, use of good communication skills, and following practical counseling guidelines. The needed concepts, knowledge, and skills must be integrated into nursing curricula for nurses to be properly prepared to apply the nursing process to primary care of hypertensive clients.

Haggerty (1983) stated that nursing is defined by what is taught in nursing schools. The legal basis for the practice of nursing lies within the profession itself. Therefore, before the nursing profession can take responsibility for assessment and evaluation of compliance with therapy for hypertensive clients, it must be integrated into nursing



curricula.

The task force of the National High Blood Pressure Education Program also stated that hypertension needs to be given greater emphasis in nursing curricula and continuing education. The task force emphasized that more nurses need to be prepared to provide primary care to hypertensive clients (Grim & Grim, 1981). In order to implement the assessment of hypertensive clients regarding perceptions of illness and treatment, and compliance behavior for the purpose of designing effective interventions, these skills will need to be learned, be it in generic nursing programs or in continuing education.

The specific implication for nursing education derived from the findings of this research lie in assessment skills, i.e. proper interviewing to elicit the private realms of perception, and behavior expectations, and appraisals (Gutman & Meyer, 1981). The singularly specific need discovered in this study is skill in evaluation of dietary barriers. Dietary barriers proved to have a significant impact on other perceptions and behavior for the study participants.

Glanz (1980) looked at not only how to assess dietary barriers (i.e. nonjudgmentally) but what to assess: (1) what barriers go with what diet, weight loss or low salt; (2) what are the barriers at different times, for meals, snacks, weekends, vacations; (3) in different situations, at work, home, restaurants; (4) with different social influences, family, friends, or alone; (5) with different



clients, demographics, health; (6) with different providers-- problems with lack of skills, problems in interdisciplinary communication. The complexity of evaluating barriers to diet is considerable. Skill in assessment of what is significant will need to be developed through a combination of research, education, and practice.

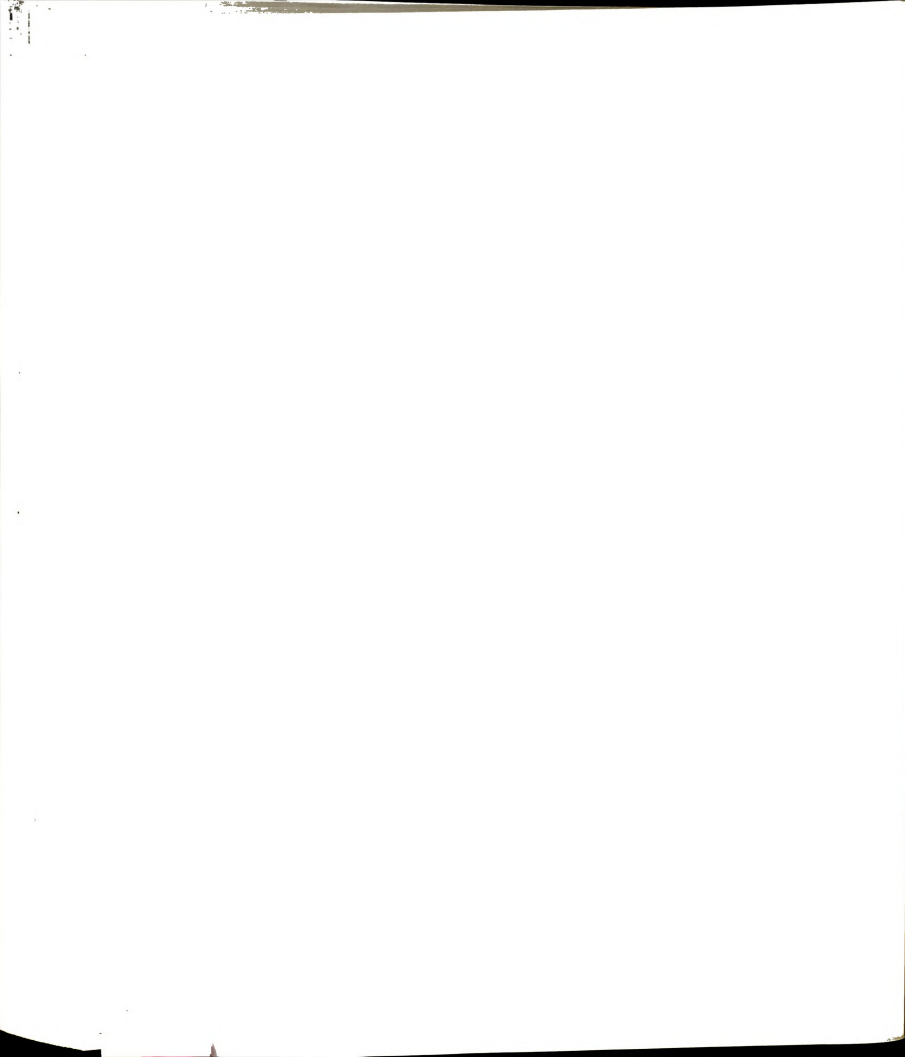
Nurses in advanced practice have graduate preparation in interviewing and assessment skills, and thus are well qualified to manage hypertensive clients in primary care. But the majority of nurses in primary health care have had a basic education that emphasized acute care. An implication of this study is the provision of continuing education for the purpose of tapping the potential of these nurses. However, workshops may be inadequate for learning the skills of assessment for perceptions and behavior.

