This is to certify that the

thesis entitled

THE RELATIONSHIP OF PERCEIVED
ILLNESS SEVERITY AND COMPLIANCE
WITH THE HYPERTENSIVE THERAPEUTIC REGIMEN

presented by

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has been accepted towards fulfillment
of the requirements for

Masters of Science degree in Nursing

Barbara Given

Major professor

Date 8-12-83

THE RELATIONSHIP OF PERCEIVED ILLNESS SEVERITY AND COMPLIANCE WITH THE HYPERTENSIVE THERAPEUTIC REGIMEN

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A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE IN NURSING

College of Nursing

1983

ABSTRACT

THE RELATIONSHIP OF PERCEIVED ILLNESS SEVERITY, AND COMPLIANCE WITH THE HYPERTENSIVE THERAPEUTIC REGIMEN

By

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Hypertension is a chronic illness which constitutes a major health problem in the United States today. Compliance with treatment is of vital importance to prevent heart disease, stroke and kidney failure. This descriptive study based on data from a large study was designed to identify hypertensives' perceptions of illness severity, and barriers to treatment, as related to stated compliance with the therapeutic regimen. Data were collected on 158 hypertensives by means of a self-administered instrument and client interview.

Using Pearson Moment Correlation Coefficients, statistically significant relationships between comparative seriousness and medication compliance ($r = .2568$, $p < .001$); stated compliance with exercise ($r = .2861$, $p < .05$); perceived illness severity barriers to treatment, and stated compliance ($r = .4524$, $p < .001$) were determined to exist in the sample. These findings could provide guidelines for nursing interventions to develop a mutual and effective therapeutic plan for hypertensive clients.

This thesis is dedicated to

nurses and hypertensive clients.

ACKNOWLEDGMENTS

Sincere thanks and appreciation is extended to Barbara Given, R.N., Ph.D., and Charles W. Given, Ph.D., for use of their data, because without their devoted efforts and willingness to share their statistics this research could never have been successfully completed.

I am also grateful to my thesis committee members Gwen Wyatt, R.N., M.S.N., Judy Longworth, R.N., M.S.N., and Dr. Barbara and Charles Given, for their guidance and support throughout the completion of this study. To Rob Hymes who acted as a statistical consultant I wish to convey my sincere appreciation. To Elaine Harmon, my thesis partner, your support and enthusiasm proved to be invaluable. Sincere thanks to Vicky and Richard Wheeler for the typing of the manuscript and concern for perfection.

Most special appreciation is reserved for my husband Frank for his love and support, for encouraging me never to stop until the completion of this study. To my son Frank, thank you for caring and understanding of the many new roles I have acquired through growth and knowledge...Again, a special thanks to everyone.

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CHAPTER I

THE PROBLEM

Introduction

There is a general agreement among health care providers that hypertension is a major contributor to heart disease, stroke, and renal failure (Working Group, 1979). These serious illnesses may be prevented if blood pressure is brought toward normal, by compliance with therapeutic treatment.

The purpose of this study is to determine which variables significantly influence the hypertensive client's compliance with the therapeutic regimen. In particular, two components of the health belief model are examined: perceived illness severity, and perceived barriers to treatment, as they relate to compliance with therapeutic treatment of the hypertensive client.

The data utilized in the study were collected as part of a federally funded research project, Patient Contributions to Care: Link to Process and Outcome (5ROINUO0662, 1982), B. Given and C.W. Given, co-principal investigators. Additionally, portion of this research was conducted in collaboration with Harmon (1983).

Background

Hypertension is a chronic illness with major complications of stroke, coronary artery disease and renal failure. Hypertension has been cited as the most common cardiovascular disease, and one of the greatest public health problems, accounting for approximately 50% of all deaths (National Heart, Lung and Blood Institute, 1980). Kannel (1978) reported on data from the Framingham study which indicated hypertension as the dominant contributor to cardiovascular disease. Degrees of elevated blood pressure have been associated in direct proportion to cardiovascular events. According to Kannel, (1978) adequate and continuous treatment significantly prevents heart disease, stroke and renal failure.

Hypertension has been acknowledged as a significant health concern by the National Heart, Lung and Blood Institute (High Blood Pressure Control, NHLBI, 1982). Over one-fourth of the United States' population, approximately 60 million Americans suffer from elevated blood pressure, with 35 million having readings greater than 160/95mm Hg, and 25 million with readings ranging from 140/90 to 160/95mm Hg. The NHLBI supports the Framingham findings of: (1) Hypertension as the most significant contributor to stroke, the third leading cause of death in the United States. (2) Hypertension as a major cause of accelerating atherosclerosis, a disease contributing to 1.25 million

cases of heart attack per year. (3) Elevated blood pressure being directly proportioned to the incidence of renal failure. Health care cost for hypertension is estimated at approximately eight billion per year, including lost wages and productivity without taking into account the toll of suffering (Levy, 1982).

According to the NHLBI report of the 35 million of hypertensives with pressures greater than 160/95mm Hg, approximately two-thirds know it, and 80% of the two-thirds have their blood pressure checked regularly. Only 24% of the 35 million have their blood pressure in control, with 24% being aware of their illness, yet not on treatment, 20% being inadequately treated, and 32% still unaware of their illness (High Blood Pressure Control, 1982).

In the State of Michigan, there are 1.8 million adult hypertensives which represents 28% of the adult population. Only 46% are aware of their illness, and of this number, half are uncontrolled. It is therefore estimated that 23% of total hypertensives have their blood pressure in control (Michigan Department of Public Health, 1982).

Hypertension Defined

The World Health Organization (WHO) 1973 has adopted the following definition of hypertension. The term hypertension is synonymous with essential hypertension, and is designated by physiological changes and characteristics

which ultimately leads to elevation of diastolic and systolic blood pressure, anatomical changes in the vascular tree, with functional impairment of the involved tissues. Hypertensive disease is considered to be a clinical entity in which vasoconstriction, elevated blood pressure and vascular sequelae which is initiated by an unknown pressor. The WHO criterion for hypertension is a systolic and diastolic pressure 160/95mm Hg. Kaplan (1978) refers to hypertension as a sequelae of arteriolar changes that occur during the progression of the disease. As Kaplan (1978) has indicated, the definition of hypertension by the WHO is controversial, since others have suggested that hypertension is not a specific disease with an arbitrary dividing line separating it from normal. According to The 1980 Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure stratification of hypertension is as indicated: diastolic pressure of 90-104mm Hg = mild, 105-114mm Hg = moderate, 115mm Hg = severe. Borhani (1981) indicated that "mild" hypertension is a misnomer because even with low levels of hypertension, there is a relationship to cardiovascular disease. Thus, treatment of mild hypertension is efficacious in decreasing mortality and morbidity. A large number of hypertensives have a diastolic pressure of 90-100mm Hg. According to Borhani, successful treatment of this group has a potential to decrease or eliminate 42% mortality rate associated with hypertension.

In this research, hypertension out of control is operationalized as a systolic pressure >140mm Hg and/or a diastolic 95mm Hg on two occasions at least two months apart, which is the standard of practice (Chobanian, 1982, Given, Given, p. 61, 1982).

Coordination of Efforts to Control Hypertension

In 1972 the National High Blood Pressure Education Program (NHBPEP) coordinated by the NHLBI, sponsored efforts to (1) provide education to health professionals and the public on hypertension, and (2) to mobilize resources to detect, control and evaluate hypertension (Guidelines for Education Nurses in High Blood Pressure Control, 1981). Cunningham and Hill 1982 postulate that the declining rate of hypertension coincides with the activities of the NHBPEP established in 1972. Activities of the NHBPEP included establishment of task forces representing various professional groups. In 1975 the NHBPEP, in collaboration 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. According to Grim, Grim (1981) their goal was to review nursing role and delineate education necessary to fulfill that role.

Nurses are the largest health professional group in the United States, and are invaluable resources in delivering health care services to those with

hypertension. Nurses provide the major portion of direct patient care in a wide variety of health care settings. Therefore, nurses have frequent opportunities for detection, follow-up, and education concerning hypertension. With specialized education, nurses can assume major responsibility in primary care of those with hypertension. Nurses are well qualified to monitor chronic illnesses, to evaluate prescribed therapy, and to provide psychosocial support and health education. One of the major challenges is accomplishing long-term control which hinges on compliance with a carefully tailored regimen (Grim, Grim, 1981; Guidelines for Educating Nurses in High Blood Pressure Control, 1981).

Specific Task Force recommendations that were developed for nurses were: (1) client and family understanding of hypertension and prescribed treatment. (2) Successful adjustment of client and family to diagnosis and treatment. (3) Assumption of responsibility for self care within the client's psychological and physical limits. (4) Achievement of controlled blood pressure in accordance with the medical goal. (5) Decreasing side effects of medications. (6) Limitation of target organ damage. Specific objectives were designated by the Task Force to support and accomplish their recommendations. The objectives were: (1) Greater emphasis on hypertension in nursing curricula, and continuing education programs. (2) Preparation of a larger number of nurses to provide primary

care for hypertensive clients. (3) Research relative to the care of hypertensive clients (Grim, Grim, 1981).

Compliance in Hypertension Control

The National High Blood Pressure Education Program has tasks of great magnitude to accomplish before achieving its goals concerning hypertension. A major task is detection of high blood pressure in those presently unaware of their condition. A second task 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 most of those with high blood pressure although highly effective and relatively safe therapy has been developed (Chobanian, 1982).

Baile and Gross (1979) state that noncompliance with antihypertensive therapy is one of the most common problems in failure to control hypertension. Webb (1980) agrees 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 serious health threat due to the probable vascular consequences. Adherence 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 great importance in the

control of hypertension.

Compliance with therapy is 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 NHBPEP 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) examined correlations between client perception factors and compliance behavior. Client perception factors include perceptions of disease threat, such as susceptibility to the disease and seriousness of the disease, and perceptions of therapy benefits and/or barriers. This group of factors about perceptions has been placed in a formulation called the health belief model (Becker, 1974; Becker et al., 1979). The total or partial health belief model has been used as a basis for considerable study of client compliance with treatment

(Andreoli, 1981; Green et al., 1982; Loustau, 1979; Stunkard, 1981; Watts, 1981).

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 take a health-related action. Therefore the model has value in predicting client compliance. According to the 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 from taking action as compared to the perceived costs and/or 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).

From this complex health belief model two components, perceived illness severity and perceived barriers to treatment, have been selected for study. Although components of the model are hypothesized to be interrelated, it is beyond the scope of this research to address all possible relationships.

Problem Statement

The specific problem is: How do client's perceptions of illness severity relate to stated compliance with the hypertensive therapeutic regimen? This problem warrants

further study, as it is vitally important for the health provider to understand health-related behavior. Understanding of such behavior is essential to obtain the cooperation and participation of clients in their carrying out major implementation of the therapeutic regimen.

The health belief model provides one approach to the understanding of health-related behavior. The approach implies that attempts to influence the behavior of clients must be based on better knowledge of client health beliefs and perceptions. For optimal health outcomes, problems which relate to compliance behavior must be appropriately overcome.

Definition of Concepts

The study variables include perceived severity of illness, perceived barriers to treatment, and stated compliance with the therapeutic regimen.

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 to biological heritage. As processes and contexts vary, so do perceptions of common experiences.

Nursing theorist King (1981, p. 24) defines perception as: 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." Where as Ajzen and Fishbein (1975) suggest that perceptions relate activity with outcome. How a person views a particular situation is influenced by experience, past memory and attitude, this will effect whether certain behavior will lead to a desired outcome or goal. According to Ajzen and Fishbein (1980, p. 5) theory of reasoned action "people consider the implications of their actions before they decide to engage or not engage in a give behavior."

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. Such effects may be changes in

type or frequency of entertainment, shopping, recreation, walking, visits with friends, isolation within the family, household chores, family responsibilities, emotions, and sleep.

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 (1981) 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 on Detection, Evaluation and Treatment of High Blood Pressure).

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 dependency, 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.

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, p.28, 1982). In this research measures of client compliance are based on client report of compliance with medication, 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 illness severity and stated compliance with the therapeutic regimen.

Secondary hypotheses:

a. There is a relationship between perceived comparative seriousness and stated compliance with a medication regimen.

b. There is a relationship between perceived comparative seriousness and stated compliance with a diet regimen.

c. there is a relationship between perceived comparative seriousness and stated compliance with an exercise regimen.

d. There is a relationship between perceived psychosocial effects of hypertension and stated compliance with a medication regimen.

e. There is a relationship between perceived psychosocial effects of hypertension and stated compliance with a diet regimen.

f. There is a relationship between perceived psychosocial effects of hypertension and stated compliance with an exercise regimen.

g. There is a relationship between percieved impact of hypertension on work and stated compliance with a medication regimen.

h. There is a relationship between perceived impact of hypertension on work and stated compliance with a diet regimen.

i. There is a relationship between perceived impact of hypertension on work 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 hypothses 1 and 2, are schematically represented in Figure 1.