Implications for Nursing Research

Certain implications for further nursing research may be drawn directly from this study.

Replication

Replication of the research is appropriate. Replication on another hypertensive sample will improve generalizability of findings particularly if a random sample was employed. Descriptive comparisons of these research findings to replicated research on a sample of well controlled hypertensives may suggest ideas for areas of intervention. Replicated research is indicated for the Mexican-American population. This is a group neglected in hypertensive



literature and the incidence rates are unknown. One subject in this study was Mexican-American.

Replication across time with the same group would add to the findings. For example, will clients have fewer barriers to diet and more compliance with medication as they grow older, or is this just a characteristic of a certain age cohort?

Replication with another chronic disease sample would provide useful information on the differences in perceptions and behavior among various chronic illnesses. Comparisons with the results of a nonhypertensive, obese sample may prove enlightening. Further research may answer the question if compliance issues are unique in hypertension.

Expanded Research

This research may be expanded upon in a number of ways. A number of alternative therapies for hypertension have been proposed. As stress management has been suggested by some of the experts (Chobanian, 1982; Kaplan & Lieberman, 1978), barriers to stress management and compliance with stress management could be included. It would be important to standardize operationalization of stress management as a number of methods have been suggested in the literature: imagery, muscle relaxation, modification of environment and/or behavior, exercise, biofeedback, meditation (Girdano & Everly, 1979).

Inclusion of measures of barriers to exercise would be appropriate. Wording of questionnaire items similar to



items in the barriers to diet subscale is suggested due to the successful elicitation of barriers by the use of that subscale. Similar questions could also be added to or substituted for some of the medication barriers items. The purpose would be to elicit perceived life style barriers as related to medication side effects (Foster et al., 1978; Hershey et al., 1980).

Glanz (1980) has determined that standardized measures are needed for dietary barriers and dietary compliance. Research findings have been difficult to compare due to the variety of measures. The complexity of measurement reflects the complexity of implementing a regimen of restrictive behavior (diet) for a variety of clients, illness conditions, and life styles across continuously varying situations.

Glanz looked at dietary research for refinement of measurement: (1) development of new measures, (2) detailed description of measure, and (3) multiple measures, including compliance across time, across various situations, measured by self report, body measurements, blood tests, or combinations of measures. Multiple measures of dietary compliance across time and across various situations would enhance the meaning of the reliability alpha coefficient for the dietary compliance subscale. The two items, as used in this research (Appendix C, Hypertension Patient Interview), are not sufficient to tap the complex parameters of dietary compliance. On the basis of limited information on dietary compliance determined by this research, specific recommendations are



made for expansion of the dietary compliance instrument to measure more completely the realm of this concept.

The implications for expansion of this research would be to analyze dietary barriers and dietary compliance by diet type, namely weight loss, low salt, or combination. And in addition, to analyze the differences between those who have not. In 1981 Glanz et al. reported the differences in compliance with hypertensive diets: 26% compliance rates for low salt diets, and 12% compliance with weight loss diets as measured by self report. However the researchers did not address barriers.

Another way to expand on this research would be to include additional perceptions of benefits of treatment, and susceptibility to illness sequelae, and other components of health belief model such as cues (messages, symptoms), modifying factors (hierarchy of needs, past coping skills, social support, nurse/client relationship), and intention to comply. Intent to comply has been demonstrated by research to be particularly important for implementation of the weight loss regimen (Ajzen & Fishbein, 1980, pp. 101-111). Analysis of additional perceptions and components of the health belief model should include correlations of compliance with the interaction of factors as well as the additive effects.

Experimental Research

A logical next step to be undertaken by the nurse researcher, after finding significant results in a descriptive survey, is an experimental design which tests the findings.



Such an experimental intervention study was the one from which the intake data were analyzed for this thesis (Given & Given, 1982). Reporting the results of the experiment are beyond the scope of this thesis.

As a follow up to the findings of this thesis, mutual interventions would need to be flexible in design to address the barriers assessed. Gutmann and Meyer (1981) have suggested behavioral techniques to improve compliance such as tailoring, imaging, situational cueing, contracting, self monitoring, reinforcement, involvement of significant others; and cognitive techniques such as client participation in education by personalizing information and making decisions consistent with good hypertensive control. The experiment should be designed to provide information on practicality and cost effectiveness of the intervention (Garritty, 1980).

Compliance as Transaction

Compliance has been criticized as a concept which may imply authoritarianism, condescension, and coerciveness (Jonsen, 1979; Stanitis & Ryan, 1982). The research in this study was done on stated compliance without determining if the therapeutic regimen was based on mutually established goals. Research could be designed to analyze the differences in compliance rates with mutually established goals or provider established goals of therapy.

Efficacy of Low Salt Diet, Exercise, and Stress Reduction

The antihypertensive value of medication and weight loss have been well documented. Needed are large scale studies

that address the antihypertensive effectiveness of low salt diets, exercise, and stress reduction. The positive health character of these interventions make them particularly appropriate for nursing research.

Conclusion

In conclusion, nursing management of hypertensive clients through research based practice involves a continuous process of practice, theory development, research, education, practice, and so forth, in an ongoing cycle. This study on compliance with the hypertensive therapeutic regimen is a beginning attempt to test nursing theory in the real world of interaction between nurse and client.

Within the conceptual framework of King's nursing theory significant relationships were found between medication barriers and compliance with medication; dietary barriers and compliance with diet, medication, and exercise; doubt of efficacy and compliance with diet and medication; perceived barriers together with perceived severity and total stated compliance; and overweight with dietary barriers, doubt in efficacy, and dietary compliance. The common theme throughout is perception of dietary barriers. The complexity revealed by these inter-related factors supports the assessment of perceptions as hypothesized in the theoretical model for the purpose of goal attainment (King, 1981, pp. 20-26, 59-62). As the nurse/client interaction process is more fully explored with continued research on nursing theory, effective interventions may be developed for the ultimate



goal of health.

In Chapter VI the research findings were presented. Included were a description and analysis of the study sample with a comparison to the sample characteristics of other studies. Conclusions were drawn from the inferential statistics applied to the research hypotheses contingent on their substantiation of, or confliction with, part research findings. The recommendations and implications for nursing practice, education, and research were discussed.



APPENDICES

APPENDIX A

CONTACT LETTER

To improve the care we give patients with high blood pressure, our medical and nursing staffs are working with researchers at Michigan State University to help patients better manage their high blood pressure. We are asking many patients, including you, for help in this effort.

Your assistance is important and we hope you will agree to participate in this important project. Your participation will involve responding to a questionnaire--administered by a research interviewer from the University--at your next visit and at two other visits during the next fifteen months. In addition, you may be asked to meet with a staff nurse during the next six months to talk with her about your high blood pressure and its treatment. We hope you will meet with them.