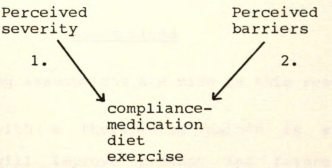

Figure 1. Primary Hypotheses

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

Description of Sample

The sample employed in this study were 158 hypertensives who voluntarily agreed and met the following criteria: (1) were aged between 18 to 65 years; (2) were medically diagnosed as having essential hypertension; (3) were able to read and write the English language; (4) were not documented as having a stroke, end stage renal disease, blindness, cancer, psychiatric problems, and pregnancy or lactation; (5) were on a prescribed diet or medication regimen for control of hypertension.

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 stated.
2. Health-related perceptions affect compliance and other health-related behavior.
3. The concepts of perceived illness severity, perceived barriers to treatment, 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 severity of illness, perceived barriers to treatment, and stated compliance.

6. The sample is representative of hypertensive clients receiving care in primary care sites.

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 was 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 model,

provider-patient relationships, developmental stages, and social support.

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. 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

Introduction

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

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 95% of the hypertensive population have essential hypertension (Chobanian, 1982; Kaplan & Liebeiman,

1978; Kochar, 1981; Marcinek, 1982). 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 (Cummings & Kirscht et al., 1982; Heine,1981; Hershey et al., 1980). This study will focus on essential hypertension which accounts for the majority of hypertensive clients seen in primary care sites.

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, which is the amount of circulating blood, can also 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, this causes subsequent elevation in blood pressure. In summary, blood pressure equals cardiac output times peripheral resistance, (BP = CO X PR) (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), which causes 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 catecholamine excretion have been found in the urine of 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 sodium that is filtered in an attempt to expand the volume of blood. In addition, the kidneys also secrete the enzyme renin, which acts upon other enzymes. Renin is increased in sodium deprivation and decreased by sodium loading. Renin is also excreted in kidney ischemia. When renin is released from the kidneys it catalyzes the conversion of angiotensinogen to angiotension I. Angiotension I is further changed to angiotension II by a conversion enzyme found in the lung capillaries. Angiotension II increases blood pressure by causing vasoconstriction of peripheral areterioles, and in addition, stimulates 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 which causes 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 that are 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 is 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, forgetfullness, and irritability. Strokes in hypertensive clients are caused by atherosclerosis acceleration and multiple microaneurysms 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. Finally, 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 results being congestive heart failure (Marcinek, 1982).

In summary, the 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 should be addressed. One way to assess the psychosocial needs of the hypertensive client is by 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 preventative 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 valence 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 valence. Kurt 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 (Becker, 1974; Becker et al., 1978; Becker et al., 1979; Becker and Rosenstock, 1978).

According to the original health belief model (Rosenstock, 1960)for individualsto take action to avoid a disease they would need to believe: that they were personally susceptible to illness, that the occurrence of the disease would have at least moderate severity on some component 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 benifits would not entail overcoming important psychological barriers, such as cost, convenience, and pain (Becker, 1974). Figure 2 illustrates a schematic diagram of the interrelationship of the major variables within the model. 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 (Becker, 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 (Becker, 1974).

The health belief model has been utilized in examining preventative health behaviors: screening tests for tuberculosis, cervical cancer, dental disease and rheumatic fever (Becker, 1974) Although the health belief model originally had been used to predict preventative 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, 1978; Becker et al., 1979; Becker and Maiman, 1980; Cummings & Kirscht 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. 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, which is an added concept for application to chronic illness. Motivation has been operationalized as state of 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 further 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 provides 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 et al., 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 seriousness of 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 (1980) Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure indicated 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

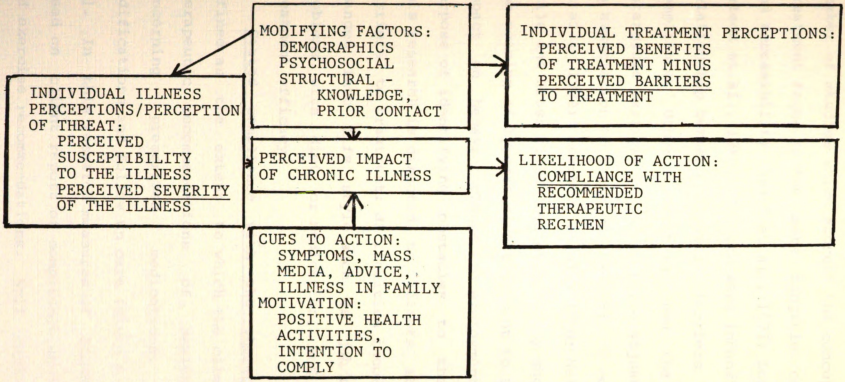

Figure 2
HEALTH BELIEF MODEL ADAPTED FROM
BECKER ET AL., 1974 AND KASL, 1974

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 research 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, 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. (1978) 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 when compared to pill counts. Interviewing the hypertensive

client 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 client (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 differences in their intended meanings (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, 1977). 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 clients take an active role in their 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 the 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. 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. Whereas the health belief model only focuses on health perceptions and the behavior an individual will undertake according to the perception of illness and treatment. For example, do hypertensive clients perceive their illness severe enough to

take the medication daily? King focuses on the overall communication and decision-making process, and the health belief model represents the health behavior the client will take. 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 represents one type of interpersonal system. Concepts from the theory of goal attainment are: perception, judgment, action, reaction, interaction, and transaction. In addition, 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 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 and efforts to control events.

Persons 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.

Furthermore, 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. 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.

According to King (1981) interaction is defined as a process of perception and communication between person and environment. 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 react to each other and the situation accordingly.

As the nurse and client set goals they are said to interact and react to each other. During this process the nurse can use the health belief model to assess client

perceptions and health related behaviors thereby helping the client overcome any barriers to treatment.

Transaction is viewed by King (1981) as an observable behavior of human beings interacting with their environment. Transaction involves bargaining, negotiation, and social exchange. In addition, persons can share their frame of reference about events in the present, identify commonality, and mutually set goals, the final outcomes of transaction. Transaction is viewed as growth and development. It is the purposeful interaction that leads to goal attainment. Therefore the nurse can facilitate client knowledge and skills, allowing growth and development, and finally maximizing the client potential to achieve compliance with treatment.

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

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,

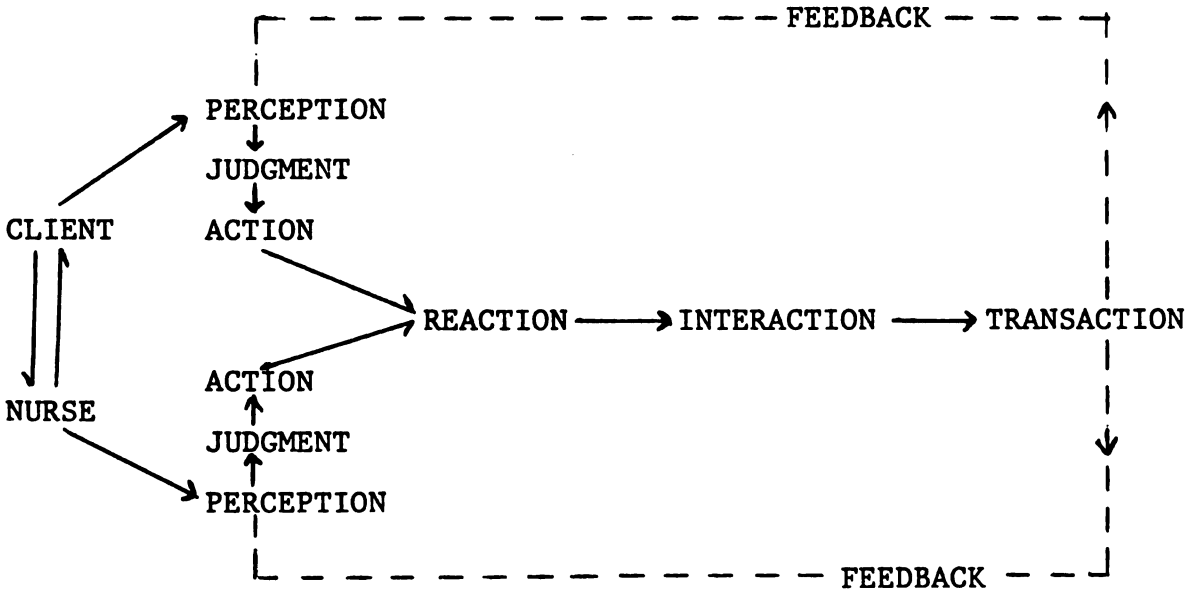

Figure 3
A PROCESS OF HUMAN INTERACTION, I. KING, 1981

judgment, action, reaction, interaction, and transaction whereby the nurse assists the client to cope with illnesses and promote health.

Nursing Intervention

The problem of hypertensive compliance with a therapeutic regimen is a complex one. Compliance means following recommendations in terms of medication, diet, exercise, and adjusting 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 a 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. In addition, do they perceive hypertension as causing other health problems? Finally, do clients perceive the hypertension as resulting in complications? To assess barriers to treatment, the nurse

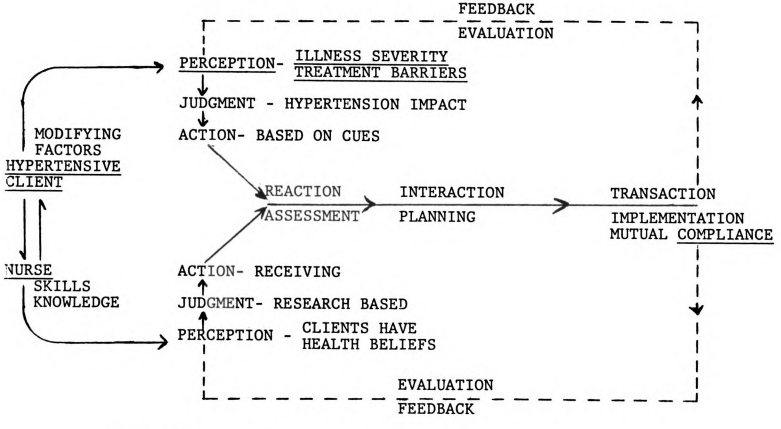

Figure 4
COMBINED MODEL FOR THE HYPERTENSIVE CLIENT

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 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 client-nurse interaction. Using the health belief model the nurse can start with the 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

Introduction

This chapter was prepared jointly and in collaboration with Harmon (1983). In this chapter relevant literature pertaining to the study variables of perceived illness severity, perceived barriers to treatment, 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 opinions of experts 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.

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 the data from the Veterans Administration Study conducted from 1967 to 1972. This was a prospective, randomized, double blind therapeutic trial which included 523 males from VA 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 infraction, 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 Mass. has demonstrated efficacy of treatment for hypertension (Kannel, et al., 1978). The participants (n = 5,184) men and women ages 30 to 62 years 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 infractions 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 Hypertensive Detection and Follow-up Program Cooperative Group (HDFP, 1982). This was a five-year study of 10,940 hypertensive participants aged 30-69 with a diastolic blood pressure greater than 90mm Hg. The report of the HDFP 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 HDFP clinic, whereas the referred care group was referred to the community physicians for care.

Mortality surveys were conducted yearly in both the "stepped care" and referred care groups throughout the five-year period (HDFP, 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 ages 30-49 at entry of study; and (4) a 45% reduction in the incidence of stroke among stepped care participants age 60-69. 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 (The Australian Therapeutic Trial, 1980). This was a controlled trial of drug treatment. In this study (n = 3,427) men and women, aged 30 to 69 years with a diastolic blood pressure 95-110mm Hg,and systolic pressure less than 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 antihypertensives for those with diastolics above 100mm Hg, however for the majority with diastolic pressure of 90-100, 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 as well.

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 rate seemed to be age-related. The younger age group were less likely to be aware of their hypertension, on a therapeutic regimen; and in controlled (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 18-44 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. Whereas in 1978, 80% were aware of their hypertension and 69% were receiving 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 by the High Blood Pressure Control Study Group (1982). The statistics showed that the majority of hypertensives do not have their disease 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."