The information you give about yourself and your personal identity will, of course, remain strictly confidential. Should the results of the study be published, you will remain anonymous. You are free to discontinue your participation in this study at any time.

If you do not agree to participate, or should you withdraw from the study after originally agreeing to participate, the amount and quality of service we provide you, naturally, will not change. However, by agreeing to participate, you will help yourself and us to provide better care for all our patients.

To indicate your willingness to participate in this study, please return the enclosed postcard so we can arrange a day and time that it will be convenient for you to meet and talk with an interviewer.

Sincerely,

Director, Family Practice

APPENDIX B

CONSENT FORM



CONSENT FORM

The study in which you are about to participate is designed to find out the beliefs that persons with hypertension have about their disease and treatment. Your participation will involve responding to a questionnaire and permitting University researchers to review your past and future medical records. If you agree to participate, please sign the following statement.

1. I have freely consented to take part in a study of patients being conducted by the _____
(Study Site Name)
and the College of Nursing and the Department of Community Health Science of the Colleges of Human and Osteopathic Medicine at Michigan State University.
2. The study has been described and explained to me and I understand what my participation will involve.
3. I understand that if I withdraw from the study after originally agreeing to participate, the amount and quality of service provided me will not change. I understand that I can withdraw from participating at any time.
4. I understand that the results of the study will be treated in strict confidence and that should they be published, my name will remain anonymous. I understand that within these restrictions results can upon request be made available to me.

I, _____, state that I understand
(print name)
what is required of me as a participant and agree to take part in this study.

Signed _____
(Signature of Patient)

Date _____

APPENDIX C

INSTRUMENTS

Sociodemographic

Hypertension Intake Information Medical Record Audit

Hypertension Patient Interview

Beliefs About High Blood Pressure

Effects Of High Blood Pressure

SOCIODEMOGRAPHIC

The following questions describe general things about you.
Please answer all the questions to the best of your ability.

1. Sex: (CHECK ONE)

- 1. Male _____
- 2. Female _____

2. Age: (WRITE IN)

3. What is your racial or ethnic background? (CHECK ONE)

- 1. White _____
- 2. Black _____
- 3. Mexican-American _____
- 4. American Indian _____
- 5. Oriental _____
- 6. Other (Specify) _____

4. What is your marital status? (CHECK ONE)

- 1. Married _____
- 2. Single, never married _____
- 3. Separated _____
- 4. Divorced _____
- 5. Widowed _____

5. Taking all sources of money into consideration, what was your family's total income before taxes and other deductions for the past 12 months? (CHECK ONE)

- | | |
|----------------------------|----------------------------|
| 1. Below \$5,000 _____ | 6. \$13,000-\$14,999 _____ |
| 2. \$5,000-\$6,999 _____ | 7. \$15,000-\$16,999 _____ |
| 3. \$7,000-\$8,999 _____ | 8. \$17,000-\$19,999 _____ |
| 4. \$9,000-\$10,999 _____ | 9. \$20,000-\$24,999 _____ |
| 5. \$11,000-\$12,999 _____ | 10. \$25,000 or over _____ |

HYPERTENSION INTAKE INFORMATION MEDICAL RECORD AUDIT

1. How many years has the patient had hypertension?
(WRITE IN) _____ Years
2. What was the patient's highest blood pressure reading during the past six months? (WRITE IN AND SPECIFY POSITION) _____
3. Was the patient overweight at the visit at which a definitive diagnosis of hypertension was made?
 1. Twenty percent over ideal body weight
 2. Normal
 3. Less than 20% over ideal body weight
 4. Weight not recorded

HYPERTENSION PATIENT INTERVIEW

Now I'm going to ask you some questions about the medicines your doctor has prescribed for you and about some suggestions he/she may have given you.

I'd like you to tell me what medicines you've taken during the last two weeks. Let's start with the first one you think of. What's its name? What other medicine have you taken in the last two weeks?