In summary, the literature supports the premise that pharmacological and nonpharmacological 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 is 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 (1980-1983).

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 education 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 noncompliant 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 occured, i.e. the extent to which the behavior coincided with therapeutic recommendations.

Compliance Measures

The 1980 Report of 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 moderates 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 bioavailability 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 non-compliance 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 overestimation 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 says 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 consisted of 135 newly treated

male hypertensives who were studied over six months. On the assumption the pill count is the most accurate measurement of compliance, interviewing was found to be a useful approach to asssessment 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 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 advantages 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 of 90mm Hg and below, or the lowest diastolic pressure consistent with safety and tolerance (The 1980

Report of the Joint National Committee; Kaplan & Liebeiman, 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, quanethidine, 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 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 above 165, hyper cholesterolemia, and target organ damage (The 1980 Report of the Joint National Committee; Kaplan & Liebeiman, 1978). Chobanian (1982) indicated that antihypertensive drugs should be considered for the mild hypertensive if the nonpharmacological approach is not effective.

In a quasi-experimental design, Haynes et al., (1983) 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 > 95mm 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 medications 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 50mg 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 than those not on medication (12.2 vs 7.8mm Hg mean decrease, $p < .001$). Clients on more vigorous treatment had a lower diastolic pressure ($p < .005$). Clients were dichotomized into two groups, grater than 80% and less than 80% compliant, as measured by pill count. Twenty seven percent of the low compliers and 44% of the high compliers had a diastolic less 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 below 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 misclassed as compliant), (3) noncompliant-and-controlled, 16% (may be misclassed 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 consequental due to HDFP findings which support treatment of diastolics 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 VA 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%, $n = 47$); propranolal (62.5%, $n = 89$); potassium chloride (60.7%, $n = 114$); and 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 diastolic below 100mm Hg; and noncompliance as stated

noncompliance with any diastolic, or stated compliance with diastolic above 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 noncompliers while self-report identified 55% of noncompliers as defined by pill count. The prevalence of noncompliance by pill count was:

(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 noncompliant.

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 decreases 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 by 10mm Hg. The obese should decrease intake of saturated fats

and cholesterol as well as lose weight to decrease their cardiovascular risk (Kaplan & Liebeiman, 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 in the hypertensive, indicates the association between overweight and elevated blood pressure is probably 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 at least three kilograms (mean, 10.5 kg). 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 pressure 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 over eat, 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 hypertensions.

Other authors claim epidemiological studies evidence a reduction of salt in the diet to below two grams a day will prevent essential 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 essesntial 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. Chlorthalidone, hydrochlorothiazide, or furosemide were given for four-week intervals. Mean fall in blood pressure was 13.9mm Hg with the lower sodium diet and 9.1 mm Hg with the higher sodium diet. Potassium fell a mean of 225 mEq 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 fell a mean of 7.3mm Hg, compared to a control group of 31 on no treatment whose disastolic rose 1.8mm Hg. A third group of 62 on antihypertensives experienced a drop in diastolic similar to the low-sodium group, plus a greater decline in systolic. However, the 31 thiazide treated subjects experienced a decline in serum potassium and

elevation of serum uric acide (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 sodiunm diet.

Kaplan and Liebeiman (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 minimizes 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 pharmocologic 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 inconsistant 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.

Studies supported the validity of information on compliance using interviews for measurement. Weight loss usually correlated with reported compliance. Inadequate information was more of a problem than inaccurate information. Glanz found difficulties with weight loss itself as a compliance measure. Further research needs 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 non compliance 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", Boyer and Kasch, 1970. Over a six-month period, 23 hypertensive and 22 normotensive middle-aged men participated in a walk/jog exercise program. Hypertension was defined as a diastolic pressure above 95mm Hg. The hypertensive group experienced a drop of

11.8mm Hg in mean diastolic and 13.5mm Hg in mean systolic pressure (p = 0.01). In the normotensive group a mean diastolic decrease of 6.0mm Hg occurred but without significant change in systolic.

Messerli (1981) stated that although exercise is regularly prescribed for hypertension, the antihypertensive mechanism of prolonged exercise remains obscure. Noting that general vasodilatation occurs immediately after exercise Messerli hypoethsized 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 callisthenic 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 ($p < 0.001$). 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 pressure 90-110mm Hg, and 101 men with high normal diastolic pressure 80-89mm Hg in a five-year time series design. A nondrug therapeutic regimen was initiated for the purpose of coronary artery disease prevention. Individualized 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, diet, etc. The authors concluded 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 > 160/95mm Hg. Half of the initial 33 with elevated blood pressure changed to the acceptable range. (< 160/95mm 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) 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 client 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 basically 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 hemodymanics, 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 drop out 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 identifiedas 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 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 et al., 1970; Haynes et al., 1976; Kirscht et al., 1977; Taylor, 1979). Cost, convenience, accessability, side effects, safety, complexity, and duration of treatment have been studied 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 preceed 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 complaint with medications and 30 non-compliant. 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 (p .05) 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 noncompliers, 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 patients. Data were collected by client interview and from the medical record. Compliance was categorized by self-report: 28% subjects were compliant all the time, 16% 3/4 of the time, 30% 1/2 to 3/4 the time, and 26% 1/2 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 negitive, although originally hypothesized 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 patients' ability to name and describe their drugs, the patients' 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 client's 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 that 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 consistency. 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 reviewers 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 no consistancy 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 "unrealistic" effect on perceived severity, motivating the individual to follow the perscribed 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 a hypertensive clinic in a VA Medical Center. The study was conducted to determine if there were

differences in self-concept and health beliefs in hypertensive patients who were compliant, and these who were noncompliant with prescribed therapy. Severity was measured by using a health belief questionnaire developed by the investigators which consisted of 15 perceptual statements 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 patients' perception of health, disease and medical treatment and compliance through interviews with 142 patients under treatment for hypertension. Severity was measured using four items concerning the subject perception about hypertension leading to a stroke, the probability of sequela 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 analzysis of data indicated a positive correlation between perceived severity of illness with full compliance.

Greene et al. (1982) studied a group of 190 patients under treatment for chronic medical illnesses to determine levels of compliance. Interviews with clients on perceived severity of illness included worries about health, recent change in health status, and extent of life-style changes. The findings indicated that clients seeing their illness as severe were less likely to follow the recommended therapy.

Taylor (1979) conducted a randomized controlled study to test health belief in relationship to compliance with antihypertensive regimens in a group of 230 males. Subjects' perception of seriousness of hypertension was assessed by a standardized 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 on 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 clients being treated for hypertension that would drop out of treatment, and to determine the characteristics that predispose them 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 the 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 and 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 severe 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 a series 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 statistically 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 ages 40 to 59 were more likely to worry about their chance of stroke and heart attack. Fifty six percent of females as compared to 36% of males were more likely to worry about their chance of stroke and heart attack. 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 about three-fourths 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, one could say that 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 the 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 an association-testing 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

correlation of low personal control, dependence on physician, and psychological barriers. Psychological barriers included economic costs, convenience, side effects, and efforts necessary to comply. Understanding of disease was not related to compliance. Less compliance occurred in those over 60, especially to diet. The authors emphasized the importance of assessing client health beliefs for individualized care and possible modification 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 adherence.

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 an association-testing 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) age--the youngest and oldest groups; (2) marital status--single and widowed; (3) education--0-6 years; (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 resulted 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. (4) provide drugs without charge for the needy over 60.

In an association-testing survey Hershey et al., (1980) examined beliefs of disease susceptibility; disease severity; disease duration; treatment benefits; general health concerns; dependence on provider; satisfaction with care; and the barriers of (1) drug side effects, (2) treatment/life style conflicts, and (3) treatment duration. One hundred thirty-two subjects were randomly selected from an outpatient hypertension program. Beliefs on health control, and dependence on provider were found to have a significant positive relationship to compliance; and 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 et al. (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 attributetd 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 is focusing on therapy continuation with treatment goals of (1). blood pressure diastolic below 90mm Hg, optimally below 84mm Hg; and (2). few side effects, optimally none. To address these two goals, Finnerty (1981) studied 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 in 27 clients and the dosage of another decreased in 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 ($r = -.57$, $p = .022$), homemaking ($r = .41$, $p = .015$), singlehood ($r = -.57$, $p = .009$), and finances ($r = -.24$, $p = .002$). 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 the study were perceived time costs and convenience of clinic visits, perceived medication side effects, and 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 et al., 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 efffect on compliance behavior.

Research addressing the monetary cost of medication and service usually reports a negative relationship to compliance (Brand et al., 1977; Kirscht et al., 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 (Foster et al., 1978; Bowler et al., 1980; Hershey et al., 1980; Kirscht et al., 1977; Levine et al., 1979, Nelson et al., 1978). The JNCDET (1981) says 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 and Rosenstock (1977) found no correlation of dietary compliance to the barriers of nonconvenience and efforts necessary to comply.

Glanz (1979) cited the dietary barrier 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 accessability this association is not clear. The intangible barriers of treatment impact on life style have more consistently 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 accessability).

Compounding the difficulty of comparing research which addresses barriers operationalized in numerous ways, the outcome variable of compliance varried 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), cited 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 and client and also 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, and increased from 15% to 34% in the control group. Two years after the visits stopped, rates of hypertension control decreased from 80% to 29% in the experimental group

and from 34% 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 the 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

received 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%), more work-site clients 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 thereapy 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 noncompliant with treatment. Therefore alternative interventions to help hypertensives achieve therapeutic control remains crucial to the nursing profession.

CHAPTER IV

METHODOLOGY AND PROCEDURES

Design

A survey design is used in this study to examine the relationship between perceived severity of illness, and stated compliance with the hypertensive therapeutic regimen. Also, in collaboration with Harmon (1983) the joint hypothesis, client perception of illness severity and barriers to treatment upon stated compliance with the therapeutic regimen will be examined. Data will be used from the intake survey phase of the hypertensive and diabetic research project conducted by B. Given and C. Given at four ambulatory sites in Michigan. The project was federally funded by the Public Health Services, Division of Nursing, Grant # 5 ROI NU 00662-03. Only intake data from one point in time will be used.

The following sections of this Chapter include the design hypotheses, operationalization of study variables, sample, instrument development, interviewers, data collection procedures, human subject protection and data analysis.

Hypotheses

Primary hypothesis 1. There is a relationship between client perception of illness severity and stated compliance with the therapeutic regimen.

Secondary hypotheses:

a. There is a relationship between perceived seriousness and stated compliance with a medication regimen.

b. There is a relationship between perceived seriousness and stated compliance with a diet regimen.

c. There is a relationship between perceived seriousness and stated compliance with an exercise regimen.

d. There is a relationship between perceived psychosocial effects of hypertension and stated compliance with a medication regimen.

e. There is a relationship between perceived psychosocial effects of hypertension and stated compliance with a diet regimen.

f. There is a relationship between perceived psychosocial effects of hypertension and stated compliance with an exercise regimen.

g. There is a relationship between perceived impact of hypertension on work and stated compliance with a medication regimen.

h. There is a relationship between perceived impact of hypertension on work and stated compliance with a diet regimen.

i. There is a relationship between perceived impact of hypertension on work 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.

Operationalization of Study Variables

Perceived 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, p. 27, 1982). The dimensions included are: (1) perceived comparative seriousness of hypertension, (2) perceived psychosocial effects of hypertension, (3) and perceived impact of hypertension on work.

The perception of illness severity was measured using a total of 34 questions (Appendix C) developed by (Given & Given, 1982). Dimension I, which is concerned with comparative seriousness of hypertension compared to other

worries, problems, and illnesses such as diabetes and pneumonia, was measured with six items on the Belief About High Blood Pressure Scale (items 1-6). Dimension II concerned with perceived psychosocial effects of hypertension, such as social change, interference with social roles, change in entertainment style, shopping, recreation, leaving home, walking, visiting, isolation within the family, household chores, family responsibilities, emotions, and sleep was measured with 21 items on the Effects of High Blood Pressure Scale (items 12-27). Dimension III concerned with perceived impact of hypertension on work concerned with illness, work conflict, difficulties hypertension may present on the job, absenteeism, irritability, job change or extra effort required to work, was measured with seven items on the Effects of High Blood Pressure Scale (items 22-28).

The format used for measuring illness severity was a questionnaire with Likert-type responses ranging from "strongly agree," agree, undecided, disagree, to "strongly disagree". Respondents recorded their level of agreement with each item describing each of the concepts. A high score was indicative of a high perceived impact of illness severity.