	Med No. 1	Med No. 2	Med No. 3	Med No. 4	Med No. 5
1. Do you take (name-med)					
(READ CATEGORIES. CIRCLE ANSWER IN APPROPRIATE COL.)					
1. All the time,	1	1	1	1	1
2. More than half the time,	2	2	2	2	2
3. Half the time,	3	3	3	3	3
4. Less than half the time, or	4	4	4	4	4
5. None of the time?	5	5	5	5	5
2. In the past two weeks have you taken the <u>prescribed</u> <u>dosage of</u> (name-med)					
1. All the time,	1	1	1	1	1
2. More than half the time,	2	2	2	2	2
3. Half the time,	3	3	3	3	3
4. Less than half the time, or	4	4	4	4	4
5. None of the time?	5	5	5	5	5
3. In the past two weeks have you taken (name-med) at the <u>recommended time of day</u>					
1. All the time,	1	1	1	1	1
2. More than half the time,	2	2	2	2	2
3. Half the time,	3	3	3	3	3
4. Less than half the time, or	4	4	4	4	4
5. None of the time?	5	5	5	5	5

Did the doctor suggest you follow a special diet?
IF NO, ASK: Has the doctor ever suggested you change
(alter) your present diet?

4. Would you say you follow the diet suggested (READ CATEGORIES)
- | | |
|-----------------------------|-----------------------------|
| 1. All the time, | 4. Less than half the time, |
| 2. More than half the time, | or |
| 3. Half the time, | 5. None of the time? |
5. When you're away from home, have you followed the diet prescribed (READ CATEGORIES)
- | | |
|-----------------------------|-----------------------------|
| 1. All the time, | 4. Less than half the time, |
| 2. More than half the time, | or |
| 3. Half the time, | 5. None of the time? |

Did the doctor suggest you alter your physical activity in any way because of your high blood pressure?
IF NO ASK: Has the doctor ever suggested an exercise program to you?

6. Would you say you follow the exercise recommended (READ CATEGORIES)
- | | |
|-----------------------------|-----------------------------|
| 1. All the time, | 4. Less than half the time, |
| 2. More than half the time, | or |
| 3. Half the time, | 5. None of the time? |
7. When you're away from home, do you follow the exercise prescribed (READ CATEGORIES)
- | | |
|-----------------------------|-----------------------------|
| 1. All the time, | 4. Less than half the time, |
| 2. More than half the time, | or |
| 3. Half the time, | 5. None of the time? |

BELIEFS ABOUT HIGH BLOOD PRESSURE

EVERYONE HAS CERTAIN BELIEFS ABOUT HIGH BLOOD PRESSURE AND WHAT HELPS THEM TO FEEL BETTER. BELOW IS A LIST OF STATEMENTS THAT SOME PEOPLE BELIEVE ABOUT HIGH BLOOD PRESSURE AND THE BENEFITS OF TREATMENT. SINCE WE ARE TRYING TO GET YOUR FEELINGS OR BELIEFS, PLEASE INDICATE THE EXTENT OF YOUR AGREEMENT WITH EACH STATEMENT. THERE ARE NO RIGHT OR WRONG ANSWERS.

ALL ITEMS ARE TO BE CIRCLED AS FOLLOWS:
IF YOU STRONGLY AGREE WITH THE STATEMENT THEN CIRCLE STRONGLY AGREE. IF YOU AGREE WITH THE STATEMENT THEN CIRCLE AGREE. IF YOU ARE UNDECIDED ABOUT THE STATEMENT THEN CIRCLE UNDECIDED. IF YOU DISAGREE WITH THE STATEMENT THEN CIRCLE DISAGREE. IF YOU STRONGLY DISAGREE WITH THE STATEMENT THEN CIRCLE STRONGLY DISAGREE.

1. In general, the doctor has helped my high blood pressure.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

2. High blood pressure is much less serious than pneumonia.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

3. My high blood pressure will go away when I don't have so many other problems.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

4. So many doctors have talked to me I don't know what to do for my high blood pressure.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

5. The treatment that has been prescribed isn't exactly right for me.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

6. High blood pressure is not as serious as some people say.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

7. Right now I have more important things to worry about than my high blood pressure.

Strongly Agree Agree Undecided Disagree Strongly Disagree

8. High blood pressure is much less serious than diabetes.

Strongly Agree Agree Undecided Disagree Strongly Disagree

9. Since my high blood pressure isn't serious I don't have to worry so much.

Strongly Agree Agree Undecided Disagree Strongly Disagree

10. Taking care of my blood pressure is worth the effort it requires.

Strongly Agree Agree Undecided Disagree Strongly Disagree

11. Treatment for high blood pressure is doing me a lot of good.

Strongly Agree Agree Undecided Disagree Strongly Disagree

12. A person could do everything he/she is supposed to do to control high blood pressure but it won't help much.

Strongly Agree Agree Undecided Disagree Strongly Disagree

13. Some patients have to take pills (medications) to help control their high blood pressure. Do you take any pills for your high blood pressure? (CHECK ONE)

1. Yes, take pills_____ 2. No, do not take pills_____

↓
GO TO QUESTION 22.

14. I am confused by all the medications the doctor has given me.

Strongly Agree Agree Undecided Disagree Strongly Disagree

15. I would have to change too many habits to take my medications.

Strongly Agree Agree Undecided Disagree Strongly Disagree

16. If I take my medications I may become dependent upon them.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
17. I am not interested in taking my medications regularly.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
18. Taking my medications interferes with my normal daily activities.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
19. I must take my high blood pressure medications even if I don't think I am getting better.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
20. I believe that my medications will control my high blood pressure.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
21. Taking medication is something a person must do no matter how hard it is.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|

EVERYONE WHO HAS HIGH BLOOD PRESSURE HAS TO FOLLOW SOME GUIDELINES FOR EATING (OR A DIET) TO HELP CONTROL HIGH BLOOD PRESSURE. SOME PATIENTS MUST BE CONCERNED WITH CALORIES OR CARBOHYDRATES, OTHERS WITH FAT OR PROTEIN RESTRICTIONS. THE FOLLOWING STATEMENTS DESCRIBE BELIEFS SOME PEOPLE HAVE ABOUT THE DIET THEY MUST FOLLOW. PLEASE INDICATE THE EXTENT OF YOUR AGREEMENT WITH EACH STATEMENT BY CIRCLING ONE CHOICE FOR EACH STATEMENT.

22. Following my diet does not interfere with my normal daily activities.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
23. I am always hungry when I stick to my diet.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|

24. I dislike the tastes of foods on my diet.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

25. My personal life does not interfere with my diet.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

26. It has been difficult following the diet prescribed for me.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

27. I have time to follow the diet the doctor ordered for me.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

28. I can count on my family when I need help following my diet.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

29. My husband/wife helps me to follow my diet.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

30. Do you work outside your home for money either full-time or part-time? (CHECK ONE)

1. Yes _____



GO TO QUESTION 31.

2. No _____



GO TO END OF QUESTIONNAIRE

PLEASE INDICATE THE EXTENT OF YOUR AGREEMENT WITH EACH OF THE FOLLOWING STATEMENTS THAT DESCRIBE BELIEFS SOME PEOPLE HAVE ABOUT WORKING AND THEIR ILLNESS. CIRCLE ONE CHOICE FOR EACH STATEMENT.

31. If I changed jobs it would be easier to follow my diet.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

32. My job does not interfere with taking my medications.

Strongly	Agree	Undecided	Disagree	Strongly
Agree				Disagree

33. I worry so much about my job that I can't take my medications.

Strongly	Agree	Undecided	Disagree	Strongly
Agree				Disagree

34. If I changed jobs it would be easier to take my medications.

Strongly	Agree	Undecided	Disagree	Strongly
Agree				Disagree

35. My work makes me so tired it is hard to follow my diet.

Strongly	Agree	Undecided	Disagree	Strongly
Agree				Disagree

36. I could control my weight if the pressures of my job weren't so great.

Strongly	Agree	Undecided	Disagree	Strongly
Agree				Disagree

37. It has been difficult to follow the work habits prescribed.

Strongly	Agree	Undecided	Disagree	Strongly
Agree				Disagree

END: You have now completed this part of the questionnaire.
Please begin answering the next section.