Perceived Barriers to Treatment

Perception of barriers to treatment is defined as the expressed belief and attitudes of the client concerning the

barriers to undertaking aspects of the therapeutic regimen, (Given, Given, p. 27, 1982; Yoos, 1981). The following dimensions of barriers to implementation of therapy are measured: (1) belief about effects of job on therapy, (2) beliefs about difficulties with changes required for diet, (3) beliefs about difficulties with medications, and (4) disbelief or doubt concerning efficacy of therapy.

Perception of barriers to treatment was measured by a total of 28 questions on the Belief About High Blood Pressure Scale. Dimension I, concerned with belief about effects of job therapy including job interference with taking medications, following a diet, losing weight and difficulty following prescribed work habits was measured with seven items (items 28-34). Dimension II was concerned with specific belief about difficulties with changes required for diet including interference with normal activities, personal life, feelings of hunger, dislike of allowed foods, time required to follow diet, and need for family support (items 7-14). Dimension III, beliefs about difficulties with medications, referring to habit change required, concern with medication dependency, disruption of daily activities and long-term therapy, was measured using eight items (items 15-22). Dimension IV, disbelief or doubt concerning efficacy of therapy, including belief 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,

was measured using five items (items 23-27).

A questionnaire was used with Likert-type response presented in (Appendix C). The degree of barriers was ascertained by assigning a numerical score to each possible response such that a high degree of barriers was indicative of high perceived barriers.

Stated compliance with the therapeutic regimen was 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, p. 28, 1982). Compliance was measured by use of a total of seven questions (Appendix C) which measured the patient's stated frequency of compliance with the use of medication (items 1-3), diet (items 4-5), and exercise (items 6-7) on the Hypertension Patient Interview Scale.

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. A Numerical score was assigned to each of the possible responses such that a low score was indicative of a high degree of compliance.

Extraneous Variables and Socio-Demographic Data

Polit and Hungler (1978) define extraneous variables as a kind of independent variable which may influence the results of the study. The extraneous and socio-demographic

variables in this study which may influence the results are: age,sex, race/ethnicity, yearly income, duration of diagnosed hypertension, highest blood pressure reading in the past six months, and percentage of body overweight at diagnosis. These variables were measured using items (1-6) on the Socio-Demographic Scale and items (1-3) on the Medical Record Audit Scale (Appendix C). Descriptive statistics were utilized for analysis. The range, mean and percentages was computed.

Sample

The sample in this study was selected in three phases. First, a population of hypertensive patients was identified at four sites in Michigan: Grand Rapids, Kalamazoo, Lansing, and Saginaw.

The study participants were a sample of 158 hypertensives who voluntarily agreed and met the following criteria:

(1) were between aged 18 and 65 years of age;

(2) were medically diagnosed as having essential hypertension;

(3) were able to read and write the English language;

(4) were not documented as having a stroke, end stage renal disease, blindness, cancer, psychiatric problems, and pregnancy or lactation;

(5) were on a prescribed diet or medication regimen.

In the second phase of the sample selection auditors, consisting of graduate nursing students who had been briefed on screening procedures, abstracted data from the medical records of those participants who met the criteria for the study. Medical records were screened for the following data: name of medications, dosages, and dates prescribed, type of diet, and two weight measures taken at least two months apart.

Finally, hypertensive clients 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, (Given and Given, 1982).

Letters were sent to all members of the eligible individuals who met the criteria requesting their participation in the study. One hundred fifty-eight subjects aged 24 to 65 voluntarily agreed to be included in the study. It is the intake data on these participants at one point in time that is being analyzed for this thesis.

Because the sample was voluntary and not randomly selected, the results of this study can be generalized only to hypertensive clients possessing characteristics which are similar to those of the sample. Therefore, results should not be considered to be representative of all clients with hypertension, especially those in specialty

care such as internal medicine, as this sample was being medically managed by residents and family physicians.

Development of Instruments

The instruments used in this study were developed for the Contributions to Care: Link to Process and Outcome research project (5ROINU00662, Given, Given, 1982). The Beliefs About Hypertension and Effects of Hypertension scales were developed in the following manner. Questions were developed from a review of patient education material and a literature review concerning what the hypertensive client should know about his/her treatment. Statements describing clients' beliefs about hypertension and benefits of and barriers to treatment were developed from two sources. First, statements were written concerning beliefs about severity of hypertension, and impact and degree of control of hypertension. Second, 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 these interviews, 35 statements about perceptual dimensions were identified.

A five-point Likert scale ranging from strongly agree to strongly disagree was used to record responses. With each instrument, statements were balanced in terms of positive and negative wording responses.

Pretest of Instruments

The instruments were administered to a sample of 154 hypertensive clients and responses were factor analyzed. For purposes of further validation, the instruments were then administered to a second sample of 97 hypertensive clients. The second sample used was drawn from populations of hypertensive clients receiving treatment at 11 geographically distinct ambulatory care centers that served as training sites for residents in family practice. Criteria for inclusion into the sample were the same as those stated for this research study.

Reliability and Validity

Measures of reliability were conducted for the instruments used in this study. Reliability is the degree of consistency or accuracy in which an instrument measures an attribute. The Reliability coefficient normally ranges from 0.00 and 1.00. The higher the coefficient alpha, the more stable the measure. Reliability coefficient above .70 are considered satisfactory, (Borg & Gall 1979). Reliability is concerned with the degree of internal consistency within the instrument. The internal consistency refers to the extent to which all of the instrument items, or subscales, measure the same attribute. One way to evaluate internal consistency is using the Cronbach's alpha method, which was used for

scales in this study.

Validity refers to the degree to which an instrument measures what it is designed to measure, and is concerned with the 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 and Hungler 1978).

Content validity is concerned with the degree to which the itmes 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 investigators.

Construct validity is concerned with the underlying attribute rather than with the scores the instrument produces. The question is: What is this instrument really measuring? (Polit and Hungler, 1978).

In sum, three types of analysis were employed by Given and Given (1982) to develop psychometrically scales used for this study. First, factor and cluster analytic techniques were to identify items on each scale. Second,

criterion measures were used to determine internal and external consistency. Third, coefficient of invariance were computed to compare stability of the scales between both samples. Finally, to measure construct validity a correlation matrix of the scales was produced. The alpha coefficient for each scale is reported in Chapter V with the data analysis.

Research Interviewers

The research interviewers included three graduate students from Michigan State University College of Nursing,speciality trained interviewers.

Staff personnel contacted the potential research interviewers at their particular sites, and, in addition, the research staff interviewed them prior to being hired. The research interviewers received two days of instruction and debriefing, which included an overview of the research project, ethics of interviewing and interviewing procedures, and participated in role-playing activities until able to carry out the procedure.

After interviewing skills were mastered, assignments were given to interviewers which included 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. Research staff members were available by phone on an ongoing basis, and were present at the sites for the initial client

interview.

Data Collection Procedures

The data were collected from two sources: (1) structured self-administered and interviewer-administered patient questionnaires; and (2) patients' medical records. This section describes the sites used for procuring the data, the type and way in which data were collected and, training and supervision of interviewers.

Sites

Data was collected from four sites within the state of Michigan. Three of the sites (Lansing, Grand Rapids, Saginaw) were ambulatory care centers staffed by residents in training as family physicians. The fourth site (Kalamazoo) shared by four internists in private practice and consisted of two offices.

Collection of Data

After receiving approval of written consent from the participants indicating willingness to participate in the study, subjects were contacted via telephone by the interviewer. Questions and concerns were answered and additional information given about the study as needed. The participants were asked when would be a convenient time to meet the interviewer at the site to complete the questionnaires.

When the interviewer met with the participant at the site, he/she again described the study, answered questions and concerns, and upon eliciting the participant agreement to participate in the study, placed him/her in a private room. Then, the interviewer explained the content of the instruments. Finally, before proceeding with the study, the interviewer asked the participant to sign a consent form (APPENDIX B) indicating willingness to participate in the study. Upon obtaining the participant written consent, five self-administered instruments were given to the participant in which four were used for this thesis: The Effects of High Blood Pressure Instrument, The Beliefs About High Blood Pressure, The Hypertensive Patient Interview, and The Socio-Demographic Instrument. Instructions and explanations were given. Then, the interviewer assured the participant that he/she would be available if questions arose and participant was left alone to complete the instruments.

The interviewer periodically checked the participant's progress and allowed 40 to 70 minutes to complete the questionnaires. Finally, the interviewer collected the questionnaires, checked for omission of information and returned them to the project personnel for coding. The questionnaires were pre-coded with the date of completion, site, and participant code number.

Human Subject Protection

Specific procedures were employed to assure the rights of the study sample participants. The rights of the participants were protected using the standards from the University Committee on Research Involving Human Subjects (UCRIHS). Contact letters were sent to subjects describing the purpose of the study, its potential benefit to the participant, length of time of the study, and requirements for participation. The letters were also signed by the medical director of the health care center where the participant sought care, or by the participant's private physician. Assurance of anonymity and confidentiality were provided as part of the contact letter and consent form (APPENDIX A and B). In addition, code numbers were used on questionnaires for identifying data collected.

Statistical Analysis Data

Descriptive statistics were used to analyze the sociodemographic and extraneous variables. The range, mean and percentages, along with tables summarizing distribution and percentages of subjects by demographic variables are presented in Chapter V. Because all hypotheses consisted of statements that described relationships between variables, the Pearson Product-Moment Correlation (Pearson r) was used in the development of the correlation matrix. The level of significance was set at .05. According to Borg ard Gall

(1979), the Pearson r describes the strength of relationship between two variables.

The correlation coefficient 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 0.00 and -1.00 are negative relationships, and correlations that fall between 0.00 and +1.00 are positive relationships (Polit & Hungler, 1979). For this study, the criteria for the strength of correlations between the variables for deciding acceptance of the hypotheses is as follows and were taken from Borg and Gall (1979, p. 513-514):

0.00 - 0.20 no relationship

0.20 - 0.35 very slight relationship

0.35 - 0.85 moderate to fair relationship

0.85 - 1.00 high to perfect positive relationship.

A regression was conducted and a multiple correlation coefficient was obtained to determine the relationship among variables for Primary Hypothesis 2: There is a relationship among client perception of illness severity and barrierse to treatment upon stated compliance with the therapeutic regimen. According to Borg and Gall (1979), multiple regression correlation may be used to determine whether two or more of the predictor variables can be combined to predict the criterion better than any one predictor variable alone.

Summary

In this chapter the methodology utlized for this study was presented. Specific topics discussed were the hypotheses, operationalization of study variables, sample, development of instruments, research interviewers, data correction procedures, human subject protection, and statistical analysis procedures. In Chapter V the analysis of data and a discussion of the results relevant to the research hypotheses and question is presented.

CHAPTER V

DATA PRESENTATION AND ANALYSIS

Overview

In this chapter a description and analysis of the sample will be presented. A discussion of the reliability measures established for each of the instruments used in measurement of study variables will be discussed. The data obtained in this study will be presented in relation to the hypothesis perceived illness severity and stated compliance. The joint hypothesis perceived illness severity and perceived barriers to treatment with stated compliance in collaboration with Harmon (1983) will also be included. Additional findings will be presented in areas of social demographics and extraneous variables. A summary of the results of statistical procedures will be discussed.

Sample Characteristics

The sample consisted of 158 persons who were medically diagnosed and under medical treatment for hypertension. Subjects ranged in age from 24 to 65 years; were literate, showed no evidence of stroke, cancer, psychiatric problems, end-stage renal disease, blindness, pregnancy, or lactation. The participants were also on a prescribed diet

and/or medication treatment for control of hypertension. Subjects screened into the study had two elevated blood pressure readings 140/95mm Hg or above within six months prior to the administration of the questionnaire and interview.

Socio-demographic Variables

The extraneous variables addressed in this study were: age, sex, race, marital status, income, duration of diagnosed hypertension, blood pressure, and percentage overweight.

Age. Subjects ranged in age from 24 to 65. The mean age was 46.8 years, standard deviation 10.4 years.

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

Race. Of this samples, 86.1% were white and 12.0% were black. The absolute frequency of race recorded was: white n = 136, black n = 19, Mexican-American n = 1, other n = 1, and one subject did not respond.

Marital Status. A majority (n = 124, 78.5%) of the subjects were married. 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 elicited from 151 of subjects (95.6%). The mean range of reported income was $17,000 - $19,999. Eighteen of the subjects (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 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 had (14.5%) hypertension 15 or more years.

Blood Pressure. The highest blood pressure reading in the six months prior to the study was ascertained for 151 subjects (95.6%). Systolic blood pressure 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, and 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 either normal or less than 20% overweight.

Table 1. The distribution and percentages of subjects by socio-demographic and extraneous variables are presented in Table 1. Age, sex, race, marital status, distribution of income level, duration of diagnosed hypertension, blood pressure ranges, and percentage overweight are summarized

in Table 1.

Summary

In sum, the presentation of descriptive statistics shows the study sample to be evenly divided between male and female, and evenly distributed over an age range of 24 to 65. The average duration of diagnosed hypertension experienced by the sample subjects was approximately seven years. The participants' blood pressure readings ranged from 108 to 210mm Hg systolic and 70 to 120mm Hg diastolic. Two-thirds of the sample subjects were more than 20% overweight at diagnosis of hypertension. The majority were white and married with a middle class income.

Reliability of Instruments

Total Severity. The statistical procedure utilized for determining reliability of the study instruments was Cronback coefficient alpha. The reliability coefficient obtained for total severity was .94. The degree of severity was ascertained by assigning a numerical score of one to five for each possible response. A high number indicated a greater degree of perceived severity. The mean score obtained for total severity was 2.672 with 158 subjects responding.

TABLE 1. DISTRIBUTION AND PERCENTAGES OF SUBJECTS BY DEMOGRAPHICS AND EXTRANEOUS VARIABLES

Variable	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. - CONTINUED

Variable	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

Comparative Seriousness. On the comparative seriousness subscale with 158 subjects responding to six items, a mean score of 3.985, was obtained with a standard deviation of .503 and a reliability of .70.

Psychosocial Effects. The psychosocial effects subscale consisted of 21 items with 158 subjects responding. The mean score was 1.919, with a standard deviation of .534, and reliability coefficient of .95.

Impact of Hypertension On Work. The seven items for measuring impact of hypertension on work showed a response of 111. The mean score obtained was 1.749, with a standard deviation of .549 and a reliability of .90.

Total Compliance. The total compliance subscale showed 158 subjects responding. The mean score obtained was 4.413 with a standard deviation of .592 and a reliability coefficient of .76.

Medication Compliance. The medication compliance subscale consisted of three items and showed 158 subjects responding. The mean score obtained was 4.737, with a standard deviation of .612 and a reliability coefficient of .77.

Dietary Compliance. The dietary compliance subscale consisted of two items with 125 subjects responding. The mean obtained score was 3.408, standard deviation 1.207, and a reliability coefficient of .81.

Exercise Compliance. With 50 subjects responding to three items on the exercise compliance subscale, a mean of

3.210 was obtained. The standard deviation was 1.282 with a reliability coefficient of .87.

Total Barriers. On the total barriers scale with 158 subjects responding, a mean score of 2.076 was obtained with a standard deviation of .464. The reliability coefficient was determined at .91.

The mean scores and reliability coefficient computed for all scales used in this study is summarized in Table 2. All the scales showed 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 with a statement of acceptance or non-acceptance. 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 $p = .05$.

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

TABLE 2. MEAN SCORES AND RELIABILITY COEFFICIENTS OF SCALES

Variable	Number of Participants	Mean Possible (Range 1-5)	Standard Deviation	Reliability
Subscale				
Total Severity	158	2.672	.407	.94
Comparative Seriousness	158	3.985	.503	.70
Psychosocial Effects	158	1.919	.534	.95
Impact on Work	111	1.749	.549	.90
Total Compliance	158	4.413	.592	.76
Medication Compliance	155	4.737	.612	.77
Dietary Compliance	125	3.408	1.207	.81
Exercise Compliance	50	3.210	1.282	.87
Total Barriers	158	2.076	.464	.91

The correlation (r) between total perceived illness severity scores of hypertensive clients and their total stated compliance scores was .1197 with a significance level (p) of .068. The null hypothesis was not rejected. There was no significant relationship between the total perceived illness severity scores of hypertensive clients and their total stated compliance with the therapeutic regimen scores. Both the correlation coefficient and level of significance were below acceptable level of significance.

Secondary hypothesis 1a. There is no relationship between the perceived comparative seriousness score of hypertensive clients and their stated compliance with medication score.

The correlation between the perceived comparative seriousness score and the stated compliance with medication score was $r = .25$ ($p = .001$), with 155 subjects responding. The null hypothesis was rejected; there was a low, positive relationship between perceived seriousness scores of hypertensive clients, and their stated compliance with medication scores, indicating that perceived seriousness, compared to other problems and illnesses, accounts for compliance with medication to a slight degree.

Secondary hypothesis 1b. There is no relationship between perceived comparative

seriousness scores and stated compliance with diet scores.

The correlation between perceived seriousness scores and stated compliance with diet scores was r = .0052 (p = .447), with 125 subjects responding. The null hypothesis was not rejected; there was no significant relationship between perceived comparative seriousness scores and stated compliance with diet scores, suggesting that dietary compliance is not accounted for by perceived seriousness.

Secondary hypothesis 1c. There is no relationship between perceived comparative seriousness scores and stated compliance with exercise scores.

The correlation between perceived comparative seriousness scores and stated compliance with exercise scores was r = .2861 (p = .022), with 50 subjects responding. The null hypothesis was rejected. There was a low, positive relationship between perceived seriousness scores and stated compliance with exercise scores. The small relationship indicates that other factors besides perceived seriousness are impacting on compliance with exercise.

Secondary hypothesis 1d. There is no relationship between perceived psychosocial effects of hypertension scores and stated compliance with medication scores.

The correlation between perceived psychosocial effects

scores and stated compliance with medication scores was r = -.0576 (p = .238), with 155 subjects responding. The null hypothesis was not rejected; there was no significantrelationship between perceived psychosocial effects of hypertension scores and stated compliance with medication scores, giving evidence that psychosocial effects do not account for compliance with medication.

Secondary hypothesis 1e. There is no relationship between perceived psychosocial effects scores and stated compliance with diet scores.

The correlation between perceived psychosocial effects scores and stated compliance with diet scores was r = -.1204 (p = .091), with 125 responding. The null hypothesis was not rejected; there was no significant relationship between perceived psychosocial effects scores and compliance with diet scores, indicating psychosocial effects as tapped here are not directly related to dietary compliance.

Secondary hypothesis 1f. There is no relationship between perceived psychosocial effects scores and stated compliance with exercise scores.

The correlation between perceived psychosocial effects scores and stated compliance with exercise scores was r = .1572 (p = .138), with 50 subjects responding. The null hypothesis was not rejected; there was no significant

relationship between perceived psychosocial effects scores and stated compliance with exercise scores, indicating that psychosocial effects as measured in this study do not affect compliance with exercise.

Secondary hypothesis 1g. There is no relationship between perceived impact of hypertension on work scores and stated compliance with medication scores.

The correlation between perceived impact of hypertension on work scores and stated compliance with medication scores was r = .04656 (p = .315), 109 subjects responding. The null hypothesis was not rejected; there was no significant relationship between perceived impact of hypertension on work scores and stated compliance with medication scores, indicating compliance with medication is not accounted for by the impact of hypertension on work.

Secondary hypothesis 1h. There is no relationship between perceived hypertension impact on work scores and stated compliance with diet scores.

The correlation between perceived hypertension impact on work scores and stated compliance with diet scores was r = .0185 (p = .432), 89 responding. The null hypothesis was not rejected; there was no significant relationship between perceived hypertension impact on work scores and stated compliance with diet scores, indicating that impact on work as measured here does not have an effect on dietary

compliance.

Secondary hypothesis 1i. There is no relationship between perceived hypertension impact on work scores and stated compliance with exercise scores.

The correlation between perceived hypertension impact on work scores and stated compliance with exercise scores was r = .1936 (p = .122), 38 responding. The null hypothesis was not rejected; there was no significant relationship betwen perceived hypertension impact on work scores and stated compliance with exercise scores, as the significance level surpassed acceptable limits.

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. Correlation coefficients computed between the study variables are summarized in Table 3.

Extraneous Variables

No significant relationships were found between the extraneous variables of race, income, 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.

Males were observed to have a higher level of stated compliance with exercise than females (r = .2718, p = .028), using a point bi-serial correlation. Twenty percent

TABLE 3. THE CORRELATION VALUES BETWEEN SUBSCALES AND COMPLIANCE

Subscale	Medication Compliance	Dietary Compliance	Exercise Compliance	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
Total Barriers	-.3476***	-.3358***	-.1157	-.3555***

* $\leq$ .05 significance
** $\leq$ .01
*** $\leq$ .001

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 ($r = .2193$, $p = .004$). These findings indicate that overweight subjects reported less dietary compliance, more barriers to diet and more doubt in therapy efficacy. A summary of the correlation values observed among the extraneous variables are summarized in Tables 4, 5, and 6 Appendix D.

Other Findings

Other sigfnificant findings among the variables of the study not included in the hypotheses are presented in this section.

There was a low, positive relationship between perceived comparative seriousness scores and total stated compliance with therapy scores ($r = .2088$, $p = .004$, $n = 157$), indicating the seriousness of hypertension compared to other worries and conditions has a small effect on reported compliance.

There was a low, positive relationship between total perceived illness severity scores and stated compliance with exercise scsores ($r = .3756$, $p = .004$, $n = 50$), suggesting that the parameters of severity as tapped in this study account for a small part of the factors which impact on exercise compliance.

Summary

In Chapter V, data were presented that described the study sample in relation to socio-demographic and extraneous variables. Reliabilities of scales designed to measure the study variables were reported using coefficient alpha. The correlation between study variables were summarized.

In Chapter VI, the research and the data described in Chapter V will be interpreted and summarized. Conclusions will be drawn based on the findings and recommendations for nursing practice and future research will be presented.

CHAPTER VI

SUMMARY AND CONCLUSIONS

Overview

In Chapter VI, a summary and interpretation of the research findings will be presented. The sociodemographic characteristics of the sample will be discussed. The hypotheses are presented in the null form and conclusions are drawn according to acceptance or rejection of hypotheses. The implications of findings relevant to nursing practice and education will be discussed, along with recommendations for future research.

Sociodemographic and Extraneous Variables

A brief summary of the socio-demographic and extraneous variables of sample subjects will be presented. The variables age, sex, race, marital status, income, duration of diagnosed hypertension, blood pressure, and percentage overweight will be addressed in relation to their influence on this study.

Age and Sex. The sample consisted of 158 individuals, 80 females (50.6%), and 78 males (49.4%). Distribution of subjects by age was fairly even with an age range from 24 to 65. The mean age of study participants was 46.8 years similar in age to hypertensives studied by Hershey et al.

(1980) whose sample mean was 52 years. The Framingham study reported by Kannel et al. (1978) on hypertensive patients age ranged from 30 to 62 years. The more recent study reported by the HDFP (1980) participants were aged 30 to 69, similar in age to this study.

The percentage for female is somewhat less than in the Public and High Blood Pressure (PHBP, 1981) sample of 1,168 controlled and uncontrolled hypertensives of whom 58.0% were females. The PHBP sample was representative of four regions of the United States: East, South, Midwest, and West. Borhani (1982) reported on the prevalence of actual hypertension in 1978, which indicated more women than men had sought and received effective treatment for hypertension. Participants identified for inclusion in this study sample were drawn from hypertensives who were not well controlled, blood pressure (140/95mm Hg). Therefore, it is expected there would be fewer females in a sample with both controlled and uncontrolled hypertension.

The PHBP study sample had 20.4% under age 35; 30.2% age 35 to 49; and 49.4% age 50 to 64. Whereas in this study sample 43.1% of subjects were in the age group below 35. Nelson et al. (1980) reported that age was not associated with compliance; however, sex was found to be significantly related to noncompliance. Nelson found 70% males were noncompliant as opposed to 45% females. Other studies reported no significant relationship between age or sex and compliance, Cummings et al. (1982), Hershey et al.

(1980). The data analysis in this study did not show differences between males and females regarding diet and medication compliance. However, males were found to have more stated exercise compliance than females. Other studies that reported the differences in exercise compliance between males and females were not found by this author.

Nelson et al. (1978) reported on a study sample that showed a significant positive relationship of compliance with age 50 or above. Brand (1977) reported less medication compliance with oldest and youngest groups, and Kirscht et al. (1977) found that individuals above age 60 had less compliance with diet.. Whereas in this study sample, low significant relationships were found between age and medication compliance, and between age and dietary barriers. Cummings et al. (1982) reported studying a group of 206 hypertensives average age 58, in which there was a slight tendency for participants who were noncompliant to view hypertension as less serious an illness than those who were more compliant. Whereas in this study sample, the mean age was 46.8 and there was a low significant relationship between comparative seriousness and medication compliance. In sum, this sample was a fair representation of hypertensives compared to other studies.