EFFECTS OF HIGH BLOOD PRESSURE

EVERYONE HAS CERTAIN THINGS THEY USUALLY DO IN CARRYING ON THEIR LIVES. SOMETIMES BECAUSE OF YOUR HIGH BLOOD PRESSURE YOU DON'T DO THINGS IN THE USUAL WAY: YOU CUT OUT SOMETHING; YOU DO OTHER THINGS FOR SHORTER LENGTHS OF TIME; OR YOU DO THINGS IN DIFFERENT WAYS. WE ARE INTERESTED IN CHANGES IN YOUR USUAL ACTIVITIES DUE TO YOUR HIGH BLOOD PRESSURE.

PLEASE ANSWER ALL THE STATEMENTS AS HONESTLY AS YOU CAN. WORK QUICKLY, NOT SPENDING TOO MUCH TIME ON ANY ONE QUESTION. THERE ARE NO RIGHT OR WRONG ANSWERS.

REMEMBER WE ARE INTERESTED IN HOW YOUR HIGH BLOOD PRESSURE AFFECTS YOU.

1. Because of my high blood pressure I do not go out for entertainment often.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

2. Because of my high blood pressure I am doing less of the shopping (errands) than I usually do.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

3. I am able to do my usual social activities.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

4. I am doing my usual community activities.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

5. I am doing my usual physical recreational activities.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

6. Because of my high blood pressure I stay home most of the time.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

7. My high blood pressure has disrupted my friendships.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

8. Because of my high blood pressure I isolate myself from the rest of my family.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

9. My high blood pressure does not interfere with the regular daily work around the house that I usually do (for example, yard work, repairs, cooking, cleaning).

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

10. Because of my high blood pressure I stay away from home only for brief periods of time.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

11. My high blood pressure does not interfere with the length of visits with my friends.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

12. My high blood pressure does not interfere with my usual recreational activities.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

13. I am asking others to do my usual household work because of my high blood pressure.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

14. My high blood pressure does not interfere with the things I do to take care of my children or family.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

15. Because of my high blood pressure I am more nervous or restless.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

16. I act irritable and impatient with myself (for example, talk badly about myself, swear at myself, or blame myself for things that happen).

Strongly Agree Agree Undecided Disagree Strongly Disagree

17. My high blood pressure causes me to do inactive recreation (for example, watch TV, play cards, read).

Strongly Agree Agree Undecided Disagree Strongly Disagree

18. My high blood pressure interferes with my sleep (for example, I wake up early, can't fall asleep, awaken frequently).

Strongly Agree Agree Undecided Disagree Strongly Disagree

19. I feel as if my family has become more disorganized since I was told I have high blood pressure.

Strongly Agree Agree Undecided Disagree Strongly Disagree

20. Because of my high blood pressure I don't walk if I can avoid it.

Strongly Agree Agree Undecided Disagree Strongly Disagree

21. Because of my high blood pressure I often act irritably toward family members (for example, snap at them, criticize them, pick fights).

Strongly Agree Agree Undecided Disagree Strongly Disagree

22. Do you work outside your home for money either full-time or part-time? (CHECK ONE)

1. Yes _____



2. No _____

↓
GO TO END OF QUESTIONNAIRE

23. I believe that my high blood pressure makes my job difficult.

Strongly Agree Agree Undecided Disagree Strongly Disagree



24. Because of my high blood pressure I am doing a different kind of work.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

25. I am absent from work often because of my high blood pressure.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

26. I do my job as carefully and as accurately as I can.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

27. Because of my high blood pressure I have to make an extra effort to get started at work.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

28. Because of my high blood pressure I act irritably toward my work associates (for example, snap at them, give sharp answers, criticize easily).

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

29. My high blood pressure interferes with my work so that I work more slowly at my job.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
-------------------	-------	-----------	----------	----------------------

END: You have completed this part of the questionnaire.

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LIST OF REFERENCES

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