Race. This study sample consisted of 86.6% white, 12.1% black, and 1.2% other. There were proportionally

more whites, and less blacks and other races than the PHBP hypertensive survey. The PHBP study included an oversample of 1,147 blacks, using weighted percentages to reflect the adult American population. The PHBP study sample consisted of 79.0% white, 16.0% black, and 5.0% other after weighing the percentages. Kaplan (1982) reported on the findings from the U.S. Public Health Service and Nutrition Examination Survey (HANES), performed from 1971 to 1974 on a representative sample of over 17,000 persons in the United States. Findings revealed a higher level of blood pressure at virtually every age for black men and women. Furthermore, blacks suffer a proportionately higher morbidity and mortality rate from hypertension than other racial groups. Research conducted by Cummings et al. (1982) on an inner city hypertensive population included 97% blacks. Table 6, Appendix D illustrates a tendency toward more psychosocial impact of having hypertension for blacks. According to Borhani, (12981) this may be due to blacks having more severe hypertension. The findings from this study should be generalized to a population with similar characteristics.

Marital Status. Works by Cummings (1982) and Haynes (1982) found no relationship between marital status and compliance. Nelson et al. (1980) reported that noncompliance was found to be positively correlated with having little social interaction and living alone. Brand et al. (1977) found that living alone correlated with less

medication compliance. In this study sample, the majority of the participants were married (n=124, 78.5%). Results showed no relationship between marital status and the study variables (Table 6, Appendix D).

Income. In this study sample, 11.9% of participants reported less than $9,000 income annually, and 44.4% above $25,000; as compared to the PHBP hypertensive sample of 61.6% below $10,000, and 19.0% above $15,000. The mean income reported for this sample ranged from $17,000 to $19,999. This study sample was represented by a higher income level than the PHBP sample. This research indicates that lower income was related to perceiving greater psychosocial effects of having hypertension thus as income increases, psychosocial impact of hypertension decreases. There were no other correlations found among the study variables (Table 4, Appendix D).

Duration of Hypertension. Duration of diagnosed hypertension by participants were: less than two years, 29.6%; three to five years, 25.0%; six to eleven years, 27.7%; and longer than 15 years, 14.5%. The characteristics were similar to the PHBP sample whose duration of hypertension was: 28% less than two years, 26% three to five years, 20% six to ten years, and 25 % longer than ten years. Duration of the illness would indicate that over time, the participants would have had considerable experience with diagnosis and treatment, therefore would have formed and set their perceptions, beliefs and behavior

about the illness. However, in this study sample, duration of hypertension showed no relationship with the study variables.

Blood Pressure. This study sample blood pressure readings ranged from 108 to 210mm Hg systolic (mean 149.3) and 70 to 120mm Hg diastolic (mean 96.7). No relationships were found among the study variables and blood pressure levels.

In Nelson et al. (1978) study of hypertension clients, the sample mean diastolic was 103mm Hg pretreatment and 90mm Hg during treatment. Diastolic blood pressure correlated highly with self-reported medication taking. Haynes et al. (1980) indicated that blood pressure correlated with pill count compliance. However, these two studies began with clients prior to being treated with medication.

It is possible that this investigator found no correlation between blood pressure and compliance because compliance may have been over reported despite the attention paid to interviewers' training. Another possible alternative explanation may be that the therapeutic regimen may have been inadequate.

Percentage Overweight. Two-thirds of the study sample was more than 20% over their ideal body weight as judged by their actual weight at their diagnosis of hypertension. A statistically significant relationship between overweight and less stated dietary compliance, and increased

perceptions of doubt of therapy efficacy was observed in this study. In addition, correlations approaching significance were found between obesity and increased psychosocial effects of hypertension, increased barriers to medication, and a tendency toward less exercise compliance. (Table 6, Appendix D).

For this sample overweight is a prevailing problem. Obesity was also found in the hypertensive screening of 1,000,000 Americans, reported by Stamler et al. (1978). Stamler stated that the frequency of hypertension in reported overweight individuals doubled for ages 20 to 39, and 50% more for those 40 to 64. Being overweight was measured by self estimates of being 25% over ideal body weight. Stamler's findings indicated that there was a higher relationship of obese hypertensives found in whites than in blacks.

The Hypertension Detection and Follow-Up Program study of hypertensives showed that 62% of the individuals were more than 20% overweight. In the PHBP sample study, 55% of the hypertensives considered themselves to be overweight, 44% had been told to go on a weight reducing diet, 22% were on a weight reducing diet, and 6.6% of total hypertensives felt they were very successful with their weight loss program (11.7% felt slightly successful).

Kaplan (1978) reported that obese individuals tend to have higher blood pressures. Weight gain has been shown to be associated with the development of hypertension in young

people. Further, Kaplan adds that in the Framingham study, obese individuals had over twice the incidence of angina or sudden death than did nonobese individuals.

Other findings by Stewart, and Brook (1983) indicated that obesity is a common ailment affecting 20 to 50% of adults in the United States. Williams (1978) stated that obesity is a health hazard which increases the risk of a number of diseases such as coronary artherosclerosis and hypertension. Mayer (1980) categorized obesity as a condition with an accumulation of fat in excess of that necessary for optimal functioning. Miller (1983) implied that obesity is a chronic illness and at least one out of every five Americans is overweight and most obese individuals will not remain in treatment.

This author did not find any studies that addressed two chronic illnesses such as obesity and hypertension in relation to compliance. However, studies by Brand et al. (1977) and Isiadinso (1979) indicated that the complexity of hypertensive therapy is associated with lack of noncompliance. Treatment for obesity is complex requiring changes in life-style behaviors, and of long duration. Diets may intefere with family habits; barriers, such as the cost of food, access to proper foods, and time required to prepare meals further increased the likelihood of noncompliance with dietary recommendations (Glanz, 1979). In addition, with hypertension this further increases the complexity of the regimen.

The findings from this study and other research indicates that obesity is a major health problem in the control of hypertension, this indicates the need for nursing interventions. The nurse is in a key position to monitor this chronic illness. In primary care, the nurse can provide longitudinal follow-up through continuity of care. The nurse can provide support in developing meaningful relationship with the client. According to Miller (1983) making an assessment of the individual's eating behaviors, including the stimuli that provoke eating is the first step in developing client/nurse perception into the unique client situation.

In advanced practice, the nurse can use advanced knowledge and skills to monitor the client on a long-term basis. Detailed assessment of environmental factors, significant others and psychosocial effect would be assessed. Assessment of social stress is also significant to plan for helping to overcome barriers to compliance. The client's perception of the severity of the consequences of the illness, and whether obesity is perceived as a chronic illness is also important. The nurse's overall goal would be to promote client perceived control of dietary behaviors.

Statement of the Research Question

The research question stated in this study was: Is there a relationship between perceived illness severity, and compliance with the hypertensive therapeutic regimen?

Research Hypotheses

In this section each hypothesis is presented separately in the null form, followed by a brief discussion of the findings in relation to the hypothesis.

Primary hypothesis I: There is no relationship between total perceived illness severity scores of hypertensive clients and their total stated compliance with the therapeutic regimen scores.

A statistically significant relationship was not found between total perceived illness severity scores and total stated compliance scores. Therefore, the null hypothesis was not rejected. These results support the findings of Andreoli (1981) Greene et al. (1982) who reported that hypertensive clients perceived illness severity showed no significant relationship to compliance. Other studies by Taylor (1979) Cummings et al. (1982) did find statistically significant difference between perceived

illness severity with hypertensive clients. The lack of agreement between perceived illness severity and stated compliance could be attributed to the different ways in which perceived severity illness is defined and measured by different studies. Many authors did not specify how they operationalized the definition of perceived illness severity. Some researchers examined overall seriousness of hypertension, whereas others indicated consequences of target organ damage as perceived severity. In this study, perceived illness severity was operationalized as perceived comparative seriousness of hypertension, perceived impact of hypertension on work, and perceived psychosocial effects of hypertension. The findings in this study may be attributed to the variation in definition of the concepts. Another alternative explanation for this finding is that some individuals may fail to experience or recognize symptoms of hypertension thereby not perceiving the illness as severe thereby not complying with the regimen, or comparative seriousness may not be an adequate measure of seriousness.

Secondary hypothesis 1a: There is no relationship between the perceived comparative seriousness scores of hypertensive clients and their stated compliance with medication score.

There was a low positive relationship between

perceived comparative seriousness scores of hypertensive clients and their stated compliance with medication scores $r = .2568$ ($p = .001$). Therefore, the null hypothesis was rejected. This finding is in agreement with studies reported by Nelson (1978) and Taylor (1979) which indicated a positive relationship, between comparative seriousness and stated compliance with medication. However, studies reported by Inui (1981) and Wagner et al. (1981) showed a negative relationship toward comparative seriousness and stated compliance with medication. Taylor (1979) measure of comparative seriousness was constructed to parallel those employed by vulnerability. Questions were constructed to elicit information regarding how worried a person would be if an illness was acquired. Whereas Nelson (1978) measure of comparative seriousness focused on target organ damage caused by hypertension and the necessity to stay in treatment for life. Different measures of compliance were used in the studies, such as pill count, self-report, combined rule of blood pressure and prescription refills.

According to Gordis (1979) there are many techniques used in measuring compliance. Perhaps the major focus should be on the methologic aspects of measuring compliance and the conceptual issues involved in the classification of clients' behavior as complier and noncomplier. The finding in this study and incongruence with other research findings may be attributed to the different measures of compliance.

This study used stated compliance to medication. It is possible that clients who perceived their hypertension as serious compared to other illnesses such as diabetes may comply with medications. Another alternative explanation may be that some individuals may perceive medication as an easy and simple regimen to follow, thereby complying with therapy, regardless of comparative seriousness.

The findings in this study would indicate the need for awareness by nurses that the hypertensive client may need ongoing assessment of the therapeutic plan. The nurse could assess the complexity of the medication regimen, such as number of pills the client has to take, and the schedule to follow. Side effects of medication should also be explored. Assessment of levels of compliance and the client's perception of illness severity is essential. The assessment should be thorough enough to determine areas of noncompliance behaviors. Since individuals are unique in their behavior, the client's perception of the degree to which compliance is or is not carried out is vital for nursing assessment. This information is essential as a basis for nursing interventions. The clinical nurse specialist possesses the skills and knowledge to monitor the hypertensive client on an ongoing basis.

Secondary hypothesis 1b: There is no relationship between perceived comparative seriousness scores and stated compliance with diet scores.

There was no significant relationship between perceived comparative seriousness scores and stated compliance with diet scores $r = .0052$ ($p = .447$). The null hypothesis was not rejected. Both the correlation coefficient and level of significance were below acceptable levels. This finding is in agreement with Glanz (1980). Glanz suggests that the widely variable pattern of the regimen presents unique problems in measurement for the investigator. For future research, Glanz recommends efficient measures of dietary compliance, attention to determinants of dietary compliance and methods to evaluate the outcomes of interventions.

It was not determined in this study whether subjects were on a special diet such as low salt or cholesterol, therefore, diet may not have been recommended as a treatment for hypertension. Another alternative explanation for these findings may be that two-thirds of the participants were more than 20% overweight, probably indicating there is less dietary compliance or maybe identifying noncompliers' personality. As 78.5% of the subjects responded this may also have attenuated the

results.

Secondary hypothesis 1c: There is no relationship between perceived comparative seriousness scores and stated compliance with exercise scores.

A statistically significant positive relationship between comparative seriousness scores and stated compliance with exercise scores was observed in this study $r = .2861$ ($p = .022$). As 50 subjects responded 79%, this may indicate that compliers' personality may be different than noncompliers. Mulder (1981) suggests that understanding of hypertension, and having a chronic illness may be significant predictors of exercise compliance. No other literature was found by this author that hypothesized a relationship between perceived comparative seriousness and stated compliance with exercise. It is possible, therefore, that this sample may be responding to marketing of physical fitness, and health care providers may be facilitating exercise as a prescription for hypertension. According to Reid et al. (1979) physicians' involvement in exercise programs are growing.

The nurse's role in this situation would be to assess the client's perception of exercise as a treatment for hypertension, and level of compliance with exercise. In addition, thorough assessment of the client's ability to exercise, such as limited range of motion, shortness of

breath while walking, easily fatigued, or access to a safe place to exercise. Also, does the client perceive hypertension as severe enough to exercise? This data would provide some guidelines for nursing interventions to help the client comply with the treatment and control hypertension.

Secondary hypothesis 1d: There is no relationship between perceived psychosocial effects of hypertension scores and stated compliance with medication scores.

A statistically significant positive relationship between perceived psychosocial effects of hypertension scores and stated compliance with medication scores was not observed in this study $r = -.0576$ ($p = .238$). The null hypothesis was not rejected. Nelson et al. (1980) reported that hypertensive clients who indicated that their illness had disrupted their life-styles tended to be poor compliers (saliency of hypertension) ($p = 0.02$). Nelson (1978) reported that a high degree of impact of hypertension on life-style was negatively related to compliance as 155 subjects out of 158 responded to items on the psychosocial scale. An alternative explanation may be that medications are easily taken and perhaps does not interfere with life-style. Another plausible explanation may be that this sample of hypertensives' blood pressure

was out of control (≥ 140/95mm Hg.), therefore, the subjects may have been noncompliant to their medication regimen, or on inadequate treatment. No other literature was found to support or disprove this finding.

These findings would indicate the need for nurses to assess the client's family or significant other as a support system. The resources the client has available and the inteference of the medical regimen with the client's social and family relationships are important. The medical regimen may be causing disruptions in life-style. This information could aid in assisting the client to develop an individual plan of care tailored to his/her life-style.

Secondary hypothesis 1e: There is no relationship between perceived psychosocial effects scores and stated compliance with diet scores.

Although the null hypothesis was not rejected for this study, the findings are approaching significance level r = -.1204 (p = .091). The findings in this study were approaching the level of significance meaning that the obtained results are unlikely to have been due to chance. As 125 subjects responded to the items on the scale indicating that psychosocial effects tapped may have an approaching relationship to compliance. Again no other literature was found to support or disprove this finding.

According to Glanz (1980), the widely variable pattern

of the regimen presents unique problems in measurement for the investigator of dietary compliance. Validity of information by self-report depends on memory, question phrasing and interview skills. Investigators have been inconsistent in data recording such as number of meals, times of day, snacks and eating out across the week. Therefore, the different methods of measures make data on diet compliance difficult to interpret.

Glanz (1980) also suggested that many of the available data concerning dietary compliance are of poor quality, and there is lack of data on dietary compliance in published reports of chronic illness. The feature of the illness may have an effect on dietary compliance and different types of dietary regimens may require specific approaches for assessment. Glanz recommends sound measures of dietary compliance, attention to determinants of compliance, and evaluation of the outcome of interventions.

Secondary hypothesis 1f: There is no relationship between perceived psychosocial effects scores and stated compliance with exercise scores.

The results of this study revealed a positive correlation approaching significance between perceived psychosocial effects scores and stated compliance with exercise scores $r = -.1572$ ($p = .138$). The null hypothesis was not rejected. Several researchers addressed compliance

with exercise Mulder (1981); Uman et al. (1981), however, they did not report significant findings between perceived psychosocial effects scores and stated compliance with exercise.

There may be a few plausible explanations for the findings in this study. As 50 out of 158 subjects who responded to the items on the scale that low response number may account for the data obtained. Since the results showed relationship approaching significance with a low number of respondents, a higher number could have probably resulted in a significant relationship. Seemingly, the number that responded felt that the psychosocial effects of having hypertension influenced their compliance with exercise. Also, it can be speculated that this sample was either noncompliant with their treatment, or exercise was not prescribed as part of the treatment plan.

Based on these findings, the nurse could assess how exercise inteferes with the client's life-style and also if the client perceives exercise as a beneficial treatment. Most physicians do not prescribe exercise as a treatment for hypertension with support and follow-up. Therefore, this could be an ideal situation for the nurse to gather information and use as a data base to help the client develop a treatment plan.

Hypothesis 1g: There is no relationship between perceived impact of hypertension on work scores and stated compliance with medication scores.

The hypothesized relationship between perceived impact of hypertension on work scores and stated compliance with medication was not supported by this study's findings $r = .04656$ ($p = .315$). The null hypothesis was not rejected. It may be speculated that perhaps since the subjects' blood pressure were out of control (140/95), they were not following their treatment. Data was not collected regarding employment status. However, as 70.3% responded to the items on work, it can be assumed that they were employed and did not perceive the impact of hypertension on work as related to compliance.

Nelson et al. (1978) examined clients' perceptions of health, disease, and medical treatment and compliance through interviews with 142 clients under treatment for hypertension. The results showed a high degree of impact of hypertension on life-style was negatively related to compliance. Foster et al. (1978) examined impact of antihypertensive therapy on job. The sample consisted of 25 hypertensive outpatients. Thirty-eight percent stated that side effects compromised their life-style affecting jobs. Foster et al. (1978), Bowler et al. (1980)reported negative relationships between impact of hypertension on

work and stated compliance.

Secondary hypothesis 1h: There is no relationship between perceived hypertension impact on work scores and stated compliance with diet scores.

A statistically significant relationship between perceived hypertension on work and stated compliance with diet was not observed in this study. Therefore, the null hypothesis was not rejected. Literature was not found to support or dispute this finding. It may be postulated that since more than two-thirds of the sample were 20% overweight, they were not following a diet, or did not perceive compliance as related to work. Another alternative explanation may be that diets may have not been prescribed as treatment for hypertension, or if prescribed not reinforced with follow-up or referral. Empirical observations made by this author indicate that normally physicians do not prescribe diets as treatment for hypertension.

Secondary hypothesis 1i: There is no relationship between perceived hypertension impact on work scores and stated compliance with exercise scores.

The null hypothesis was not rejected. There was no significant relationship between perceived impact of

hypertension on work scores and stated compliance with exercise scores r = .1936 (p = .122). The search of the literature revealed no studies that measured perceived hypertension impact on work scores and stated compliance with exercise scores. Therefore, this study is a contribution to the gap in research. Scientific studies are needed to guide nursing practice to understand and explain the function and forms of nursing care in meeting the needs of society, and in helping clients regain or maintain health. In sum, based on findings from this study the impact of hypertension on work does not seem to influence compliance with treatment.

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.

A moderate statistically significant relationship was observed among perceived illness severity scores, perceived barriers to treatment scores, and stated compliance scores r = .4524 ($p \geq .001$). The total variance accounted for in compliance by severity and barriers resulted in 22.5%. Therefore, the null hypothesis was rejected. When four components of the health belief model were combined, there was a total relationship to compliance found by Becker et al. (1977). Whereas Andreoli (1981) found no difference in

combined health beliefs of susceptibility, severity, benefits, and barriers with compliant and noncompliant male hypertensives. Both Nelson et al. (1980) and Greene et al. (1982) have combined parts of the health belief model with other variables, however, results have been difficult to make comparisons.

One point may be made about the findings in this study. The moderate correlation found may be due to the specific use of measures which addressed perceived life-style barriers, and perceived severity as compared to other problems and concerns. The assumption of the health belief model as reported by Kirscht and Rosenstock (1977) indicated that compliance behavior is accounted for by multiple perceptions; this supports the moderate correlation found in this study between the variables severity, barriers and compliance. A search of the literature did not locate other studies seeking a relationship between severity, barriers, and compliance.

Based on these findings, the nurse could develop an assessment tool to assess the client's illness severity, barriers to treatment, and stated compliance. Questions that would yield the most useful information could be constructed. Questions such as: Is the client experiencing side effects from the medications or treatment? How serious do you think your present illness is? After an assessment is completed, the nurse would be able to help the client problem solve to develop a

treatment plan suited to the client's life-style. As this research does not address interventions, the findings indicate areas important to assess and where the focus of intervention might be.

Other Findings: There was a low positive relationship between perceived comparative seriousness scores and total stated compliance. This finding is in agreement with study result reported by Cummings et al. (1982) who examined patient perceptions of hypertension in relation to compliance with treatment. The results showed that participants who considered their hypertension more severe were slightly more likely to comply with treatment than those who considered hypertension as less severe. This is an unexpected finding since two-thirds of the sample were over 20% overweight, thereby not complying with diet. In addition, the sample blood pressures were above 140/95mm Hg out of control. One may want to examine the types of treatment prescribed for the subjects as treatment may mean taking medications only and not following diet or exercise regimen. Finally, there was a low, positive relationship between total perceived illness severity scores and stated compliance with exercise scores found in this study. This finding may be attributed to individuals being more aware of the benefits of exercise, and providers suggesting exercise as a treatment.

The implications for nursing derived from these findings indicate that the nurse may want to assess how the

client perceives diet and exercise as being a beneficial treatment. The observed correlation between perceived illness severity and compliance with exercise scores emphasizes the value of assessing the benefit of exercise. As the nurse may want to emphasize exercise as part of the treatment plan for the client.

In sum, hypotheses regarding perceived comparative seriousness of hypertension in relation to stated compliance with medication, and stated compliance with exercise; perceived psychosocial effects and stated compliance with diet and stated compliance with exercise; and perceived illness severity with barriers to treatment in relation to compliance, were found to be statistically significant. Other findings related to perceived comparative seriousness and total compliance, and total perceived illness severity with stated compliance were also found to be statistically significant. Other hypothesized relationships between study variables were not found to be statistically significant.

Implication for Nursing Practice

The results of this study have identified a number of significiant relationships that may be applied to nursing practice with the hypertensive client in primary care and advanced practice. Implications for nursing practice are discussed within King's framework of goal attainment. The goal of determining individual's perception of illness

severity in relation to compliance is linked to the assessment phase of the nursing process. Study findings which have relevance in the assessment of hypertensive clients include the following.

There is a low positive relationship between clients' perceived comparative seriousness of hypertension clients, and stated compliance with medication. Based on this finding nurses would be aware that hypertensive clients need assistance in complying with treatment. The nurse is in a key role to educate clients on the seriousness of hypertension and long term care. This would facilitate clients' compliance, and help maintain their health status. In advance practice nurses are qualified to monitor chronic illness, evaluate prescribed treatment and provide psychosocial support and health education. In primary care the nurse can provide longitudinal follow-up and coordinate care with other health care discipline.

The nurse clinician has knowledge and skills in history interview and assessment. During the assessment phase, the nurse would assess the client's perception about the effects of hypertension and its treatment on his/her health status. The client's perceived severity of illness in relation to compliance with medication, side effects of medications, and complexity of regimen would be assessed to identify clients who are having difficulty following treatment or clients at risk for noncompliance. According to King (1981) in assessment the nurse acts, reacts, and

interacts with clients to reach transaction. Awareness by the nurse of the client's perception of hypertension compared to other worries, problems, and conditions would reveal inappropriate health beliefs or misperceptions of illness. Whether the client perceives the illness as severe, and whether the illness is severe can be assessed. This would help determine if perceived seriousness is accurate. The nurse can then help the client to focus on those areas to correct misperceptions.

Other findings of this study indicated there was a low positive relationship between comparative seriousness and stated compliance with exercise. This would provide a base that clients may need assessment on an ongoing basis and follow-up regarding the client's perception of illness in relation to exercise compliance. In addition, the client's awareness of the relationship of exercise to blood pressure control is also significant. The prescribed exercise regimen may need to be given to clients written as a prescription with follow-up on diary keeping and counseling. In primary care the nurse can provide continuity through follow-up. The nurse possesses nurse/client interaction skills, expanded clinical judgment, and ability to assess psychosocial needs. According to King (1981) the nurse seeks to understand the social system of the clients. During the interaction process the nurse would assess social problems or concerns, gather and interpret information thus helping the client

set goals which would lead to compliance and blood pressure control.

The observed correlation between perceived psychosocial effects scores and stated compliance with diet and exercise scores should emphasize the value of assessing the client's perceived psychosocial effects on diet and exercise.

Some areas the nurse clinician could assess are: how exercise and diet intefere with the client's life-style, also the complexity of the regimen. Are there barriers such as food cost, and preparation time, and whether the client is able to carry out the exercise regimen, or experiencing side effects from the treatment. The impact of the treatment plan on the client's health, and the effect of therapy upon the control of hypertension is important. Other areas such as social support, resources available, stressors and relationships with family members and friends can be explored. The nurse could collect data and from assessment of data can assist the client to comply with the treatment. In addition, the nurse can provide continuity and coordination of care through follow-up and referral as needed.

In advanced practice the nurse is responsible and accountable to the client, and can provide a broader scope of the therapeutic plan. Through consultative and collaborative strategies, the nurse/client mutually determine goals for desired behaviors to achieve

transaction. As King (1981) cited when transactions are made between nurses and clients, goals are attained, this leads to compliance with the regimen and blood subsequent pressure control.

Since no relationships were found between the following hypotheses: Total perceived illness severity and compliance; comparative seriousness and compliance with diet; perceived psychosocial effects of hypertension and compliance with medication; perceived impact of hypertension on work and compliance with diet and exercise should emphasize the need for nurses to make continuing reassessment of clients' perception of their illness in relation to compliance with the therapeutic regimen, and to determine accuracy of information being collected. Since this data was collected at one point in time, there still may be changes in perception of illness over time. The nurse may still want to assess some clients' perception of their illness on an ongoing basis. Continual reassessment can be done at different intervals on a long term basis to act as a guide in subsequent interviews. The data collected would be utilized to help the client formulate an individual plan to help increase compliance. It would appear unwise to assume, based on these findings, that the hypertensive client's perceptions of illness severity does not influence compliance with treatment.

The positive correlations found between comparative seriousness and exercise, medications and total barriers as

illustrated in Table 3 indicates that those are significant areas to focus on for assessment with the hypertensive client. Findings such as these clearly indicate that assessment is crucial to help the hypertensive client develop plans to increase compliance.

According to King (1980), goal attainment is derived from interpersonal systems whereby the nurse and client represents one type of interpersonal system. Human interaction between nurse and client take place, goals are set, ways to achieve them are explored, which provides a basis for interventions. The findings in this study supports King's theory of goal attainment. The nurse interacts with the client to make an assessment of the client's perceptions of illness severity and barriers to treatment in relation to compliance. Data collected from the assessment could provide a basis for nursing interventions to provide a mutual and effective plan of care for the hypertensive client, which would lead to commpliance and blood pressure control.

Implication for Nursing Education

Implication for nursing education may be based on the study findings and should be included in continuing education, undergraduate and graduate education for nurses. Since nurses have more contact with clients than any other health care providers, nurses have more

opportunities to influence clients' health behavior. The health belief model should be incorporated in nursing education. The model can be used as a health assessment tool to assess its theory and its applicability for clinical practice. The model can serve as a framework for assessment and evaluation of outcome of client care.

Study findings of client's perception of illness severity in relation to compliance with treatment have shown that positive relationships exist. Among the implications of these findings it is recommended that assessment using the health belief model be incorporated in the curriculum to enhance nurses understanding of client's perceptions of their illness and how it affects their willingness to carry out the therapeutic regimen. According to Given and Given (1983) it is the client's perceptions of their illness rather than the illness itself that will influence their behavior. In an in-service program an assessment tool formulated from the health belief model could be introduced to nurses to use for assessment and evaluation of clients. This would increase nurses understanding of hypertensive clients with whom they interact. Perceived illness severity should be incorporated into nursing diagnostic categories and perhaps dichotomized as "realistic" and "unrealistic" perceived illness severity and presented for clinical testing. Tested interventions based on diagnostic labels could aid in identifying clients at risk for noncompliance.

According to Gordon (1982) nursing diagnoses are used as a basis for planning interventions and evaluating outcomes. Outcome of care for clients could be evaluated and documented for cost-effectiveness and third-party reimbursement. This would be crucial to nurses working in expanded roles to document what they really do and the cost-effectiveness of the nurse clinician. Since nurses provide care to a large number of hypertensive clients in ambulatory care setting, nursing diagnoses would serve as guidelines to organize care for clients. The U.S. Department of Health, Education, and Welfare (1980) has written goals for detecting hypertension. Their primary goal is early detection, and their secondary goals are: increased knowledge of consumer, screening all clients who have sought health care, setting up methods to screen outside the health care system, and referral and follow-up on all persons with hypertension. The nurse could be instrumental in helping to achieve these goals.

Study findings, as well as pertinent literature, support the view that perception of illness severity, barriers to treatment and compliance are influenced by a number of factors. The findings in this study contribute to nursing education by indicating there is a need for nurses to assess the hypertensive's client perceived illness severity, barriers to treatment in relation to compliance so that interventions can be implemented.

Additionally, it is recommended that future research

be conducted in graduate education regarding nursing interventions to increase compliance and control hypertension. This would add to the knowledge base of nursing practice, and future theory development.

Recommendations for Future Research

A number of recommendations for future research are suggested from this study. The suggestions for improvements of the design include the following:

Replication of the study with samples from a variety of health care sites, such as Health Maintenance Organizations, internal medicine and private physicians to determine how those individuals perceive the severity of hypertension and relationship to compliance behavior. In addition using random sampling thereby allowing every subject to have an equal chance of being assigned to any group, this would increase the generalization of the findings, and enhance the possibilities of obtaining statistically significiant correlations.

The sample subjects in this study had hypertension considered out of control (diastolic $\geq$ 95mm Hg) a comparison of subjects with controlled hypertension (blood pressure within normal limits) could be included to determine their perception of the severity of their illness in relation to compliance, and how it compares to perceptions and compliance for individuals out of control.

Replication of the study using samples with other chronic illnesses, such as diabetes, obesity, asthma or chronic obstructive lung disease, to determine their perceptions of illness severity. Other illness such as chronic obstructive lung disease may have more dramatic effect on the client since the symptoms are progressive. One would be able to evaluate the client's perception of the severity of the illness in relation to compliance. In addition, to determine linear progression of illness in relation to perceived severity, data could be collected at different points over time, three year, and five year intervals. This would provide insight into client's perception of illness as it becomes more pronounced in relation to compliance with treatment.

A study should be conducted to compare a sample of obese and nonobese hypertensives to determine if there is a difference in their perception of illness severity in relation to compliance to treatment. In addition, one could assess how the compliant individual personality differs from the noncomplier. Since obesity is a chronic illness that poses a threat to one's health, and is linked to other conditions appropriate action to lose weight may be taken for other reasons than health such as body image, and social acceptance. Also obesity may not be perceived as an "illness" in sense of the term to some individuals. Data collected on such a sample would be useful to nurses to use as guidelines for nursing interventions of the obese

and hypertensive clients.

Summary

In sum, the overall value of this study emphasizes that there still remains a large number of hypertensive clients who are noncompliant to treatment. The nurse is in a key position to manage this chronic illness. Findings from this study indicate that there is a need for nurses to assess the client perceived illness severity, barriers to treatment, in relation to compliance. The data received would provide a basis for nursing interventions. Through research, the validity of study results are documented. This would contribute to the testing of nursing theory which could be integrated with past research and utilized for future theory development. Therefore, nursing management of hypertensive clients through research based practice would be documented.

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APPENDICES

APPENDIX A

CONTACT LETTER

To improve the care we give patients with hypertension, our medical and nursing staffs are working with researchers at Michigan State University to help patients better manage their hypertension. 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 hypertension 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,

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 _____ 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 serivce 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 what is required of me as a participant and agree to take part in this study.

Signed _____
(Signature of Patient)

Date (_____)

APPENDIX C

INSTRUMENTS

BELIEFS ABOUT HIGH BLOOD PRESSURE

EFFECTS OF HIGH BLOOD PRESSURE

HYPERTENSION PATIENT INTERVIEW

HYPERTENSION INTAKE INFORMATION MEDICAL RECORD AUDIT

SOCIO-DEMOGRAPHIC

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.

PLEASE ANSWER ALL QUESTIONS IN THE FOLLOWING WAY.

IF YOU STRONGLY AGREE WITH THE STATMENT, 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 AGREE WITH THE STATMENT, THEN CIRCLE STRONGLEY DISAGREE.

Comparative Seriousness

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

Barriers to following diet

7. Following my diet does not interfere with my normal daily activities.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

8. I am always hungry when I stick to my diet.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree Undecided Disagree Strongly
Agree Disagree

Barriers to taking medication

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

Strongly Agree Undecided Disagree Strongly
Agree Disagree

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

Strongly Agree Undecided Disagree Strongly
Agree Disagree

17. If I take my medications I may become dependent upon them.

Strongly Agree Undecided Disagree Strongly
Agree Disagree

18. I am not interested in taking my medications regularly.

Strongly Agree Undecided Disagree Strongly
Agree Disagree

19. Taking my medications interferes with my normal daily activities.

Strongly Agree Undecided Disagree Strongly
Agree Disagree

20. I must take my high blood pressure medications even if I don't think I am getting better.

Strongly Agree Undecided Disagree Strongly
Agree Disagree

21. I believe that my medications will control my high blood pressure.

Strongly Agree Undecided Disagree Strongly
Agree Disagree

22. Taking medication is something a person must do no matter how hard it is.

Strongly Agree Undecided Disagree Strongly
Agree Disagree

Efficacy of Treatment

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

24. 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

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

27. 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

Job Therapy Conflict

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.

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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 WORNG ANSWERS.

PLEASE ANSWER ALL QUESTIONS IN THE FOLLOWING WAY.

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.

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

Psychosocial Effects

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 interefere 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

Impact of Hypertension on Work

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

Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree

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

Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree

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

Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree

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

Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree

26. 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

27. 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

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

Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree

HYPERTENSION PATIENT INTERVIEW

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

Compliance with Medications

	A Med. No. 1	B Med. No. 2	C Med. No. 3	D Med. No. 4	E Med. No. 5
1. Do you take _____ (name-med) (READ CATEGORIES. CIRCLE ANSWER IN QPPROPRIATE 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 prescribed dosage of _____ (name-med) (READ CATEGORIES. CIRCLE ANSWER IN QPPROPRIATE 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

3. In the past two weeks have you taken _____ at (name-med) recommended time of day

(READ CATEGORIES. CIRCLE ANSWER IN QPPROPRIATE 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

Compliance with Diet

4. Would you say you follow the diet suggested (READ CATEGORIES)

1. All the time
2. More than half the time,
3. Half the time,
4. Less than half the time, or
5. None of the time?

5. When you're away from home, have you followed the diet prescribed (READ CATEGORIES)

1. All the time
2. More than half the time,
3. Half the time,
4. Less than half the time, or
5. None of the time?

Compliance with Exercise

6. Would you say you follow the exercise recommended (READ CATEGORIES)

1. All the time
2. More than half the time,
3. Half the time,
4. Less than half the time, or
5. None of the time?

7. When you're away from home, do you follow the exercise prescribed (READ CATEGORIES)

1. All the time
2. More than half the time,
3. Half the time,
4. Less than half the time, or
5. None of the time?

HYPERTENSION INTAKE INFORMATION MEDICAL RECORD AUDIT

1. How many years has the patient had hypertension? (write in) ____.

2. What was the Patient's highest blood pressure 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. Normal	2. Twenty percent over ideal body weight
9. Weight not recorded	3. Less than 20% over ideal body weight

SOCIO-DEMOGRAPHIC

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 staus? (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)

00.	Below $5,000 ___	05.	$13,000-$14,999 ___
01.	$5,000-$6,999 ___	06.	$15,000-$16,999 ___
02.	$7,000-$8,999 ___	07.	$17,000-$19,999 ___
03.	$9,000-$10,999 ___	08.	$20,000-$24,999 ___
04.	$11,000-$12,999___	09.	$25,000 or over ___

APPENDIX D

TABLE 4

TABLE 5

TABLE 6

TABLE 4. THE RELATIONSHIP BETWEEN AGE, INCOME, DURATION OF HYPERTENSION AND 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
Comparative Seriousness	-.0335	-.0139	.0946
Psychosocial Effects	-.0711	-.1563*	-.0041
Job-Related Severity	-.0695	-.0165	-.1613
Medication Barriers	-.0883	-.1170	-.0303
Diet Barriers	-.2240**	-.0520	-.1103
Efficacy Barriers	-.1060	-.1311	-.1054
Job-Related Barriers	-.0664	-.0710	-.0714

*$\leq$.05 significance
**$\leq$.01

TABLE 5. THE RELATIONSHIP BETWEEN SYSTOLIC AND DIASTOLIC BLOOD PRESSURE AND 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
Comparative Seriousness	.0506	.0337
Psychosocial Effects	.0270	.0080
Job-Related Severity	.0541	.1197
Medication Barriers	.0950	.1187
Diet Barriers	-.0903	.0298
Efficacy Barriers	-.0050	.0454
Job-Related Barriers	.1024	.1891*

*<.05 significance

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

	Sex	Marital Status	Race	% Overweight
Medication Compliance	-.0437	-.0959	.1165	-.0360
Dietary Compliance	-.0559	-.0368	-.0703	-.2205**
Exercise Compliance	-.2718*	-.0570	-.1745	-.2243
Comparative Seriousness	.1229	.0521	.0339	-.0885
Psychosocial Effects	-.0332	.0093	.1504*	.1612*
Job-Related Severity	-.0941	-.0428	.0369	.0357
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

* ≤ .05 Significance
** ≤ .01
*** ≤ .001